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PREFACE

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The pandemic crisis has dominated our economic, political and personal life for more than a year now. It was therefore natural to also put it centre-stage at this year's CEEeGov. The question was: Is CoV-19 a driver for eGovernment?

Undeniably, the pandemic has changed our patterns of life considerably including usage of the digital media for working, shopping and communicating. In Public Administration, sending administrative staff to home office due to a pandemic "lockdown" brutally exposed shortcomings in public-sector digitization: Crime suspects had to be released because public prosecutors could not issue warrants from their home offices, building permits were not granted for months for lack of electronic files, school education virtually breaking down because neither necessary infrastructure nor useful concepts and content were available for remote teaching. One could be excused for gaining the impression that the private sector was largely better prepared for the pandemic than the public sector.

This raises the question, whether Corona may turn out to be the ultimate boost for digitization in this domain and whether administrations with better levels of digitization also fared better during these months, but also whether there are limits to what can be done digitally.

A number of contributions deal with the role eGovernment plays in managing the pandemic, such as vaccination logistics and contact tracing.

This proceedings volume covers a wide range of aspects of this general topic from technical consideration to empirical validation. Of course, also contributions on other eGovernment and eParticipation topics can be found.

The authors are confident that this volume will contribute to the understanding of how CoV-19 changes the way how we see eGovernment and its pace (and possibly direction) of implementation.

The editors, Budapest, Chișinău, Cluj-Napoca, Ludwigsburg, Münster, Vienna, May 2021

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eGovernment and the Pandemic I

ACCELERATION FACTOR PANDEMIC: A SYNTHESIS OF E-GOVERNMENT MATURITY MODELS AND PUBLIC ADMINISTRATION EMPLOYEES' PERSPECTIVE

Julia Kaesmayr[1], Michael Schorn[2] and Anna Steidle[1]

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Abstract
The Covid-19 pandemic and the Online Access Act (Onlinezugangsgesetz – OZG) are forcing Germany's public administration to accelerate digital transformation in general and the digitalization of agencies on federal, state and municipal level in particular. To assess this endeavor's progress, existing e-Government maturity models were evaluated. The majority of models mainly focus on technical characteristics of an administrative act, while disregarding the importance of (1) public servants, (2) their work situation and (3) organizational processes. It is the latter three determining successful digitalization. Consequently, we fuse previous e-Government maturity models with the individual perspective of public servants including internet-based work, virtualization of teams and societal participation. This paper describes the synthesis of a model, its advantages and limitations including next steps towards its empirical validation.

Keywords: e-government maturity models, digitization measurement**,** Onlinezugangsgesetz (OZG)

1. Introduction

While the Online Access Act (Onlinezugangsgesetz – OZG) has been in place since 2017 as a measure to foster digital transformation towards e-government maturity in Germany's public sector, digitalization of agencies on federal, state and municipal level in particular is progressing slowly [29]. Whereas citizens and companies have become accustomed to execute common tasks online, for instance shopping, banking or subscription cancellations, handling information and communication technology (ICT) on a daily basis, when it comes to administrative services, it is often still a case of showing up live and in person at the relevant agency [8].

To comprehend the pressure Germany's public administration is facing the current situation must be explicated. By the end of 2022 585 administrative services have to be available online. This entails, a service is entirely processed digitally and online including its notification. Up to now only 38 services have reached the described degree of digital execution[1]. This result is all the more critical given the 585 digitalized services to-be consist of around 1.900 administrative procedures [40] according to the catalogue of public services (LeiKa).With regard to municipalities the pressure is even higher, for two reasons: First of all, municipalities are responsible for the execution of a great deal of these procedures and, consequently, for their availability online. Although municipalities are not mentioned in the OZG explicitly, with the passing of the law a dispute arose whether

[1] For an updated status see https://informationsplattform.ozg-umsetzung.de.

municipalities are subject to it after all. Second, most parts of administrative proceedings are in care of municipalities and therefore are completed within. The Corona pandemic has unequivocally and irrevocably forced municipalities to provide public administration services online. As such, the pandemic has given a powerful boost to digitalization in municipalities [13].

Between the months of August and November 2020, 600 municipalities were questioned about their (digital) state in a representative survey conducted by the German Association of Towns and Municipalities (Deutscher Städte- und Gemeindebund – DStGB). Results yielded the majority views the pandemic as a driver of digitalization and, hence forth developed and implemented corresponding projects. Accordingly, the budget for further digitalization projects in 2021 was increased. With regard to survey results two problems have emerged. (1) Although the pandemic has been identified as driver for digitalization for public administration in general, 56% of respondents stated they had no strategy in place for the digital transformation. This was particularly evident for small municipalities lacking necessary resources. (2) These small municipalities also lack skilled employees (47%) versed in handling digital tools, for example setting up and leading a video conference and collaborating in document management systems. Despite being autonomous concerning the implementation of the OZG, municipalities would prefer to be given guidelines (76%) by the federal government and from politics receive (more) financial support (85%) and expert advice (43%). However, to ensure guidelines, advice and funding of digitalization projects attain the aspired effect it is necessary to denominate digitalization correctly. This way (1) digitalization deficits and status quo can be evaluated accurately and (2) its consequences may be predicted validly. Consequently, correct conclusions may be drawn and recommendations ought to be derived reliably.

Up to now, digitalization of administration has often been described using e-government maturity models, for instance Hiller & Bélanger [20] , Moon [30], Layne & Lee [27] and more recently Fietkiewicz [17], Distel & Becker [14] and Jeong [22]. Schorn et al. [38] also built on the well-known models in their study of digital administrative services around business start-ups. According to their findings greater digital maturity does not necessarily go hand in hand with higher quality in terms of administrative action, a series of interviews with public servants revealed [38]. This is because e-government maturity models so far do not integrate the employee's perspective deliberately. The intentional consideration of public servants' view points towards industrial and organizational psychology. Successful digitalization largely depends on public organizations' and their servants' willingness and ability to transform procedures and work habits. So far, e-government maturity models cannot describe digitalization to capture the full range of consequences it has on public administration and stakeholders. This calls for an interdisciplinary approach wherein e-government maturity and individual behavior are integrated. In doing so we are in line with the newly formed field of behavioral public administration which combines theories and methods from psychology and public administration research [18]. Our main contribution resides in the development of a synthesized model uniting the divergent research areas, which in the future may aid in providing a more detailed view into positive and negative ramifications digitalization has on good administration.

2. Methodological Approach

Before we take a closer look at the methodological approach, it is necessary to clarify our understanding of the terms digitize and digitalize to prevent misconceptions. Often the terms *digitize* and *digitalize* are used synonymously. We are utilizing the term *digitalize* throughout this publication to emphasize the transformational processes including all parties involved. However,

we are differentiating between cause - digitalized work, communication and processes - and effect - change within organizations including societal implications. Though important for electronic political participation for instance, the latter are not subject of our model.

The model synthesis was conducting using dialectics. Dialectics as a method applies in two ways: Debate and didactic. We focus on the didactic approach wherein two or more different positions instruct one another generating ideas. With regard to the fact that dialectics can be followed back to Plato and Aristotle [4], the approach largely stayed the same. In the beginning there often is a complex situation, problem or conflict that requires a (re-)solution. The logic of dialectics demands the presentation of a central question to begin with. Concurring (thesis) and disagreeing (anti-thesis) arguments are formulated. The opposing arguments then are contrasted and discussed. Goal is to reach a conclusion (synthesis).

Having opted for this approach, we are not alone but in good company with Berniker and McNabb [5]. The authors adapted the method to apply it to anecdotal data on technology transfer gathered through expert interviews. From the data retrieved, three models could be derived. The models were contrasted and then synthesized into a model of their own creation.

The synthesis of our digital model requires four steps: 1. Evaluating literature on e-government maturity, internet-based or digital work, so that the dialectic approach (‘dialectic inquiry’) by Berniker and McNabb [5] can be adapted to our requirements and applied. 2. Compiling criteria and assumptions of each argumentative side. 3. Consequently, we are laying out and dialectically discussing contradictions as rationale for the synthesis of our mode. We utilized an administrative reference procedure (own development) to our aid. 4. Presenting the synthesized model and constructs

3. Conducting a Dialectic Inquiry

We approached the body of literature by dividing it into two domains: 1. E-government maturity models and 2. Internet-based or digital work. We describe each domain’s literature analysis separately. In doing so we create the basis for applying dialectics. E-government maturity models mainly disregard the interaction of internet-based work and public servants, wherein focusing only on individuals digital work and environment, e-government maturity is being neglected. The following two sections set the starting point

3.1. Step 1: Analyzing E-government Maturity Models

Continuing the string of thoughts from the introduction and following the methodological approach explained meta-studies on e-government maturity models conducted between the years 2010 and 2021 were our focal point of interest. We were able to identify seven publications: Kawashita [23], Khanra & Jospeph [24], Nielsen [32], Almuftah et al. [1], Chaushi et al. [9], Fath-Allah et al. [16] and Lee [28]. The studies contained from 11 up to 26 model comparisons based on ideas developed by consulting firms (private sector) and scholars. All seven studies contained both types of models.
With respect to Nielsen [32] it appears that the field of empirical examinations on e-government maturity models is not particularly extensive, hence a dominance of studies with a qualitative meta-synthesis approach. Except for Kawashita et al. [23] whose recent (2020) study only dealt with meta-analysis of meta-analytic level studies the remaining six studies were qualitative synthesis. This provided an ample baseline. Nielsen offered extensive insight into existing models in 2016 through literature review, 2019 Khanra & Joseph added to it by extending the view through a meta-

ethnographic [33] approach. Essentially the authors, too, identifying the intellectual commonality of e-government maturity models and translated each study's denomination into one another's to express their finding.

Reaching the point of our insight, certainly not a novelty, but a practical and lucid method, we offer an overview of our findings of commonalities in e-government maturity models. Following we show the results of comparing the studies identified.

Regardless the point in time of publication and the (meta-)level of analysis, some authors are represented in all studies, as are Hiller & Bélanger [20] and Layne & Lee [27]. Not only that their publications of e-government maturity models can be classified as pioneering in the sense of trailblazing, their perspective complement each other. Hiller & Bélanger [20] offer the nowadays commonly known five dimensional perspective: information, interaction calling it two-way communication, transaction, integration and (political) participation on e-government maturity. Layne and Lee [27] direct the attention towards vertical and horizontal integration, taking on a customer centric approach [2], but using a similar vocabulary describing their approach. There are e-government maturity models with variations in the number of stages (e.g. Wescott [42]) as can already be observed in the early years of their development. However, the multitude of stages, such as those listed in Nielsen's analysis, can be traced back to Hiller & Bélanger's [20] five stage model as referred to above. All encompassing, Hiller & Bélanger [20] and Layne & Lee [27] can be viewed as basis for most e-government maturity models developed, e.g. Siau & Long [39] and Wescott [42], empirically examined, e.g. Moon [30], Coursey & Norris [10], Fietkiewicz et al. [17], and synthesized, e.g. Almuftah et al. [1], Chaushi et al. [9], and Lee [28]. If the dimensionality was not adopted, most e-government models, with only few exceptions (e.g. Janowski [21]), can be traced back to the original five dimensions. Alternatively, their conceptualization can be transferred to its structure.

3.2. Internet-based Work

Since its inception the topic of internet-based or digital work has grown in interest especially with regard to effects on employees, their social life and organizations' profitability (e.g. Korunka & Kubicez [26], Rice [35], and Ruiner & Wilkesmann [37]). To get an overview of how vast the body of literature on internet-based work and its characteristics is, we conducted four different types of literature investigations between the years of 2000 and 2021. Three searches were executed utilizing google scholar, one using EBSCO. The google scholar search was conducted with key word variations internet-based work (unquoted) and 'internet-based work' (exact terms = quoted) to narrow down the results. 80 studies were found. Exchanging the key words with 'digital work, framework OR model' (unquoted) the pool of publications could be enriched by 46 to a sum of 126 publications. The EBSCO search was conducted with the parameters (digital work) OR (internet-based work) in title, supplemented with the key words (framework) OR (model). 135 publications were listed including 99 duplicates, providing 35 results in scientific journals, eBooks and books. In total 161 publications were screened.

Our analysis of features characterizing digitalization suggests the following: (1) There are studies dealing with digitalization and work. However, the problem is that these studies capture the subject on the basis of perceived or expected implications, often from the extreme position of the technophobic or technophile as described by Ruiner & Wilkesmann [37]. This approach does not capture characteristics of digitalization in its entirety lacking the application of general psychological principles to work-related challenges, e.g. Köhler et al. [25] and Arnold et al. [3]. (2)

In addition, there, too, are studies that examine single features of digitalization, yet again not capturing the full range of behavior in the digital work place. These include, for example, Poethke et al. [34] or Botthof & Hartmann [7].

Hertel et al. [19] based their conceptualization of internet-based work on recent literature, e.g. Derks et al. [12], Dennis et al. [11], and van Iddekinge et al. [41]. The analysis suggests five core characteristics:

(1) Accessibility: While a network structure offers access to information within (internal) an organization the internet, being external from the organizations point of view, gives access to a huge variety of data at any given point in time.
(2) Interactivity: As just referred to, network structure connect computer which can form systems. Such systems enable fast and vast exchange opportunities not only for data but also for communication rendering it interactive.
(3) Reprocessability: With the use of internet comes the possibility for reprocessing information and tracking processes since it can be retrieved upon request at any point in time. Consequently, data storage and the 'handling of *big data*' is an important task.
(4) Automatization: By means of computers pre-programmed, monotonous, and repetitive works can be executed without human interaction giving this characteristic the potential to provide relief of such tasks.
(5) Boundary crossing: These capabilities are mentioned ultimately allowing computer systems to provide services across the globe independent of geographic location and language. This pervasion of technology into professional and social life increases the chance of interconnectedness while simultaneously forcing the relevant (information and technology) skills to be fostered and further developed.

3.3. Step 2: Assumptions and Counter Assumptions

So far, we analyzed meta-studies on e-government maturity models and searched for conceptualization of internet-based work to capture digitalization of public agencies and administrative action. In the following comparison we show two tables address assumptions in the first and counter assumptions in the second column. As described in the introduction, and against the background of Behavioral Public Administration, we regard the domain of internet-based work as (inter-)action of public servants and therefore as behavioral factors of digitalization.

The main assumption of the analyzed e-government models to describe the digitalization of a public administration emanates from the procedure.

E-government Maturity Model Perspective	Internet-based Work Perspective
Assumptions	Counter Assumptions
Administrative action is based on procedures.	Administrative action is based on the action of public servants.
Procedures determine the use of digital technology.	Public servants apply expertise to execute digital tasks and services.
Digitalization of administrative action means the use of tools to execute tasks and deliver services.	Digital procedures require digital skills.
More digital tasks and services mean higher quality.	The increase of digital tasks and services do not mean better quality.

Table 1: The e-government model perspective: Assumptions and counter assumptions.

The main assumption of core characteristics to describe digitalization of public administration rests on the action of public servants.

Internet-based Work Perspective	E-government Maturity Model Perspective
Assumptions	Counter Assumptions
Administrative action is executed by public servants.	Administrative action is determined by procedures.
Public servants apply expertise to execute tasks and deliver services.	Public servants only execute procedures.
Digital technology has an impact on public servants' workload and work quality	Public servants experience neither additional demands nor special resources from digital work. Processes may differ but without touching psychological needs of bureaucrats.
Digital technology is utilized in order to manage and facilitate workload and to deliver services.	The increased use of digital technology for the fulfilment of tasks and services do not correlate with better quality.

Table 2: The Internet-based work perspective: Assumptions and counter assumptions.

3.4. Step 3: Contradictions and Commonalities

In this step, we lay out contradictions of opposing assumptions of e-government maturity models and internet-based work core characteristics as rationale for the synthesis of a new model. To emphasize the contradictions, we exaggerate both domains and their views to their extreme to illuminate logical flaws and insufficient considerations [5]. We carry out this discussion by utilizing an administrative reference procedure concerning the establishment of legal relationships (German 'rechtsgestaltender Verwaltungsakt', e.g. permissions) as a comprehensive guideline. This reference procedure is based on processes which stem from the work of digitalization labs to implement the OZG. The procedure entails eight steps.

		Contradictions from the	
Steps	Operations in a Reference Procedure	E-Government Maturity Model Perspective	Internet-Based Work Perspective
1	Advice/information on rights, obligations & documents	It is sufficient to provide advice and directions through digital technology, e.g. websites, embedded videos and dedicated platforms for up- and downloads.	Advice and directions can only be provided with human interaction in order to be accepted and understood. Information and interaction are being offered on- and offline.
2	Receive notification	Auto-generated notifications are sufficient to inform applicants.	Notifications are personalized to address the applicants' subject matter comprehensively.
3	Inspection of formal correctness and responsibility	These steps don't require human interaction and can be automatically executed by a dedicated software. Incorrect forms/requests out of jurisdiction can be rejected fast & easy.[2]	Public servants execute this step supported by digital technology in order to act upon administrative regulations, the law and in the best interest of applicants.
4	Review of completeness of documents		
5	Conclude collection of documents or request additional		Public servants act upon the guidelines of good administration by applying digital discretion. This allows public servants to follow their legal directive, the agency mission and act in the best interest of applicants.
6	Substantive examination of status recognition or requirements for a permit	Examination and determination are automated according to administrative procedure (order of steps), regulations and criteria the law mandates.	
7	Status determination or authorization respectively denial of a permit		
8	Issuing and notification of the ruling	Auto-generated notifications are sufficient to inform applicants. Only standardized reasonings are provided.	Notifications are sent personalized to address the applicants' subject matter precisely and provide background and reasoning underlining the decision.

Table 3: Comparison of contradicting arguments of e-government maturity models And internet-based core characteristics

The intention of this table is to contrast the domains' contradictions. Due to the constraints of this paper we cannot delve into all possible strings of argumentation, and therefore restrict ourselves to the most important. When considering e-government maturity models to the extreme of fully digitalized administrative procedures and human interference, i.e. helping behavior towards applicants, job autonomy in form of discretion and control over own actions would seize to exist. With procedures as focal points human interaction would only be optional, but no longer essential to administrative action. An example: The application for a business permit. Under the assumption that a decision-making process of an administrative act would occur entirely digitalized, solely the examination of its results and the issuance of the decision remained a task of public servants (or case manager) as representative of their agency (organization). This would reduce public servants' workload and free up capacities. However, it would also (1) pose threats to their work and (2) inherent risks, although a high degree of digitalization would have been achieved in accordance with e-government maturity as could be seen with Schorn et al. [38]. The consequence is two folded. First, public servants could no longer fulfill their tasks by helping and interacting with applicants, applying discretion and controlling single actions necessary, because they would hardly

[2] In a fully automated system step 5 is unnecessary since incorrect or incomplete forms are rejected immediately and the request of additional documents then would be obsolete due to prior rejection.

be involved in such procedures. Second, assuming administrative procedures have a divergent degree of complexity, the more complex an administrative procedure appears, the more difficult its digitalization. If, in our example the administrative procedure is digitalized inadequate, incorrect decisions may occur, which in turn can be challenged in court, most likely leading to a higher degree of dissatisfied applicants.

Looking on the other side - taken to the extreme - internet-based work would no longer entail the processes of an administrative procedure. Instead, individual actions performed in the digital workplace would be highlighted. This perspective may not seem as extreme, but if core and impetus for digitalization in public administration no longer factor into the equation: what for?

3.5. Step 4: Synthesis

We can summarize, that the domains show stark contrasts but also noticeable conceptual similarities. Neither conceptualization describes digitalization in the public sector sufficiently. Following, we describe the commonalities of both domains followed by the description of our model. To add to it we provide examples to point out the levels of interaction of involved parties.

1. Information (e-government maturity =1) and accessibility (internet-based work =2) both describe the access and provision of information for applicants. At the content level, this dimension describes the dissemination of and access to data and information on applications and procedures by public administration. Data and information are offered via digital communication channels. Recipients of data and information are employees, applicants, and individuals or groups affected or to be involved. For applicants this means, for instance internet pages of a federal state with concerns into life situations and services including required documents are provided. For employees it could be, e.g. intranet pages with information on legal bases, administrative regulations, contacts, and so forth.
2. Interaction (1) and interactivity (2) depict the vast exchange opportunities between public servant, hence, government and applicant. This dimension describes multidirectional communication of applicants, involved persons and groups with public administration. This exchange involves all digitally available communication channels. Concerning employees, interaction deals with digital communication, cooperation and collaboration between colleagues within their agency and across other agencies. An example: Applicants can contact case managers via chat or make an appointment via an electronic calendar to clarify existing questions online through suitable tools (e.g. video call). Residents living near a planned major construction site can find events for the public hearings wherein they can part take interactively. Employees can discuss an issue with colleagues of other agencies who ought to be involved in their case.
3. Integration (1) appears to be the natural progression of information and interaction. It refers to the incorporation of functionalities across different levels of government and agencies [27]. Hertel et al. [19] name this dimension boundary crossing (2). We associate the dimension to applicants' engagement in electronic governance by pervasion of technology. Agencies may access automatic or manual data transfer to other agencies without the need for manual conversion of data prior to transferring it. Applicants have access to digital communication with agencies (e.g. portals) without (media) disruption[3]. While horizontal integration links authorities or services of agencies at the same level, vertical integration links authorities or

[3] Media disruption here refers the need to switch from digital to analog and back to digital during the course of an administrative procedure.

services with those of other levels. For instance, applicants experience integration, in the offer of a portal through which required documents for a permit can be applied for. Case managers experience integration, for example, in the form of the automated transfer of data from another authority into their own specialized application.

4. Data storing and the reprocessability of information (2) is a result of technical advancement based on Hertel et al. [19]. There is no direct equivalent in e-government maturity models. This dimension involves the storage of data on persons and facts within the scope of a procedure. Data of applicants can be retrieved by personnel depending on the degree of authorization in order to be (re)used or monitored in a procedure. An example: In case of a building permit, architects can retrieve floor plans online for the submission of the application. The relevant personnel of the housing agency can subsequently consult notes and the status of the procedure in an established electronic construction file.
5. Transaction (1) and automatization (2) describe the transmission of data and information. As part of an administrative process declarations of intent and rights are transferred in the broadest sense. The associated processing can be digitally supported up to fully automated execution. Transactions include, for example, the transmission of applications and notices for a permit, but also the transfer of a fee. Transaction concerns public servants and applications.

We have laid out communalities and described the dimensions. What about the contradictions? We resolve the contradictions by dividing administrative procedures, public servants' and team behavior including societal participation into levels of interaction. This way intra- and extra-organizational [23, 31] interaction are factored in. Stages of digitalization as in e-government maturity models no longer apply to this model since digitalization may occur to a certain extent in two dimensions at the same time on different levels of interaction between agency (public servant) and citizen (applicant).

To be able to assess the degree digitalization in the future constructs for each dimension were derived following the C-OAR-SE model of Rossiter [36]. According to the author for each rater (entity) a construct must be defined, else the model is inadequate for operationalization and quantitative assessment. Following, we show the current state of the model including its constructs. In preparation of future item development, the model was evaluated by through seven qualitative expert interviews regarding construct completeness and clarity.

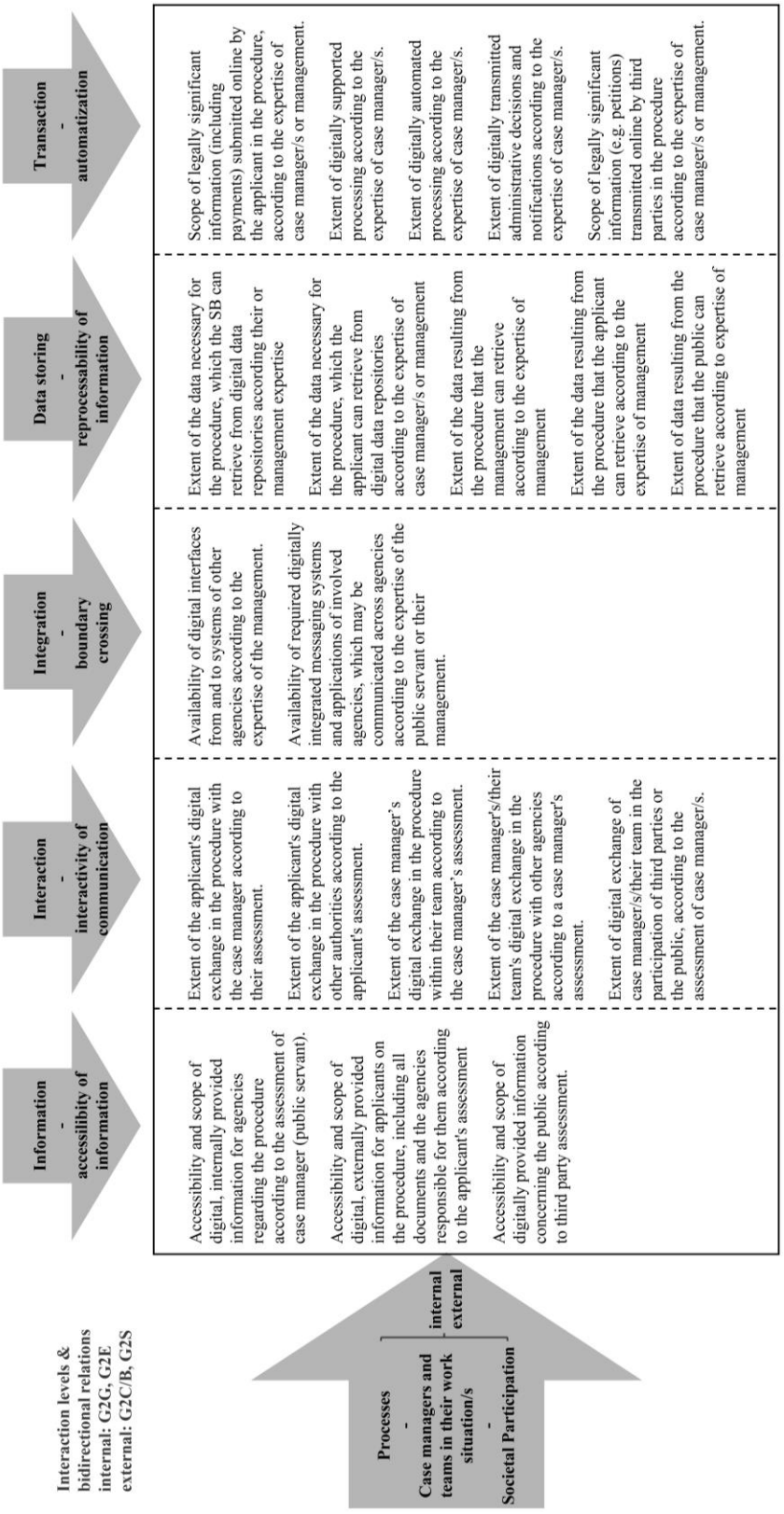

Figure 1: Model for Capturing the degree of Digitalization in Public Administrations (CDPA)

4. Discussing the Dialectic Approach and Future Research

This model was derived from the literature and synthesized according to dialectics following Berniker & McNabb's [5] inquiry technique. The development of its constructs followed Rossiter's C-OAR-SE procedure [36]. The accusation of arbitrariness stands, but may only be credibly applied to the selection of criteria for deducing its dimensions and the aggregation of levels of interaction opposed by seven expert interviews. On the basis of the revisited model, construct validity may be evaluated through content (content validity) and expert opinion. The items yet to be generated and its conceptual structure can then be assessed with quantitative methods.

The higher goal of this endeavor was to develop a model applicable in the field. Future longitudinal studies will need to examine whether and how the proposed dimensions of digitalization can predict administrative outcomes by shaping public servants' work and consequently their work behavior. Given the evidence of such predictive validity, long-term research with the current model might provide additional practical insight: It may furthermore indicate how digitalization may support good administration and yield towards beneficial transformation practices in order to attain the goals of the OZG.

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DEGREE OF EGOVERNMENT DEVELOPMENT AND LEVEL OF INFORMAL ECONOMY – A NUDGE FROM THE COVID-19 PANDEMIC?

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Abstract
Across the whole world, more than half of the global workforce have their main employment in the informal economy. EU member state factsheets suggest that undeclared work in its various manifestations is a real problem for all countries, hence the need for appropriate tackling strategies, from a multitude of theoretical and practical perspectives. One of these, the neo-institutional theoretical perspective, considers that individuals` behaviour is shaped by the institutional environment they are embedded in, defined by three pillars namely, the regulative, normative and cultural-cognitive pillars. Based on this perspective, in our study we aim to investigate, at exploratory level, the relationship between the degree of development of e-Government services and the level of informal economy, with a specific focus on the effects of the Covid-19 pandemic on people's perceptions about this relationship in several EU countries with high percentages of undeclared work and a lower degree of e-Government development. We employed secondary data extracted from previous surveys (Eurobarometers, eGovernment benchmarks, UN eGov Survey), combined with a quick online survey of a small number of experts' perceptions about undeclared work and e-Government services during the pandemic in one of the analyzed countries. The study is exploratory and can serve as a starting point for future tests of the new theoretical developments suggested in the field.

Keywords: *informal/shadow economy, e-Government development*

1. Introduction – context and aim

Decent work and economic growth, reduced inequalities, sustainable cities and communities – they are three out of 17 sustainable development goals of our world [38]. All three are interconnected, on one side, and connected to informal or shadow economy issues, as well as public administration and e-governance, on another side. Covid-19 pandemic added an unwanted, unforeseen, and terrible burden, with huge consequences on the world system – considering the necessary global approach provided by a system thinking perspective [11], [23]. Governments in all countries need to find solutions to these huge economic and societal issues, and researchers from all fields have to analyze the situation from various disciplinary perspectives. Our study carves out a very small piece of the big puzzle, namely the relationship between e-Government development and shadow economy, with the intention to explore ways through which improvements in e-Governance could contribute to the lessening of the grey, informal economy – and thus contribute to a better, sustainable development. In order to do this we explored the involved concepts – shadow/informal economy, e-Government development – together with factors of potential interaction on this relationship – e-Participation, trust, ICT and media communication – digital skills, citizen perceptions for a group of

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eight Central and Eastern European countries. The main aim of our exploratory study is to draw attention on possible alternative ways to decrease shadow activities.

2. Conceptual issues

What is informal, grey or shadow economy, and how can we measure it? The question is old, going back to the 70s, and still controversial, both theoretically and operationally. If we are not able to define it, we are not able to measure it, and as a consequence cannot find solutions for decreasing it. Are there differences between informal economy, sector, work or employment? As the International Labour Organisation states, there are differences, and all the nuances are quite important from a technical point of view, when a country needs to report various statistics for official measurements:

"The following can serve as an easy reference for the terminology associated with informality and their technical definitions: (a) Informal economy All economic activities by workers or economic units that are – in law or practice – not covered or sufficiently covered by formal arrangements (based on ILC 2002) (b) Informal sector A group of production units (unincorporated enterprises owned by households) including "informal own-account enterprises" and "enterprises of informal employers" (based on 15th ICLS) (c) Informal sector enterprise Unregistered and/or small-scale private unincorporated enterprises engaged in non-agricultural activities with at least some of the goods or services produced for sale or barter (based on 15th ICLS) (d) Employment in the informal sector All jobs in informal sector enterprises (c), or all persons who were employed in at least one informal sector enterprise, irrespective of their status in employment and whether it was their main or a secondary job (based on 15th ICLS) (e) Informal wage employment All employee jobs characterized by an employment relationship that is not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits (based on 17th ICLS) (f) Informal employment Total number of informal jobs, whether carried out in formal sector enterprises, informal sector enterprises, or households; including employees holding informal jobs (e); employers and own-account workers employed in their own informal sector enterprises; members of informal producers' cooperatives; contributing family workers in formal or informal sector enterprises; and own-account workers engaged in the production of goods for own end use by their household (based on 17th ICLS) (g) Employment in the informal economy Sum of employment in the informal sector(d) and informal employment (f) outside the informal sector; the term was not endorsed by the 17th ICLS"

(Source of definitions: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/emp_policy/documents/publication/wcms_210443.pdf)

In our study we scrutinized the most recent works on general informal or shadow economy concepts - [3], [4], [9], [12], [13], [15], [17] – together with studies explicitly connecting shadow economy and e-Government development – [8], [10], [16], [18], [21], [24], [25]. For the measurement side we used the views of two leading researchers in the field – Williams and Schneider - who provided the most comprehensive overview of the shadow economy from a global perspective. [19], [20]. To these we added the most recent studies relating shadow economy and e-Governance to the Covid-19 pandemic, because during this period many restrictions lead to a heavy move to the online activities, including in administration; at the same time, a sharp increase in ICTs developments took place, from the same necessity to move offline activities to online ones, and the citizen's satisfaction with governmental reactions is quite important for future developments [6], [7], [27], [32].

Taking into consideration the easiest or simplest definition of informal economy as being constituted of all unregistered economic activities, those which escape from detection in the official estimates of a country's gross domestic product (GDP), and would have contributed to the officially calculated GDP if they were recorded [18], [19], [20], a step forward is finding a way to actually measure these activities – the most challenging task. Same studies mentioned for the definition state the existence of three categories of approaches for this measurement – two of them being

direct approaches and the other one indirect. Direct approaches can be based on sample surveys, largely used, but very dependent on the quality of the questionnaires and sensitive to the respondent's willingness to cooperate, or on the discrepancy between income declared for tax

purposes and income measured by selective checks – specific to fiscal auditing programs, particularly effective in this regard [18]. These two categories of direct approaches – surveys and tax auditing – usually lead to underestimations of the shadow economy (due to the unreliable answering behavior) or distortions due to the biased samples (in terms of compliance) involved in auditing. The indirect approaches are based on macroeconomic indicators - discrepancies between income and expenditure statistics, discrepancy between the official and actual labor force, total volume of transactions, currency demand equations, and electricity consumption (best physical indicator of overall economic activity); estimation methods can consider just one indicator, or all of them – as the most widely used MIMIC approach (multiple indicators, multiple causes) [3], [13],[18], [19], [20].

Moving forward to the potential causes of the informal economy, the most frequent analyzed factors include: tax and social security contribution burdens, quality of institutions, public sector services, excessive regulations, tax morale, deterrence, development of the official economy, self-employment [12],[13],[18],[28]. These theories could be grouped into *regulative, normative and cultural-cognitive* ones [18], which would improve the bigger conceptual model of influence factors for the shadow economy – suggesting the need to simultaneously consider more factors, if possible from every category. Many influence factors or causes of informality are in a relationship (mediation, moderation) with e-governance, and previous studies have shown that e-Government could limit the scope of the informal economy [8], [10], [17], [18], [21], [24], [25]. Continuing the systems thinking perspective, other factors serve as antecedents of e-Government services acceptance and use, and thus indirectly affect shadow economy; the most important ones refer to citizen's trust in a competent and well-intended governance and government websites [1], [2], [14] or to the willingness to use e-Government services based on perceived digital skillfulness [1], [5], [6], [10],[17], [24].

Considering all these conceptual and operational debates, we decided to collect and synthesize available data for the main influence factors related to e-Government and shadow economy (direct and indirect, according to extant methodologies).

3. Empirical data

We collected secondary data available in various public sources, mostly at the level of the European Union, and some worldwide. The aim was exploratory, meant to bring together figures that are not usually found together, in order to generate ideas for future potential explanations. Data was collected from four Eurobarometers (latest standard, public opinion Eurobarometer, as well as special ones for undeclared work or attitudes towards digitalization) [34], [35], [36], [37] and from other institutions dealing with the issues of interest for our exploratory research: EU reports, United nations, International Labour Organization [29], [30], [31], [32], [33]. For the perceive impact of the Covid-19 crisis on the relationship between e-Government and the informal economy we used a short online questionnaire (sent through SurveyMonkey). There were just three questions:

1. Considering your own experience, how did e-Government services function, overall, during the Covid 19 pandemic? (better than before, same as before, worse than before)
2. Considering the way government managed the Covid 19 pandemic, how would you evaluate your trust in the national government? (higher than before, same as before, worse than before)
3. Considering your own experience and that of your close friends, how would you evaluate the
   level of undeclared work during the Covid 19 pandemic? (higher than before, same as before, worse than before)

Six persons were interviewed, from which 1 expert, 1 person with high knowledge, 2 persons with good knowledge, and 2 persons with sufficient knowledge (above average) in the field of shadow economy. All six persons have an academic career, with research and consulting expertise – and can be considered experts for our exploratory study from both a theoretical and a practical point of view – they were (all of them) previously involved in projects and published articles related to shadow economy, civic engagement, communication between citizens and government, quality of public services, and website credibility – their perceptions being thus relevant for the investigated subject. The intention was to sense the perceived trend for three of the potential factors of influence on the relationship between the degree of e-Government development and the level of the shadow economy – mainly level of e-services functioning, trust in national government and perceived level of undeclared work. The answers were overwhelmingly similar: 5 out of 6 persons appreciated that e-Government services were better during the pandemic (and 1 the same), their trust in the government is not modified or same level (and 1 worse), and that the level of the undeclared work was higher during the pandemic (and 1 the same).

The secondary data collected are presented in two tables: in table 1 we synthesized indicators referring to: e-Government Development indexes and ranks in 2018 and 2020 for the eight Central and Eastern European EU countries analyzed, shadow economy measured through both indirect (MIMIC) and direct (Eurobarometer surveys) approaches, as well as e-Participation; some potential control variables were extracted, as well (population, GDP).

Variables in table 1:

EGDI = eGoverment development index
ePart. = eParticipation index
GNI = Gross national income
Shadow econ. = estimation of shadow economy % using the MIMIC (multiple indicators, multiple causes) method (Medina & Schneider, 2018)
EB2019 = Eurobarometer Survey 498 on undeclared work (from 2019)
QD14 = percentage of people who stated they would not have refused a potentially undeclared payment during the last 12 months
QD 10 = percentage of people who stated they received a non-declared payment during the last 12 months
QD 4.1. = percentage of people who trust in tax and social security institutions tackling undeclared work
QD 4.2. = percentage of people who trust in the labour inspectorate tackling undeclared work

Table 1: eGovernment development and shadow economy for 8 Eastern European EU countries

Country	EGDI 2020	Rank 2020	EGDI 2018	Rank 2018	Rank diff. for EGD	ePart. rank 2020	ePart. rank 2018	Rank dif. for ePart.	Population 2020	GNI /capita 2020 (USD)	Shadow Econ. % 2018 (MIMIC)	EB2019 QD14	EB2019 QD10	EB2019 QD 4.1	EB2019 QD 4.2
Bulgaria	0.7980	44	0.7177	47	-3	23	35	-12	7.177.396	7.760	20.8	87	6	31	31
Czech Republic	0.8135	39	0.7084	54	-15	65	92	-27	10.603.762	18.160	10.5	91	3	51	48
Croatia	0.7745	51	0.7018	55	-4	23	57	-34	4.236.016	12.430	23.0	94	4	33	32
Hungary	0.7745	52	0.7265	45	+7	75	69	+6	9.783.925	12.870	20.5	98	6	56	53
Poland	0.8531	24	0.7926	33	-9	9	31	-22	38.265.226	12.710	16.7	96	5	41	40
Romania	0.7605	55	0.6671	67	-12	46	69	-23	19.876.621	9.970	22.9	91	5	38	40
Slovakia	0.7817	48	0.7155	49	-1	70	50	+20	5.439.318	16.610	11.2	90	4	52	54
Slovenia	0.8546	23	0.7714	37	-14	29	48	-19	2.074.788	22.000	20.2	97	3	29	28

In table 2 we have variables related to trust in the national government, perceived quality for the provision of public services and self-perceived level of digital skills. For a quick visual identification, highest values are in bold green, and lowest ones in bold italic red.

Country	Trust in national government - % of high (EB 91, 2019)	Provision of public services - % of good (EB 90.3, 2018)	Totally agree (%) to be sufficiently digitally skilled (EB 503, 2019)
Bulgaria	25	**33**	22
Czech Rep.	37	**67**	22
Croatia	**13**	**33**	21
Hungary	**48**	63	22
Poland	38	57	21
Romania	21	38	18
Slovakia	29	52	***16***
Slovenia	35	61	**27**

Table 2: Levels of perceived potential factors of influence for the relationship e-government – shadow economy

4. Discussion and conclusions

Previous studies have shown that increasing the e-Government index significantly reduces the size of the shadow economy and e-Government contributes to the lessening of informal economic activities. [4], [8], [18]. Also, trust in various institutions (national governments included) and perceived information literacy are important in explaining citizen's adaptation to governmental actions [1] and shadow economy prevention.[12], [14], [17]. As for crises' effects, extant studies showed they increase shadow economy [4]; the Covid-19 pandemic, as a very unique type of crisis, mostly increased the use of e-governmental services, encouraged people to develop their digital skills [6] and might lead to a bringing out of the shadow of those categories of people from the undeclared economy who were seriously affected and might benefit from temporary public financial support, through a voluntary disclosure initiative [7],[27], [31].

Our small survey with experts suggests that during the Covid-19 pandemic e-government services were better, but this did not change the perceived level of trust in the national government, and the level of shadow economy increased, according to the interviewed people's perceptions. One might argue that the number of experts we used is small; however, in exploratory, qualitative researches, aimed to develop new strings of research, using a grounded theory approach, the number is acceptable – according to Strauss and Corbin, any number between 5 and 50 can be adequate. [22].

We obtained data for 8 countries and 11 variables of interest, measured either once (one year data) or twice (consecutive years or every two years); such a mixed measurement does not allow a reliable correlation analysis, but can still represent a good start for the identification of future patterns to be tested. With a very simplistic, basic ranking of the analyzed countries on each variable of interest from tables 1 and 2 we can quickly see that there are not clear and unique

explanations for the relationship between e-Government and shadow economy – on the contrary, sometimes they can be confusing or illogical. Slovenia has the highest EGDI, but has also a pretty high level of shadow economy; the lowest level of shadow economy of the Czech Republic corresponds to the third rank in the EGDI hierarchy, and for Poland it's a similar situation. If we're looking at trust in government, the highest value is for Hungary, yet for Hungary we have a quite low value for EGDI (only Romania has a lower one, from the 8 countries) and a high value of the shadow economy. As for the citizen's perceptions towards their digital skills, values are not so spread, but they are almost all quite low, lower than 25% (just Slovenia has a perceived percentage of 27.1); Slovakia, with the lowest value (16), has a very good position for the shadow economy - is the second one in terms of low shadow economy. Similar questions appear when we look at trust in national tax institutions or national labour ones, or if we compare these percentages with those for the trust in the national government. And if we consider e-Participation, we can notice that while the number one position for Poland would have an effect in a lower shadow economy (3rd position), for Croatia the second position in e-Participation corresponds to the highest level of shadow economy, and a similar situation of a negative relationship is for Bulgaria. Of course, the starting base is quite different for the 8 countries, as well – we can see this by looking at the change in EGDI rankings from 2018 to 2020 or – especially – if we look at the population size or the GDP values. It is pretty clear that a more complex perspective is needed, in which all potential factors of influence should be studied together, and not separated, because their individual contributions change when other factors are considered or added in the big picture.

Previous studies compared EU countries from singular perspectives – one method, one theory, one particular group of factors pertaining to that theory – and for a good reason: it is difficult, if not impossible at this time, to have comparable data for each country, same year, same method and all factors involved. Special Eurobarometer data are not collected on annually bases, which makes a real longitudinal analysis impossible. Supplementary difficulties are raised by the endogeneity of shadow economy drivers [13], [20]. Despite the exploratory nature of our study, the very basic analysis and the limited sample of countries we used, the data we collected are useful for supporting the idea of designing, at least at EU level, future instruments that combine direct and indirect approaches and in which the most important influence factors could be all estimated at the same time, with the same measuring instrument, repeatedly, to allow not only cross-sectional comparative analyses, but longitudinal ones, as well. Theories should not be seen as exclusive, but rather as intertwined, coexisting. This would allow a quantification of a relative weight for every factor, controlling for the different economic, social and cultural starting bases, offering a more accurate image of the required prioritization of national governments' strategies.

The Covid-19 pandemic gave a serious nudge for the development of e-Government services and created supplementary awareness towards the importance of digital skills for citizens, but it is still a long way until these changes alone will produce visible effects on the level of shadow economy. It is important, though, to take steps in this direction - our study suggests that in order to find solutions for decreasing the shadow economy it would make sense to consider supplementary theories and variables of influence, such as the relationship between the level of e-Government development and the level of undeclared work - and start configuring official reporting instruments that would allow the collection of data necessary for testing these theories. The lessons given by the pandemic should be learned and valorized on long term.

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COMMUNITY SUPPLIES VIA LOCAL ONLINE MARKETS IN TIMES OF THE CORONA PANDAMIC

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Abstract
The Corona pandemic requires not only good crisis management but also the guarantee that people have local supplies in their communities. This raises the question of what role local supplies via local online markets (LOM) can play in a crisis such as the Corona pandemic. This will be investigated on the basis of two research questions:

Q1: "What additional value can LOMs provide in the crisis management of a pandemic?"
Q2: "How have local online markets developed during the Corona pandemic?"

In addition to seven municipalities in Baden-Württemberg (BW), where an LOM had been set up, another five municipalities from other federal states that already operated online markets were surveyed as benchmarks.

The article replies to the research questions and derives recommendations from the results for a reasonable use of LOMs for local supplies in times of crises.

1. Introduction

The SARS-CoV2 virus, which appeared in Wuhan/China in December 2019, spread throughout the entire country in a very short time and worldwide a few weeks later. Unlike an epidemic, when cases of sickness only occur regionally [1], the SARS-CoV2 has infected and continuous to infect people all over the world. As a consequence of this rapid and wide expansion of the disease it is therefore called a pandemic [2]. Consequently, Germany was and still is also hit by this virus and its aftereffects.

In order to counteract the virus, the German government tried to protect its people by introducing stringent measures – a lockdown from 17 March 2020.

In the first lockdown (23.03.2020 to 30.04.2020), the closures of facilities and shops was carried out. Exceptions were made of those facilities which belonged to the essential services, such as funeral parlours, medical institutions and care homes, traffic facilities, police, emergency services and also all other public services. Food retailers, chemists and petrol stations were and are still not affected by the second lockdown (16.12.2020 to 19.02.2021, as of 25.02.21). Restaurant owners,

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service providers, clothiers and other retailers had to close their doors to the public. The consequences of the pandemic therefore affected local suppliers in the communities, since with the shutdown they became subject to major restrictions [3]. Due to these restrictions, online providers and markets were increasingly used by customers to do their shopping.

In 2019/2020 the Ministry for Rural Areas (MLR) in BW funded seven rural municipalities to set up an LOM as part of a competition for new ideas. LOMs are virtual platforms on which, for example, possible offers from individual businesses and shops in the municipality, information about cultural or tourist events, the possibility of booking hairdressing appointments online, the purchase of vouchers and tickets for events, the tracking of deliveries, information about allergens in restaurants and much more is available to customers in digital form [4] So, many different local traders on a common platform can be found there offering the online customer their products [5]. A key feature is that the platform is operated by an intermediary and not by suppliers or customers themselves. The intermediary for the local online markets is, among others, the municipality itself or e.g. its economic development agency [6]. As all seven municipalities were in 2020 in the initial phase of setting up their LOM, the COVID19 pandemic offered an opportunity with its lockdown to publicize it, promote it and to make it better known to the public. If and how this opportunity was used in the context of crisis management will be examined using two research questions.

Q1: *What additional value can LOMs provide in the crisis management of a pandemic?*
Q2: *How have local online markets developed during the Corona pandemic?*

In addition to the seven municipalities in Baden-Württemberg, where a LOM was being set up, another four from other federal states were studied as a comparison since they were already using online markets and one from another federal state since it was implemented during the crisis.

2. Background

2.1. Communal crisis management

A crisis is an unexpected problem seriously disrupting the functioning of an organization, sector, or nation and which represents the turning point or the climax of a dangerous development [7]. So, it is a dangerous situation that threatens as well the existence of the municipality. Systematic crisis management is necessary in order to be able to control the crisis or possibly to prevent it from flaring up. The term *crisis management* is generally described as the analysis, planning, implementation and the controlling of the prevention, preparation, management and follow-up of the crisis [8]. In the best scenario, crisis management does not begin with the outbreak of a crisis, but demands organized planning for its prevention for weeks, months and possibly years before the crisis occurs [9]. In order to counteract a lack of experience and uncertain decision-making, it is indeed realistic to have comprehensive crisis plans ready, which the municipality can put into practice themselves in the event of an emergency [8].

In order to maintain the performance of municipalities in crises management, various sub-areas have been developed by the municipalities as part of their crisis management and to which special attention must be paid [10]. Three indispensable sub-areas of municipal crisis management are: 1. assuring all public services. This includes services of the public order administration (e.g. renewal of identity cards), mobility (e.g. public transport), water and wastewater supplies and waste management by the municipality. Communication and public relations play an important role in the provision of information to the public during the crisis. 2) Assuring the full function of the fire

brigade. The fire brigade is responsible for providing assistance in public emergencies caused by natural disasters, accidents or similar incidents [11]. The global corona pandemic belongs therein. Therefore, the assurance of the performance of fire brigades is obligatory [12] even during global crises. 3) Assuring local supplies. Local supplies are defined as the local and timely supply of goods and services for daily needs [13]. In this context, local and timely means within walking distance of ten minutes or less than 1000 metres. § Section 10 (2) of the GemO [14] insists that the municipality provide within the limits of its capacity, the facilities necessary for the economic, social and cultural well-being of the public e.g. services in the areas of energy and water supply as well as sewage supply. This provision of general interest services includes compulsory tasks of a municipality [15]. However, it is questionable whether local supplies can be seen as a service of general interest. Since it is assigned to economic development, it is a voluntary task of the municipality.

Thus, the supply locally in BW is not an obligatory task of the municipality, neither in "normal" times nor in times of crisis. However, since good local supplies significantly increase the attractiveness of a municipality, most feel obliged to provide good local supplies.

2.2. Development of local supplies

The development of local supplies in municipalities should also be seen in the context of the general development of retailers as its pillars. Retail trade is understood to mean all traders who sell products directly to the end customer. The portfolio mainly includes food and beverages, textiles and shoes, sporting goods, electronic goods, cosmetics, furniture, stationery and products for personal use [16].

Other pillars of local supplies are the public and private service providers such as bakers, butchers, tailors, handicrafts, hairdressers, banks, post offices, restaurants, doctors and others. Furthermore, we can summarise local retailers as well as local service providers as the local suppliers.

A general change of customers consumption and purchasing behaviour combined with their greater mobility are components of the so-called structural change in the retail sector. A structural change is characterised by a permanent change in the economic structure of an industry, as well as by scientific-technical innovations and demographic conditions [17].

The private household income has risen in recent years, leading to changes in the types and quantities of products purchased [18]. The biggest change in customer behaviour is probably the inclusion of digital innovations for shopping. As a result, more purchases are being made digitally [19]. Closely linked to customer behaviour is buying behaviour. It is striking that the new supply situation has led to a change in buying behaviour. The reasons for this are, for example, new online ordering services and the opening of new (online-)shops [20].

Likewise, the combination of online and offline services opens up a new shopping experience. So-called multichannel services "web-to-store" and "store-to web" extend the former shopping on site by many shopping variants.

This leads to the so-called ROPO effect, "Research online - purchase offline" which means that the preparatory search for information about a product is done online and the purchase is finally made in the local shop [21]. In this context, 56 percent of buyers already obtain information about products online before making their purchase [22]. Characteristic for this multichannel service

"web-to-store" are also reservation of goods, availability enquiries or online bookings for explanations in the shop [23].

Sometimes the search for information about goods often takes place in the local shop before the product is finally ordered online [24]. This multichannel service is also called "store-to-web" and means something like "from the shop to the web". The salesperson answers any questions about the products. The purchase itself, however, is then made online at home or while still in the shop. This procedure is called the *reverse ROPO effect* [25]. Customers see the advantage of the internet in that they can compare products better with each other, see product reviews themselves and also benefit from low prices [23].

These trends in shopping and customer behaviour are also reflected in the local supply situation e.g. the loss of small local suppliers from the corner shops which offer groceries and other articles for daily needs [26]. The corner shop offers local people an opportunity to cultivate social contacts [27]. The local economy and the reduction of transport distances benefit from local corner shops [28].

As well as the above-mentioned reasons for structural change, other aspects also lead to the closure of corner shops e.g. price pressure and increasing competition contributed to the decline. Not forgetting the growing demand by customers for more choice, which had lead to an expansion of goods on offer in a shop [29].

This development had been apparent for many years. Between 2010 and 2018, the number of small local suppliers fell by 23% [30] and those remaining are still struggling today with a steep decline in revenue due to digitalisation and other economic developments [31]. In the future, digitalisation will be a fundamental component of the retail sector. However, small local suppliers are often overwhelmed by it. 66% see digitalisation as a major challenge [32]. The main obstacles behind this are the data protection requirements and the lack of know-how among shop-owners and employees. In addition, the high investment requirements also play a major role in avoiding ditigalisation [30]. Therefore, the level of it among local shop retailers is often still weak and results in a struggle with coping with the effects of the Corona pandamic. Adapting to digitalization is the only possible way to guarantee their existence.

2.3. Changes in local supply due to the lockdown

Based on Corona regulations restrictions also have to be observed in local shops. As of 17.3.2020, the restrictions were implemented by the BW state government [3]. Not only the retail trade, but also service providers, gastronomy and city marketing have been severely affected by this because many have had to close. These closures led to serious consequences: Local suppliers not only lack several weeks' profits but they also have to reckon with considerable financial losses caused by fixed and personnel costs [33]. This already resulted in an increased in bankruptcies during 2020 [34]. While local suppliers such as local shops, post offices and restaurants experienced an enormous decline in turnover due to the SARS-CoV-2 virus, the turnover in the food sector increased in almost 90% of the shops by April 2020 [35].

For citizens, the restrictions could mean, among other things, longer shopping trips, longer waits outside shops (e.g. by limiting the number of people inside), unavailability of certain products and services in local shops (e.g. hairdressers or restaurants, etc.). Many providers have switched to pick-up or delivery services. The order is delivered direct to the customer and can often be completed

with contactless payment. [36] Other changes are the increased offer of neighbourhood help or home deliveries. This is especially beneficial for less mobile people and those at risk. The conclusion is that local supplies have changed a lot, mainly due to the Corona pandemic.

2.4. Role of local online markets in local community provisioning

The LOM is a virtual platform on which, for example, possible offers of individual local entrepreneurs and shops, local information about current cultural and tourist events, the possibility to book online hairdressing appointments, the purchase of vouchers and tickets for local events, as well as tracking deliveries. These and even more are available to the customer on the LOM [4].

LOMs are operated by an intermediary and not by providers or customers themselves [6]. The intermediary can be the municipality, its economic development agency, a cooperative, etc..

Since 2012, LOMs have been used to strengthen local trade [37]. According to the Ministry for Rural Areas and Customer Protection BW, local suppliers are to be networked in such a way that regional orders can also be placed by an LOM [38]. It is about combining and supplementing local offers by local (additional) digital offers. Not only the customer himself benefits from the use of LOM, but also the provider of the local business [39]. The most important advantages are summarised at a glance in Table 1.

The customers
• benefit from being able to shop online with local traders [40]. • The network on LOM consists only of local suppliers [38]
• support local trade by buying from local online traders. Local retailers depend on this support, [40,41]
• value convenience e.g. time savings, flexibility and being able to shop digitally anytime and anywhere [20].
The traders
• can build up a second mainstay in the field of online trade with their internet presence [43]. • provide 24-hour access from any location [44] • meet the demand of consumers for environmentally friendly produced products [39] .
The city
• increases its attractiveness through the visibility of its local retailers on the net [41]. Collecting at pick-up points also create social meeting points [5].
The rural area
• profits enormously from LOM in that more regional products are purchased via digital devices, so that the digital shopping convenience is combined with regional economic power [38,42]

Table 1: Advantages of a local online markets for different stakeholders

3. Methodology

Data collection is based on semi-standardised interviews, a questionnaire and a deep analysis of the selected local online markets.

The semi-standardised interviews included open and closed questions. This gave the interviewees the opportunity to emphasise special aspects and researches to gain deeper knowledge.

The seven municipalities from BW, selected for funding to set up an LOM, were surveyed by questionnaire. These were the municipalities of Heidenheim, Murrhardt, Laichingen, Weingarten, Blaubeuren, Oberndorf am Necker, Schönbrunn / Spechbach. One couldn’t be interviewed, because their LOM had not been implemented at that time.

As comparison, five other municipalities outside BW were examined. These were selected randomized and as benchmarks: Wuppertal, Wolfsburg, Monheim am Rhein, Altmühlfranken and Pfaffenhofen an der Ilm. Relevant data on these LOMs were collected by means of telephone interviews. The interviews were also based on the questionnaire. In total, the sample consists of twelve municipalities. Since not all municipalities provided the information requested, the sample varies in its number of answers per question. The development of the LOM was examined three times: January, April and July 2020. Changes due to the second lockdown were outside the period of investigation.

The questionnaire was derived from theoretical principles, developments in local supply, and the current situation of the SARS-CoV-2 virus. This resulted in the following components: 1. crisis management in the municipality, 2. marketing for the LOM , 3. ideas behind the LOM, and 4. support of the LOM by the municipality.

4. Results

When considering the results, it must be taken into account that the LOMs funded by BW were still in their implementation phase. This means that the full potential of supplier diversity, as well as product and service diversity, had not yet been fully exploited and at the same time an additional budget from the MLR funding had been available to support measures by the municipality.

We first look at the answers given regarding the research question: *What additional value can local online markets provide in the crisis management of a pandemic?*

In response to the general question of whether the municipality benefits from the implementation of an LOM, 8 out of the 11 municipalities surveyed in the affirmative and only one saw no benefit from the implementation from an LOM and two municipalities answered that they hadn't seen any advantage through their LOM (see figure 1).

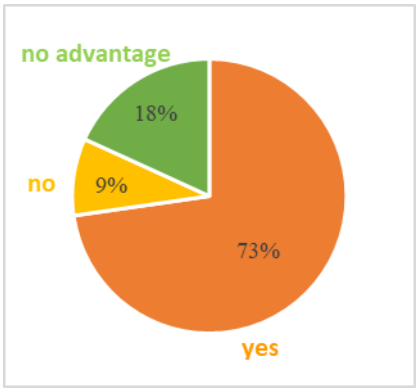


Figure 1: Profit of the municipality through the LOM n=11 [44]

However, the empirical study showed that most of the municipalities surveyed are currently not involved in crisis management. Even if they are not involved in crisis management, when asked, whether they could generally see any additional value from their LOM in crisis management of a pandemic, all respondents answered in the affirmative. With an assessment of the additional value between 1 (lowest benefit) and 10 (highest benefit), the average was 7.3.

They had seen more value through the increase in local purchasing power, through uncomplicated online shopping, through the presence of local suppliers in the market and through possible local / regional shopping. None of the respondents estimated the benefit to be less than five. The reason

that it is not 10 is that there is still room for improvement upwards as explained before (e.g. more suppliers, broader range of products and services). Table 2 shows the answers to questions on the expansion and improvement of the LOMs. Increasing the number of any type of product was the most frequent answer.

Criterion	Number of mentions
Inclusion of further articles (drugstore, stationery and toys)	5
Maximum digitalisation of products	2
Increase in the number of providers	1
Merger of several LOMs to strengthen regional positioning	1
Optimisation of the presence of the suppliers	1
Establishment of a payment function	1
Simpler processes for further lockdown	1
Establishment of a search-bid function	1
Expanding advertising	1
General expansion of the project	1

Table 2: Answers given for improvement of the LOMs [44]

Additionally during the Corona pandemic, the benefits of market transparency via digital display, online ordering and payment options, contactless delivery and decentralised local and crisis-resistant supplies are regarded as additional values.

Whether an LOM can be seen as a solution to global crises depends on the type of crisis. 8 out of 11 of the respondents see an LOM as an efficient solution overall. Especially in the case of the Corona pandemic, reasons such as the advantage of contactless delivery or the possibility of decentralised and crisis-resistant supply were mentioned. One stated that in times of Corona, LOM only covers short-term demands. Others replied that LOMs also offer a solution in an environmental crisis caused by short supply chains and reduced CO_2 emissions as well as in natural disasters, because of deliveries made possible by helicopter after the supply shortages was notified digitally via LOM. A power blackout is mentioned as an example of an LOM probably not being a solution here. One mentioned that an LOM might be an advantage for the local supplier but not for the customer because customers are able to buy via online-shopping everywhere.

Also, LOMs can add great value to the management of a pandemic, e.g. important messages on the current situation, such as incidence figures, applicable protective measures or offers of help can be reported via the LOMs directly or by a link between the municipal websites and the LOM. Asked about the operator of the LOM, it becomes clear that 8 out of 11 of the LOMs are not operated by the municipalities surveyed, so they have no direct influence on the LOM-concept and therefore can’t decide or influence how to use it during crisis-management proceedings.

Now we will look at the answers given to the questions linked to the second research question: *How did the local online markets develop during the Corona pandemic?*

Here, particular attention was paid to the following changes: level of LOM awareness, changes of the idea behind the LOM, products and services as well as product range, visitors (clicks), sales as well as most purchased products.

10 out of 11 answered the question positively about measures to make the LOMs better known. They advertised e.g. by broadcasting, online campaigns, press releases, by advertising on facebook, etc. Only one answered that they had done nothing special to improve the LOM awareness.

10 out of 11 offered a central delivery service. 6 out of 12 changed to a contactless delivery service during Corona and introduced free deliveries limited to the locality.

8 out of 11 partly widened the idea behind their LOM. They added food supplies and products in daily use. One of the 8 even introduced a regional voucher system and another free offers for traders.

The demand for food supplies and products in daily use increased during Corona. While in January regional products, books or shoes were the products most bought, in April it was mainly food and products in daily use, vouchers, mouth-nose protection masks and other hygiene articles. In July, the focus was again on regional products and books. Nevertheless, at this time, vouchers and food were bought more through the LOM.

In order to be able to determine concise changes of products offered, figures were recorded for the months of January, April and July of 2020 (see table 3).

When evaluating the changes in the number of products, only the LOMs from which data was provided were considered – 8 out of 11 answered.

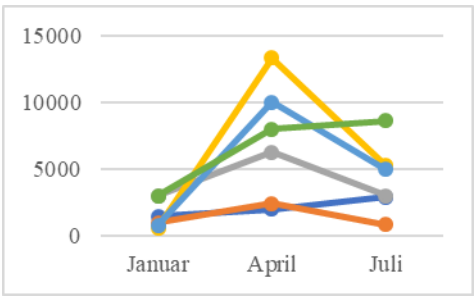
	Supplier	A	B	C	D	E	F	G	H
January		1.500	280	700.000	-	-	850.000	2.500.000	4.000
April		-	283	700.000	129	100	850.000	2.500.000	8.000
July		3.500	306	700.000	750	70	850.000	2.500.000	950.000

Table 3: Development of the number of products on the respective LoMs [44]

At first glance, this reveals an inconsistent pattern. This is due to the fact that respondents C, F and G have the complete product range of a bookshop on the online market. Consequently, other suppliers with few products have no influence on the change in the number of products in the LOM. Respondents A, B, D and H show an increase in the number of products.

A change in the number of suppliers occurred only in one LOM, because of a voucher campaign. A key finding, however, is that some traders who had not posted products on the LOM before Corona started to post them online during the pandemic.

A clear change can be seen in the number of LOM visitors (cf. Figure 2). The results of six respondents are visible here. The LOM records the highest number of visitors during the lock-down in April, after which the use of the LOMs immediately decreases again for most of them.



Supplier E – yellow
Supplier G – dark bluer
Supplier A – green
Supplier D – grey
Supplier B – orange
Supplier C – light blue
(all other suppliers provided no or incomplete information)

Figure 2: Changes in visitor numbers at the LoM, [45]

This development is also reflected in the LOM sales figures as well as in sales figures of online markets throughout Germany. They increase in gross online retail sales in Germany from 16.48

billion in Q1 2020 to 20.22 billion in Q2 and then a decline to 19.33 billion in Q3 [45]. Many shoppers see the LOM as a shop window but then buy the product in the local shop, which is why the LOM sales figures are sometimes not very high.

Comparing both groups, the LOM funded by BW and the LOM not funded at all, no significant differences have been found in their suitability for crisis management and their development during Corona. Their only differences at present were their number of traders, products and customers but they were relatively similar.

5. Discussion and outlook for future research

At the time of the initial lockdown, both the number of products on offer in almost all LOMs increased, as did the number of visitors and sales [46]. Unfortunately, the comprehensive effect of the online offers on the sales via LOM cannot be completely recorded numerically, since some users of the LOM search online and buy offline. These sales are not recorded in the online system and can't be linked to the LOM.

Many suppliers have adapted to this different situation, both in terms of the product range and with regard to services such as delivery options. At the same time, some local retailers could have used the potential of the LOM even more for their businesses to compensate for the lack of sales in their brick-and-mortar shops.

As explained above, LOM can provide significantly more value in the municipal crisis management of a pandemic. But, the influence of the use of a LOM is limited due to the fact that the operators are not the municipalities.

Furthermore, to shop with LOM, internet access is necessary using a PC or a mobile device (phone or tablet) and therefore the ability to handle hardware and software [5] although, not self-evident, is nevertheless a prerequisite to be able to use an LOM at all. This means that the audience is limited and therefore the question arises whether a LOM is only partly suitable for crisis-management.

Next, LOM requires a high financial outlay. Even if the LOM has already been set up, it still requires personnel and financial maintenance by the operator [5]. Providers are often only based in the urban area and thus have a local presence. Therefore, their number of customers is in general comparatively small. So, it is hard to survive at all, even if more and more retailers want to go online. However, the small numbers of customers make it more possible for LOM to serve them during a crisis such as Corona.

Considering future crises, it could be beneficial to increase the number of providers in order to deliver all goods needed in a community.

Furthermore, the existence of traders on LOM also presupposes an internet presence. This is often not available. Barriers such as high costs or lack of staff know-how make it difficult to enter the net [42]. Given the fact that corner shop traders have little extra time to manage the online shop as well as their offline shop, many have no inclination to participate in a LOM. This prevents the LOM from being able to offer a broad range of products, even in a crisis.

Therefore, the current customers often do not have the opportunity to buy all the products they need or want in a LOM but may have to switch to larger online markets. This also makes it hard for the LOM and its traders to survive at all.

The further development of LOM could also be placed in a wider context. One question arises as to which of the new forms of (inner) city developments offers citizens in their cities an attractive living environment that both uses and integrates the possibilities of digitalisation in commerce, so that it could be used during pandemics.

As single aspects within this larger context, the following could also be explored: 1. which reasonable cooperation between neighbouring municipalities could both increase the range of offers on an LOM and thus increase their attractiveness and also proportionally reduce the installation and provision costs for the participants? - 2) How could logistic costs and the environmental impact of delivery and pick-up trips be optimised? - 3) How could LOM be better integrated into the crisis management by municipalities even if the operators are not the municipalities themselves? - 4) How can citizens without internet access make use of an LOM? - 5. How can local traders and service providers be supported in their adaptation of a new digital mindset and their business integration into an LOM?

The municipalities already studied, together with their LOM, have all embarked on the path of digitalisation and have paved the way for additional opportunities to buy and sell even in times of a pandemic. Other municipalities can definitely benefit from their experience. At the same time, we have noticed that there is still a need for further development taking into consideration all stakeholders (e.g. municipalities, providers, traders and customers) as single units and as a local commercial network within an LOM.

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eGovernment I

IS BLENDED-LEARNING HERE TO STAY? PUBLIC ADMINISTRATION EDUCATION IN ROMANIA

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Abstract
So far Covid-19 has brought serious turbulences to the higher education system be it in the form of substantial drops in research founding and international student enrolments or increases in expenses associated with digital solutions for teaching and learning, as well as funding for bridging social gaps between different categories of learners. However, while building on existent scholarship, the authors look at the Covid-19 crisis as an important contextual factor for integrating more practical skills in the public administration curriculum in Romania. This article compares the Romanian expectations of public administration academics with those of the practitioners and question whether a blended approach to teaching public administration might prove beneficial to preparing more adaptable and autonomous (future) civil servants. Data collected from interviews with practitioners in public administration and a survey among public administration students is expected to indicate a potential positive correlation between blended-learning and development of transversal competencies associated to and necessary for "the craft of public administration".

1. Background

There are already more than eight decades since scholars in politics and economics, lawyers and philosophers have ground the study of public administration and argued in favor of its enduring identity crisis. [1][2][3][4][5][6][7][8][9][10] This effervescent debate could be summarized in four intellectual traditions to the study of and discourse about government. [7] In a chronological sequence, these were: the study for the development of practical wisdom (D. Waldo, R.A.W. Rhodes), practical experience (L.H. Gulick), scientific knowledge (H. Simon), and (eventually), the study of relativist perspectives or the postmodernism (R.C. Box, D.J. Farmer). [11]

Practical wisdom is, at its core, an interdisciplinary approach, concerned (very broadly) with three questions: (1) Where are we going? (2) Is it desirable to go there? (3) What can we do to get there? [12]. Its overall significance to understanding government in all its intricacies is undoubtful. J. Raadschelders argues that because of its interdisciplinary basis of knowledge, *practical wisdom* has pedagogical value for students, scientists, civil servants, politicians and citizens, alike. [7] The search for applied knowledge, essential to the *practical experience* approach generated a specific interest in building case studies and designing effective tools for practitioners. Consequently, it is generally sought by policy (and decision) makers, and enjoyed by students as well, for "the real-

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world sense" it provides. [7] *Scientific knowledge* allows for experimental testing of laws or principles in a monodisciplinary manner, and so, from a pedagogical point of view, it targets mostly (early stage) researchers; however, practitioners may find it relevant as well, insofar as they accept looking for solutions by themselves. Finally, *postmodernism* accommodates the cultural diversity of today's society and is usually more accessible to specialists, e.g. mid-career officials and doctoral students. [7]

These debates have shaped the curriculum for public administration programs on both sides of the Atlantic. [5] [10] For instance, D. Waldo considers personnel, budgeting and organization as the three major traditional curriculum "areas" for public administration education and pleads that no single discipline provides the knowledge base for public administration careers [4]. R. Rhodes argues in favour of public administration returning to statecraft, and public administration education focusing on counselling, stewardship, practical wisdom, probity, judgement, diplomacy, and political nous. [10] Finally, speaking of the future of public administration education, J. Raadschelders concludes: "skills in public budgeting and finance, program evaluation, and human resource management ought to be complemented with courses on, at least, disciplinary perspectives about modern civilization, the development of government over time, and political theories about the relation between government and citizen". [8]

The current pandemic has risen multiple questions pertaining to the future of online education: how much is possible, effective, educationally healthy [13], and would blended education become mainstream? [14] [15] This article compares the Romanian expectations of public administration academics with those of the practitioners and questions whether a blended approach to teaching public administration is beneficial to preparing more adaptable and autonomous (future) civil servants. In doing so, it aims at providing a starting point for a more comprehensive analysis of the impact Covid-19 has had on updating public administration education in Romania and abroad.

2. Methodology

Our research explores two main questions: 1) what is the desired profile of a civil servant working in public administration in Romania? and 2) how are public administration academic programs accommodating it? Four limits need to be observed.

Firstly, this article focuses on the Romanian central public administration and general civil service; in doing so it does not discuss the rules and regulations applicable to specific civil service positions relevant to the Romanian Parliament, the Presidential Administration, the Legislative Council, the diplomatic and consular services, custom border, police and other bodies of the Ministry of Internal Affairs, as well as any other civil servants enjoying specific statutory norms (e.g. public managers, etc.). Secondly, the research differentiates between high civil servants and civil servants in management and execution positions (as regulated by the Administrative Code articles 389, 390, 392), as well between temporary and permanent civil service positions. We analysed only data relevant to civil servants in management and execution positions. Thirdly, the article does not account for the special situation of the personnel employed as personal members of the dignitary's cabinets, nor of the magistrates or elected or appointed public officials; nor it considers the case of contractual staff which observe the labour law, and work for public organizations (mainly ministries), carrying out duties of secretariat, protocol, administration, maintenance-repairs and service, guarding and others. Finally, the data used to compile the profile of public administration alumni is relevant solely to graduates of bachelor programs that were successfully accredited according to the Romanian legislation.

This article draws from several sources. Firstly, international, peer-reviewed reports (such as those drafted by SIGMA-OECD or The World Bank Group) provided substantial assistance in decrypting some of the general principles of civil service, as well as in underlining the main concerns of the national government and the European Union institutions for the process of reforming the public administration system in Romania. Additionally, the human resource management literature, as well as the research on competence-driven curricula provided the arguments for considering blended learning a possible tool for a more hands-on and "real-world" orientated public administration education.

Secondly, we used the Romanian legislation relevant to contractual employment to public administration, civil service career, organization of higher-education system, design of internship programs, as well as all connected regulations to these main areas of interest. A selective list of legal documents, with their most recent updates that were considered is presented below.

Government Decision 1000/2006 on the organization and functioning of National Agency for Civil Servants, last revision: August 28, 2017.
Government Decision 611/2008 regarding the organization and development of civil servants' career, last revision: July 21, 2020
Government Decision 525/2016, Strategy for development of civil service, last revision: July 7, 2017.
Government Decision 650/2016 on training strategy for public administration 2016-2020, last revision: July 7, 2017.
Government Decision 905/2017 on the general registry of employees, last revision: August 24, 2018
Administrative Code, last revision: February 3, 2021

Table 1: Selective list of legal documents consulted for this research

Thirdly, in order to compile the desired profile of a civil servant working in public administration in Romania, we analysed the standards for several occupations included in the general domain entitled "administration and public services" (Table 2).

Fourthly, the official webpage of the National Agency of Civil Servants (dedicated to national competitions)[4] facilitated the collection of important data pertinent to the content of the recruitment tests and the expectations the system lays forward to its candidates.

In addition, 23 semi-structured interviews[5] were conducted with representatives from 12 ministries, the National Institute of Administration, the National Agency of Civil Servants and the Competition Council. Fourteen of the interviewees have previously served as members in recruitment commissions, and 7 performed HR tasks in the recruitment process. The distribution of the sample is presented in Table 3. Anonymity of the respondents was guaranteed; as such the table below contains no correlation between the ministries and HR representatives or members in the exam commissions.

[4] Official webpage: http://www.anfp.gov.ro/Concursuri

[5] The interviews took place in two phases: April 2019 (17 interviews) and January 2020 (6 interviews). The interviews conducted in April 2019 substantiated a National Report on the Recruitment of Civil Servants in Romania (authored by Diana Iancu).

Occupation	Required competencies	Available link (only for Romanian documents)
administrative officer	• communication in the official language • communication in foreign languages • basic skills in mathematics, science and technology • IT competencies • learning competence • social and civic competencies • entrepreneurial competencies • cultural expression competencies • coordination of team work	1
front desk officer		2
city hall secretary		3
documentation officer		4
legal councillor		5
chief account in public administration		6
public procurement expert		7
local expert on Roma		8
expert on prevention and fight against corruption		9
expert/specialist in public-private partnership		10
project evaluator		11
inspector (tutelage authority)		12
civil protection officer		13
fiscal inspector		14
inspector in labour security and health		15
inspector in labour protection		16
treasury inspector		17
inspector / referent human resources		18
manager of the labour security and health system		19
referent for civil registry		20
head of urbanism office		21
general school inspector		22
school inspector		23
school inspector for human resource development		24
school inspector for permanent education		25

Table 2: List of the occupations in administration and public services (Source: Romanian Authority for Qualifications)

General Secretariate of the Government	1 interview
Ministry of Regional Development and Public Administration	1 interview
Ministry of Transports	1 interview
Ministry of Internal Affairs	2 interviews
Ministry of Culture and National Identity	1 interview
Ministry of Labour and Social Justice	1 interview
Ministry of Finance	1 interview
Ministry of Agriculture and Rural Development	1 interview
Ministry of National Education	1 interview
Ministry of Health	1 interview
Ministry of Waters and Forests	1 interview
Ministry of Research and Innovation	1 interview
Ministry of Communications and Information Society	1 interview
National Institute of Administration	1 interview
National Agency of Civil Servants	4 interviews
National Institute	3 interviews
Competition Council	1 interview

Table 3: List of the interviews (conducted in April 2019 and January 2020)

Finally, in order to assess the profile of the Romanian public administration graduate, we analysed the competencies higher education institutions in Romania listed as outcomes of their bachelor programs. Thirty programs were investigated, of those available in the National Registry of Qualifications in the Romanian Higher Education[6] (Table 4 comprises the universities included in our research).

Of these programs, only one was identified as fully operational in a blended learning approach available long before the Covid-19 pandemic. The bachelor programme in the National University of Political Studies and Public Administration (Bucharest) was redesigned using a blended approach starting with 2014. Data collected by the university from two surveys on students' satisfaction (conducted in February 2018 and February 2019 on a population of 620 persons, respectively 664) were used to complement the information the authors have acquired during their own teaching experience two years before the pandemic.

[6] In order for universities to receive accreditation for their academic programs, they need first to introduce their learning outcomes in the National Registry of Qualifications in Higher Education (available at: http://www.anc.edu.ro/registrul-national-al-calificarilor-din-invatamantul-superior-rncis/). Although the intended effect of the Registry was to assist potential candidates identify the most suitable program for them, the registration process was heavily regulated (since 2009) and so variation between the learning outcomes in public administration was minimal.

“Babeș Bolyai” University, Cluj-Napoca
“Ovidius” University, Constanța
Academy of Economic Studies, Bucharest
National University of Political Studies and Public Administration, Bucharest
“Atheneum” University, Bucharest
“Aurel Vlaicu University”, Arad
“1 Decembrie 1918” University, Alba Iulia
“Alexandru Ioan Cuza” Police Academy, Bucharest
“Alexandru Ioan Cuza” University, Iași
University of Bucharest
West University of Timișoara
University of Pitești
“Dunărea de Jos” University
University of Oradea
“Valahia” University of Târgoviște
University of Petroșani
“Ștefan cel Mare“ University, Suceava
Politehnical University, Bucharest
“Petrol-Gaze” University of Ploiești
“Nicolae Titulescu“ University, Bucharest
“George Bacovia“ University, Bacău
“Lucian Blaga” University, Sibiu
“Eftimie Murgu” University, Reșița
University of Craiova
“Constantin Brîncuși”, Târgu Jiu
“Spiru Haret” University, Bucharest
“Petru Maior” University, Târgu Mureș
“Nicolae Bălcescu” Land Forces Academy, Sibiu
“Constantin Brâncoveanu” University, Pitești
“Dimitrie Cantemir” Christian University, Bucharest

Table 4: List of Romanian universities with public administration programs (in order of their entry in the National Registry of Qualifications in the Romanian Higher Education)

3. Results

3.1. The profile of the Romanian civil servant

To build the profile of the Romanian civil servant, we looked at two processes we consider equally important: the one identifying and bringing promising candidates into the public administration system (recruitment) and the one keeping the most performant ones in the system (performance appraisal). Additionally, we looked at the competencies linked to occupations relevant to public services, as reflected in the documents registered at the Romanian Authority for Qualifications.

A significant part of human resource scholarship portrays the recruitment as a component of the talent acquisition management, alongside screening of candidates and selection interviews. According to J. Daly, „recruitment is the process of identifying and securing a pool of qualified job candidates for employment consideration” and includes the review of the sought position, the scope of the search and the methods to be considered. [16] The screening consists in reviewing applicant

files and resumés, conducting appropriate testing (e.g. ability testing, knowledge testing, general aptitude testing, behavioural testing, etc.), and separating promising candidates from marginal ones. Finally, the step of selections interviews consists in establishing an interviewing methodology, conducting interviews and administering post interview testing when needed (medical exams, security and reference check). For the purpose of this article however, recruitment will refer to talent acquisition management. With reference to the Romanian case, the recruitment signifies all procedures implemented by public authorities and institutions in order to: 1) obtain the assent of or send the notification to the National Agency of Civil Servants; 2) identify and attract candidates for filling vacant positions (permanent or temporary) by advertising the job vacancy; 3) select the files of the candidates eligible to participate to the recruitment tests; 4) organize the recruitment tests and deliver their final results.

Performance appraisal on the other hand is understood as „the process by which the employees' performance is based on clearly stated appraisal criteria". [17] Usually, some of these criteria may be linked to the achievement of performance targets and some refer to the employees' competences and ability. In the Romanian case, the Administrative Code stipulates that civil servants are assessed based on their performance, using the criteria presented in Table 5.

Performance criteria for civil servants in:		*positions*	
		execution	*management*
1. Implementation capacity	Capacity to implement their own solutions and those agreed in order to achieve the organisational objectives	yes	yes
2. Capacity to effectively solve problems	Capacity to overcome the obstacles or difficulties encountered in the current activity by identifying the appropriate solutions and assuming the identified risks	yes	yes
3. Capacity to assume responsibilities	Capacity to conduct, at the request of hierarchical superiors, activities that go beyond the responsibility as defined in the job description; the ability to accept errors or, as the case may be, the deficiencies of their own activity and account for thereto; the ability to learn from their own mistakes.	yes	yes
4. Capacity to self-refine and capitalize on the acquired experience	Capacity to permanently increase the professional performance, to improve the results of the current activity by putting into practice the acquired knowledge and skills	yes	yes
5. Capacity to analyse and synthesize	Capacity to interpret a large amount of information, to identify and capitalize on common elements as well as new ones and to select the essential aspects for the analysed field	yes	yes
6. Creativity and spirit of initiative	Active attitude in solving problems and achieving goals by identifying alternative ways of solving these problems; inventiveness in finding ways to optimize the activity; positive attitude towards new ideas	yes	yes
7. Capacity for planning and strategic action	Capacity to anticipate requirements, opportunities and possible risks and their consequences; capacity to anticipate solutions and to organize their own time or, as the case may be, others time (depending on the level of competence) for the efficient performance of their duties.	yes	yes
8. Capacity to work independently	Capacity to carry out tasks to perform their job duties without requiring coordination, except for the cases where the activities envisaged extend outside the limits of their competence	yes	no
9. Capacity to work in a team	Capacity to integrate into a group, to make their contribution through effective participation, to efficiently convey and to allow the development of new ideas, in order to achieve the objectives of the team	yes	no

10. Capacity to manage the allocated resources	Capacity to efficiently use the allocated material and financial resources without any prejudice to the activity of the institution	yes	yes
11. Capacity to organize	Capacity to identify the activities to be carried out by the organization, their delimitation into responsibilities; to set objectives; to achieve a balanced and equitable distribution of responsibilities and objectives according to the level, category, class and professional rank of the subordinate staff	no	yes
12. Capacity to lead	Capacity to create a realistic vision, to translate it into practice and to support it; the ability to plan and manage the work of a team of different personalities with a different level of ability to collaborate in fulfilling an assignment; the capacity to adapt the management style to different situations, and to act for conflict management and resolution	no	yes
13. Coordination capacity	Harmonization of staff decisions and actions as well as activities within a compartment in order to achieve its objectives	no	yes
14. Capacity to control	Capacity to monitor how decisions are transformed into realistic solutions, to identify deficiencies and take the necessary measures to correct them in time	no	yes
15. Capacity to achieve the best results	Capacity to motivate and encourage the development of staff performance by: knowing the collective aspirations and providing a development perspective and a trusting attitude; the skill to listen and consider different opinions, as well as to provide support in achieving positive collective outcomes; recognition of merits and cultivation of performances	no	yes
16. Decision-making competence	Capacity to make prompt decisions, with sense of responsibility and within the framework of the law	no	yes
17. Capacity to delegate	Capacity to transfer competencies to subordinates respecting the law and their own competencies in order to achieve the objectives of the managed organization in a timely manner	no	yes
18. Skills in Human Resources Management	Capacity to efficiently plan and manage the work of the subordinates, while providing appropriate support and motivation	no	yes

19. Capacity to develop the skills of the staff	Knowledge of the competencies of the subordinate staff; the capacity to create, implement, and maintain effective policies to motivate the staff; the ability to identify the training needs of the subordinate staff and to formulate proposals on the theme and the concrete forms of training	no	yes
20. Mediation and negotiation skills	Capacity to organize and lead a meeting, as well as to guide discussions towards a commonly agreed solution, considering the different positions of the parties; the capacity to plan and conduct interviews	no	yes
21. Objectivity in judgment	Fairness in decision-making; impartiality in evaluating the subordinate staff and in awarding the staff for outstanding performance results	no	yes

Table 5: Performance criteria for civil servants in Romania

Data collected shows that although a formal (legal) coordination of the recruitment exists (as exercised by the National Agency of Civil Servants), there is a significant procedural, as well as cultural fragmentation in the process. Firstly, there is little (if any) coordination in central administration with regard to evidence-based analysis of human resource demand and supply, planning of recruitment and selection of "best to fit the job description". Secondly, while the legislation on civil service recruitment is unitary (with tuned specifics depending on the position's typology and requirements), there is little evidence of professionalization in the case of exam commissions and appeal boards and testing the candidates may differ from memorizing legal texts to solving complex problems that may arise in a working environment. Thirdly, there is a considerable fragmentation in central administrative capacity: different budget allocations and organizational cultures impact the ways human resources bureaus are organized and their capacity to recruit. In what performance appraisal is concerned, it is usually perceived as an additional (bureaucratic) burden, reflecting very poorly the link between responsibilities and competencies necessary to perform the job and having little (or no) relevance to the career of the civil servant. As indicated in the interviews, human resources bureaus usually act as "gate keepers": they are competent and also administratively accountable for their (mis)interpretation of the provisions pertaining to the organization of the recruitment process. As such, the core functions of human resources officers are to observe the intricacies of the legislation, while working in a context of legal inflation (e.g. Governmental Decision 611/2008 was modified 8 times, while the former Statute of the Civil Servant, enacted in 1999, was amended 28 times before being replaced in 2019 by the Administrative Code). This may translate in a protective attitude of human resources offices towards legal compliance, especially in cases where there are hierarchical / political pressures to solve "the vacancy puzzle".

As the relevant literature argues, building a talent pool and selecting "the best of the best" for public recruitment are core objectives for any efficiency-driven organization. To this end, having well-trained professionals involved in pooling talent and selecting the candidate that is matching the job requirements and excels in a competition designed to operationalize those requirements in needed competencies, skills and abilities seems a legitimate expectation for central administration in Romania. The current legislation partially meets this expectation, as described by the interviewees. It does offer a framework for filtering candidates: first in the selection of application files and

secondly during the recruitment tests (written test and/or interview, as well as additional tests – measuring specific proficiency of candidates – e.g. in foreign languages, IT, etc.).

However, all the interviewees debate the relevance of the recruitment tests: all agree that knowledge of the law is important, but also argue that memorizing it says nothing about the capacity to understand it and correctly execute it. In fact, after analysing examples of tests we could conclude that none of the competencies included in Table 5 are, for instance, clearly and unequivocally assessed during the recruitment stage.

Talent pooling is simply not an issue for central public administration at this time: considering the need for transparency and neutral-based selection criteria, as well as the risks for clientelism and politicization, the legislation allows limited paths for organizations (public authorities or institutions) to (early) identify talents. For instance, the Recommendation of the European Parliament and of the Council of 18 December 2006 on transnational mobility within the Community for education and training purposes: European Quality Charter for Mobility, and the Ministerial Order 3955/2008 regarding the organization of internships in bachelor and master programs and the Framework Convention on internships in bachelor or master programs do provide a favourable context for screening possible, future applicants. The specialized training program for high civil servant provides a precedent for any other similar programs open to interested parties willing to work in management and/or execution positions in civil service. Additionally, existent faculties and departments of public administration may provide further possibilities for talent pooling. With the exception of two respondents that remotely discussed the issue of internships, no other interviewee identified the topic of talent pooling as a concern for the public recruitment process in Romania.

To conclude, before entering the system, the candidate to a Romanian civil service position needs to master the legislation, be proficient in Romanian, be a good communicator and show capacity of learning and working in a team, under a democratic setting. After at least one year in the system, he/she needs to have developed the capacity to work independently, analyse and implement solutions, assume responsibility for his/her results and plan ahead. When assuming a management position, the civil servant requires in addition, to have learnt to organize others, mediate different interests and negotiate with different parties, take fair and impartial decisions, coordinate, control and lead.

3.2. The profile of the Romanian civil servant

Currently, the framework law regulating the Romanian education system is Law no. 1/ 2011 which affirms the principle of academic autonomy, and regulates the structure of the academic year, the management of programs (including those pertaining to human resource management and payment), the academic governance and the system of awarding diplomas. Additionally, The Romanian Agency for Quality Assurance in Higher Education (RAQAHE) regulates the standards for the accreditation of universities and their programs. In 2019, RAQAHE and its Commission on administrative sciences, education and psychology introduced new standards for quality assurance. These standards regulate aspects relevant to faculty, syllabi contents, curriculum (mandatory and elective courses), learning outcomes, research, and campus facilities. Table 6 gives an overview of the curriculum standards in place for bachelor programs in public administration, in Romania.

RAQAHE standards	Public Administration degree
Core courses. At least 5 should be included in the curriculum (as mandatory) Total weight in the curriculum: 25-30%	Administrative science
	Administrative Law
	Constitutional Law
	Public Management
	Public Policy
	Public services management
	Economics
	Sociology
	Logics
	Strategic planning
	Public finance
	Ethics and deontology in public administration
	Applied informatics
Specialisation courses. At least 7 should be included in the curriculum (as mandatory or elective) Total weight in the curriculum: 60-65%	Labour and social protection law
	Urbanism
	Comparative administrative systems
	Public relations
	Human resource management in public administration
	Administrative litigation
	Public procurement
	Public accounting
	Project Management
	Quality in public sector
	Communication in public administration
	Techniques and methods for formulating public decisions
	Internship (mandatory)
	Projects in public sector
Complementary disciplines (mandatory or elective) Total weight in the curriculum: 5-10%	Business law
	European law
	Financial law
	General theory of law and state
	Law-Drafting techniques
	Civil law
	Criminal law
	Formal drafting of legislation
	Public marketing
	Psycho-sociology of leadership
	Political science
	Urban development and planning
	European Public Policies

Table 6: RAQAHE standards for bachelor programs in public administration

Data we analysed show that the Romanian public administration education is quite unitary: the curriculum requirements set by RAQAHE heavily (yet to some extent understandably) limit the innovative capacities of universities and their faculty. More than 80% of the courses are similar to

all thirty bachelor programs we investigated. Consequently, the competencies public administration alumni acquire by the end of their studies are over 95% identical to all universities. The list includes the following competencies (C1… C10):

[1] C1: Knowledge of the theory of public administration, and the capacity to analyse operational concepts relevant to the field, with a particular focus on the European Administrative Space for the European Administration specialization;
[2] C2: Ability to use the fundamental principles and concepts of organization and functioning of administrative structures for the professional insertion in public and/or private institutions that are related to the public sector;
[3] C3: Capacity to identify and implement legal acts and policies regarding the administrative system, including the initiation and design of legislation and administrative regulations at the national level, respectively EU level for the European Administration specialization;
[4] C4: Expertise in elaborating and implementing institutional development strategies in central and local public administration, consistent with European public administration developments;
[5] C5: Ability to use standard decision-making methods and instruments to write, evaluate and manage policies and administrative projects, as well as EU-funded projects, for the European Administration specialization;
[6] C6: Capacity to use quantitative and qualitative research methods, as well as normative and conceptual analysis in order to engage in administrative science-related research activities;
[7] C7: Ability to communicate on public administration affairs in the language of the curricula and in an international language;
[8] C8: Capacity to perform professional tasks on time, thoroughly, effectively and responsibly, by following the ethical principles characteristic for the public sector;
[9] C9: Knowledge in the use of IT systems and platforms, as well as IT instruments relevant for the process of e-governance;
[10] C9: Develop teamwork skills, acquired through various teamwork exercises performed and through the enhancement of interpersonal skills.
[11] C10: Capacity for critical thinking and the ability to identify, analyse and solve a wide range of administrative, organizational and policy-related problems.

Eventually, the bachelor graduate in public administration should be able to use fundamental principles and concepts of organization and functioning of administrative structures; identify and implement legal (administrative) regulations; apply strategic management tools in any public organisation; be ethically correct in identifying, analysing and solving public administration problems, and communicate the solutions efficiently in Romanian and a foreign language. Additionally, he/she should remain focused on self-actualization, and consolidate skills such as working in teams.

As presented above, there is a reasonable degree of compatibility between the expectations of the central public administration and the outcomes of the universities training public administration students in Romania. However, correlating more the profile of the Romanian civil servant with that of the graduate of public administration should represent a priority for both the National Agency of Civil Servants and other regulatory bodies of civil service and education, as well as universities.

There is, indeed, little evidence in our research suggesting such an interest exists: firstly, our interviews show that inter-connecting ministries and other central administration organizations is quite difficult, especially when recruitment and performance appraisal are considered (and although

steps in creating a unitary / national-wide recruitment process have been made, no tangible results can be observed at the time of writing this paper). Secondly, there is little to no substantial communication between central administration and universities, with regard to curriculum development. Existent legislation makes one-year internships mandatory for public administration students, yet in many cases these internships lack coordination and a strategic vision; therefore, as suggested by the interviewers, internships are seldom (or never) considered as possible indicators for the available talent pool. Thirdly, a considerable number of positions in central public administration are not open to public administration graduates: instead, alumni of economic studies and law are preferred even in general positions. Needless to say, the list of competencies specific to public administration (e.g. understanding the public administration system, using evidence-based decision making, mediate and negotiate conflicting interests, etc.) are less accommodated in programs focused on economics and general law.

3.3. Discussion: a blended-learning approach to public administration education

Covid-19 prompted central administration and universities to reflect on viable alternatives to traditional, face-to-face interaction. On March 16, 2020, the Romanian Government issued a state of emergency and since, all public administration bachelor programs moved to an online education and many departments in central administration relied heavily on tele-work. In such conditions, rethinking the set of competencies public administration needs seems a reasonable expectation. For instance, the pandemic showed that public organisations need civil servants capable of coping with crisis, managing online communication, and mitigate conflictual situations. Can these types of competencies be developed using blended learning?

Looking at the only bachelor program in Romania that uses a blended approach since 2015, the answer seems positive: National University of Political Studies and Public Administration uses Moodle (www.apcampus.ro) and allows students to access their lectures, seminars and laboratories offline, use their own time to study and accommodate with a collaborative learning environment. These facilities have had a strong impact on the students of the programme and, we may infer that they might have contributed also, to developing competencies that presently, central public administration deem relevant. For instance, in the satisfaction surveys conducted for the class of 2017-2020 (data collected in a face-to-face interaction in 2018 and 2019, from 644 students, respectively 620 students enrolled in full-time classes in public administration bachelor programme), 98% declared that they were satisfied and very satisfied with the theoretical background received during their studies, 91% (an average of the two years) with the practical training, and over 97% with the blended teaching methods. In fact, 86% (average) declared that they considered themselves ready to a great extent to become a good civil servant once graduating the classes, and over 75% (average) thought of the Moodle platform as a way of improving substantially their education. The benefits of employing a blended approach included: working independently on some papers (36%), studying in teams, with colleagues (27%), organising his/her own study time (58%). These, in return, are connected by the literature with developing a more creative learning environment and better communication skills. [18] [19]

However, the available data is not sufficient to analyse the impact of blended learning for public administration education. A more in-depth analysis of the potential blended learning has on developing competencies needed for the “craft of public administration” and the “real world” is, however, strongly recommended: there is currently little (to no) literature analysing the outcomes of blended learning for public administration education. A better contextualisation of blended

programs in post-Covid-19 environments, may prove beneficial to better linking the theory and practice of public administration.

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THE STATUS OF E-GOVERNMENT RESEARCH FROM A BIBLIOMETRIC ASPECT

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Abstract
The e-government as an ever-growing dimension of public administration gets more and more attention worldwide [10]. It is considered an essential tool nowadays to improve efficiency and cost-effectiveness while providing better services to citizens. The study aims to investigate the e-governance research advancements and trends from the past 10 years.

The empirical research is based on bibliometric data and defines the most active affiliations, top resource titles, the leading topic clusters, and research tracks from various angles. Data are collected restricted to the articles related to the "e-government" and "law or legislation" keywords between 2010 and 2019 November (a total of 513 articles). The data source is the Scopus citation database.

Findings show a fragmented picture of the research field, dominated by computer science and in alignment with this, by conference proceedings. Keyword co-occurrence analysis shows 14 different modules classified into a 3-dimension model based on research foci on the publications. These are managerial, political, and legal aspects. While based on density the leading keywords are interoperability, public administration, and social media. The latest trends show the emergence of natural language processing and smart city issues.

Our research emphasizes the trends of e-government research as a leading research field in public administration studies. It is important to note, however, that the topic is rather multidisciplinary. It is important to see the correlations between the academic basic research activities and countries' practical e-government implications.

Keywords: *e-government; bibliometrics; e-government research*

1. Introduction

The technology and communication system used in public administration and the functioning of the government tasks become more and more essential nowadays. It addresses the newest challenges of the information societies while serving the citizens with the highest standards of services achievable. The digital government requires new services, new methodological concepts, new technological advancements, and a new concept of leadership in public administration [3].

The UNESCO created a widely used and acknowledged definition of e-governance in 2011 as follows: „*The public sector's use of information and communication technologies (ICTs) with the*

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aim of improving information and service delivery, encouraging citizen participation in the decision-making process, and making government more accountable, transparent, and effective." [9] The e-government has three components in its concept, these are the follows [4]:

- more efficient government
- better services to citizens
- improved democratic processes.

There is a growing demand for e-governance primarily in the developed countries, such as the United States, Canada, Japan, and the European Union member states [10]. Within the EU, modern, technology-driven governance is considered as a condition to promote a knowledge-based society, while the government efficiency is an essential result in service improvement and cost-effective functioning. Due to its strategic nature, EU member states have adopted several strategies to implement and adapt the latest technologies into governmental procedures [10].

The electronic government – often referred to as e-government – is an ever-emerging field of research with different research tracks. The concept of e-government became a hot priority for every country as there are a growing demand and requirement from the side of citizens for an efficient, cost-effective, well-operating government structure. This demand drives growing pressures that the government sector should satisfy for a more engaged and satisfied private and business sector. The phenomenon itself is a complex one, referring to multiple links and connections occurring between authorities and citizens [6].

In recent years, there have been some attempts to synthesize the existing literature about e-government [1], [6], [8].

The article aims to provide an overview of the e-government research field between 2010 and 2019, particularly dealing with the questions of law and regulation. Besides identifying the key authors, institutions, and source titles, it is important to organize the leading topics and some of the current trends based on co-occurrence analysis. The research conducted gets its value from presenting the research field through the lens of public administration. It provides help for scholars researching e-government issues, and practitioners, pointing out the latest policy and research trends.

2. Electronic government as a research field

To provide a complex overview of the research field, it is important to identify the current research trends and a bigger picture of the research field. A general analysis was conducted based on keyword search, with the "e-government" keyword in the Scopus database[3]. The Scopus is one the biggest international and multidisciplinary citation databases, providing a wide range of sources internationally recognized. The keyword search shows a total of 14057 documents, with the starting year of 1979 (1 document). A significant increase started in 2000, reaching its peak in 2010 (1082 documents). Since then, a declining tendency can be found on a larger scale, reaching a total number of 883 documents in 2020. The leading countries from the perspective of the scholarly output are the United States (1753 documents), followed by China (1479 documents) and the United Kingdom (1143 documents). Other highly ranked countries in the research field are among the most developed ones too, including Germany, Australia, Italy, Greece, Spain, the Netherlands. However, after them, emerging states such as India can be observed as well. From a disciplinary

[3] The keyword analysis is carried out based on the formula as follows: TITLE-ABS-KEY (e-government).

point of view, Computer Science dominates (9532 documents), followed by the Social Sciences (4541 documents) and the Business, Management and Accounting (2547 documents). Following disciplines are Engineering, Mathematics, and Decision Sciences that reveal the multidisciplinary nature of the research field both involving STEM (science, technology, and engineering and mathematics) researchers and social scientists. Concerning the most frequent document types, conference papers dominate (7251 documents), followed by journal articles (4605 documents) and book chapters (1288 documents). The conference papers are characteristic of dynamically developing research fields, mainly in computer sciences. The most active institutions are Brunel University London (the United Kingdom), Delft University of Technology (the Netherlands), and University at Albany (the United States).

After the general statistic overview on the existing literature, it is important to define the main research areas and questions related to the e-government research field. This can be done based on previous literature reviews. The e-government is identified as digital government, a concept that has already been presented in the introduction section [3]. In their article, they pointed out the most important scholars in the bibliometric and review analysis of the research field. They found that e-government gets its roots in computer science, political science, information science, and public administration. These disciplines, however, work with altered theoretical and methodological backgrounds, trying to address a different part of e-government. There is a discussion on the e-government as a sole, independent research field, where one group of scholars argues that e-government is not a sole field but an essential part of the public administration modernization [5], while others argue that e-government is a multidisciplinary but coherent field [2].

The most important themes of the e-government research have been identified including government transformation, citizen engagement, public service improvement, and digital democracy [7]. Besides these, they identified some of the issues worth investigating but still disputed such as how to measure and relate more accurately the e-government to the traditional public administration disciplinary research.

A framework has been established in which every e-government article can be classified based on their main research foci and perspectives, including managerial, political, or legal research projects [5]. It is interesting to classify their main keywords related to these three research perspectives summarized by Table 1.

Research perspective	**Main issues**
Managerial	Efficiency, effectiveness, economy Technology adaptation Cost-effectiveness Human Resource management
Political	Values of representativeness, accountability Information systems use for transparency. Citizen and community engagement
Legal	Values of equity, individual rights Privacy and access to information Human rights

Table 1: 3-dimension model of research perspectives in the field of e-government (source: own contribution based on [5])

3. Research goal and methodology

In the previous sections, the concept of e-government has established based on the findings of the international literature. From a specific perspective, the e-government can be seen as a multidisciplinary research field, having strong connections with the public administration. This will be later deeply analyzed by bibliometric tools, through a sample of articles consisting of 513 articles.

The identification of these articles is an essential point of the research. The articles were gathered by keyword analysis from the Scopus citation database, earlier already used to draw the general tendencies of the research field. The formula of keyword search is as follows:

TITLE-ABS-KEY ("e-government" AND law OR legislation) AND (LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2012) OR LIMIT-TO (PUBYEAR, 2011) OR LIMIT-TO (PUBYEAR, 2010))

As it can be seen in the syntax, the keywords are “e-government” with an “and” parameter for law or legislation, defining mainly the public administration related papers. The time scope is restricted between 2011 and 2019. It is important to note here, that 2019 is the last fully administrated year of the database. Then, the set of the publications found was imported into the SciVal research intelligence platform for further analyses as a newly defined publication set.

Aspects of analysis	Publication set
Scholarly output	513
Number of researchers	1130
Field-weighted citation impact	0.83
Citation count	2591
Citations per publication	5.1

Table 2: Descriptive statistics of the publication set analyzed (source: own contribution based on SciVal)

Some of the main descriptive statistics can be seen in Table 2 about the publication set. The total number of publications is 513, involving a total of 1130 authors. The publications included received a total of 2591 citations, meaning an average of 5.1 citations per publication. The field-weighted citation impact shows that these publications are a bit under-cited compared to other similar publications in the discipline, having a value of 0.83.
For further data analysis, we used the VOSViewer 1.6.16. version for Microsoft Windows System. The program is a bibliometric visualization and data analyzing software, where the research objects are the authors, publications, affiliations, citations, indexed keywords. Various bibliometric analyses can be conducted in the software based on a pre-defined and imported CSV file of the publication set.

Research topics were analyzed by the SciVal research intelligence online tool, importing the publication set. Two papers could not be imported into the SciVal, so a total of 513 publications were involved. The SciVal was used to identify the most active affiliations, resource titles, and topic clusters. These topic clusters draw the main research trends and tracks of the research field, which is extremely useful for scholars and practitioners who tend to connect to the international discussion

on the e-government. Three indicators are presented regarding the keywords: scholarly output, field-weighted citation impact, and prominence percentile. Here, it is important to make clear the meaning of these variables. Scholarly output refers to the number of publications published by the predefined set of authors. Field-weighted citation impact is the ratio of the total citations received by the denominator's output, and the total citations that would be expected based on the average of the subject field. It considers the differences in research behavior across disciplines such as the difference between heavily co-cited and lightly co-cited disciplines. The prominence percentile shows the current momentum of a topic by looking at very recent citations, views, and CiteScore values. CiteScore here refers to the yearly average number of citations to recent articles published in that journal. Leading keywords were visualized by VOSViewer based on the co-occurrence analysis of all keywords. All keywords contain both the author keywords and index keywords providing the whole collection of relating keywords found in the articles.

4. Results

Research findings are presented in three sections, first presenting the descriptive statistics of the publication set. Then, presenting the prominent topic clusters and topics leading the current research trends in the field. Thirdly, the leading research tracks are presented based on the keyword analysis, identifying their inter-connectivity and their time dimensions.

4.1. Sample characteristics

First, the leading institutions and leading source titles are presented.

Institution	Country/Region	SO	Authors	Citations per Publication	FWCI
University of Bologna	Italy	10	8	8.4	1.34
Delft University of Technology	Netherlands	9	14	16.8	1.67
Graz University of Technology	Austria	6	6	6.2	1.19
Universidad Autónoma de Madrid	Spain	5	9	4	0.76
Technical University of Munich	Germany	4	6	0.8	0.25
Tallinn University of Technology	Estonia	4	9	1.5	0.73
Brunel University London	United Kingdom	4	5	28.5	0.68
Harokopio University	Greece	4	7	2.3	0.5
Dublin City University	Ireland	4	7	4.3	0.5
National University of Ireland, Galway	Ireland	4	7	4.3	0.5
University of Agder	Norway	4	6	15	1.68

Table 3: List of the most active institutions (source: own contribution based on SciVal)

Table 3 summarizes the leading institutions. It is important to note that the research field is very fragmented, and institutions do not own it as the main research profile. This is strengthened by the scholarly output by institutions led by the University of Bologna with 10 publications, followed by the Delft University of Technology (9 publications) and Graz University of Technology (6 publications). The biggest group of researchers is found in Delft (14 authors), followed by Universidad Autónoma de Madrid and Tallinn University of Technology both with 9-9 authors. The highest number of citations per publication is reached by the Brunel University of London, being a leading university in the broad field of e-government (28.5 citations per publication), followed by

the Delft University of Technology (16.8 citations per publication). Surprisingly, the University of Agder in Norway scores the highest field-weighted citation impact with 1.68, closely followed by the Delft University of Technology (1.67).

Scopus Source	Publications	Citations	Authors	Citations per Publication
ACM International Conference Proceeding Series	45	120	95	2.7
Proceedings of the European Conference on e-Government, ECEG	35	28	75	0.8
Lecture Notes in Computer Science	31	147	65	4.7
Communications in Computer and Information Science	8	3	23	0.4
Proceedings of the Annual Hawaii International Conference on System Sciences	7	85	13	12.1
Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engi	7	10	15	1.4
Transforming Government: People, Process and Policy	6	52	9	8.7
Government Information Quarterly	5	407	6	81.4
Electronic Government	5	21	13	4.2
Applied Mechanics and Materials	5	1	12	0.2
International Conference on Management and Service Science, MASS 2011	5	5	7	1

Table 4: List of the top resource titles (source: own contribution based on SciVal)

Table 4 indicates the leading resource titles gathering the most legal and public administration-oriented e-government publications. The list is led by conference proceedings, namely the ACM International Conference Proceeding Series (45 publications), Proceedings of the European Conference on e-Government, ECEG (35 publications), and Lecture Notes in Computer Science (31 publications). Some journals are observed as well, gathering somewhat a smaller number of publications, but having a much higher field-weighted citation impact and in the case of Government Information Quarterly, a much higher number of citations received as well. These journals are the Transforming Government: People, Process, Policy, and Government Information Quarterly. SciVal-based analyses show 24.9 percent of publications have been published in Q1 top-quartile journals, while more than half of the publications in the top 50% (Q1 or Q2) journals. It shows the high relevance of these papers.

4.2. Prominent topics

The identification of the prominent topic clusters and topics sheds light on the main trends in the research field. It contributes to the understanding of the main elements of e-government research.

Rank	Topic Cluster	SO	FWCI	PP	Topic	SO	FWCI	PP
1	Research; Technology; Industry	199	0.73	79.384	Open Government; E-Participation; E-Governance	141	0.71	99.462
2	Industry; Information Systems; Research	24	1.91	85.542	Electronic Government; Information Dissemination; Interoperability	13	0.97	73.131
3	Cryptography; Authentication; Data Privacy	19	1.06	97.256	Electronic Government; Semantic Web Services; Interoperability	10	0.36	33.191
4	Archives; Library; Collections	12	0.55	19.076	Web Accessibility; Visually Impaired; Electronic Government	9	2.12	93.261
5	Design; Human Computer Interaction; Websites	11	1.85	42.102	Electronic Signatures; Identity Management; Non-Repudiation	9	0.82	67.258
6	Knowledge Management; Industry; Research	9	1.14	58.835	Legal Documents; Case Law; Deontic	8	0.96	84.556
7	Artificial Intelligence; Algorithms; Semantics	9	1.33	54.083	E-Procurement; Tendering; Government Procurement	6	0.09	78.234
8	Industry; Research; Marketing	8	1.58	98.394	Information Security; Protocol Compliance; Breach	5	0.68	98.799
9	Software Engineering; Models; Software Design	8	1.07	91.901	Smart Cities; Municipal Administration; Internet of Things	5	2.56	99.846
10	Party; Election; Voter	8	0.38	86.479	Top Management Support; Cloud Computing; Software-As-A-Service	5	5.5	95.609

Table 5: List of prominent topic clusters and topics (source: own contribution based on SciVal)

Table 5 includes the leading topic clusters and topics within the scope of the publication set. The classification is based on the three dimensions including the managerial, political, and legal perspectives [5]. The dominating topic cluster based on scholarly output is the "Research; Technology; Industry" (199 publications), while based on the field-weighted citation impact the "Industry; Information Systems; Research" stands out (1.91). The prominence percentile shows the highest value for the "Industry; Research; Marketing" (98.394). Among the more specific topics, the "Open Government; E-Participation; E-Governance" dominates based on the scholarly output (141 publications), while the "Top Management Support; Cloud Computing; Software-As-A-Service" topic has the highest field-weighted citation impact (5.5) and prominence percentile (99.846).

Classifying the topic clusters into the 3-dimensioned model, the dominance of managerial topic clusters is observed. The first two topic clusters based on scholarly output belong to the managerial cluster. Besides this, on the top 10 list, 6 topic clusters can be classified to the managerial, 2 to the political, and 2 to the legal clusters. When turning to the more specific, smaller topics, the most active topic can be found in the political cluster, while the second in the legal cluster. 5 of the top 10 topics are devoted to legal issues, 3 for the political, and 2 for the managerial issues.

4.3. Research tracks

The research tracks are more specified elements of the research field than the above-analyzed topic clusters and topics. The research track analysis is carried out based on keyword co-occurrence analyses, from three perspectives. First, the main modules of keywords are presented. It is followed by an overlay analysis of the keywords, drawing the time dimension of the field, and pointing out the dynamics and newly joining sub-directions of the e-government research between 2012 and 2018. Thirdly, a density analysis is carried out to identify the core components and keywords of the highly active directions on a density map.

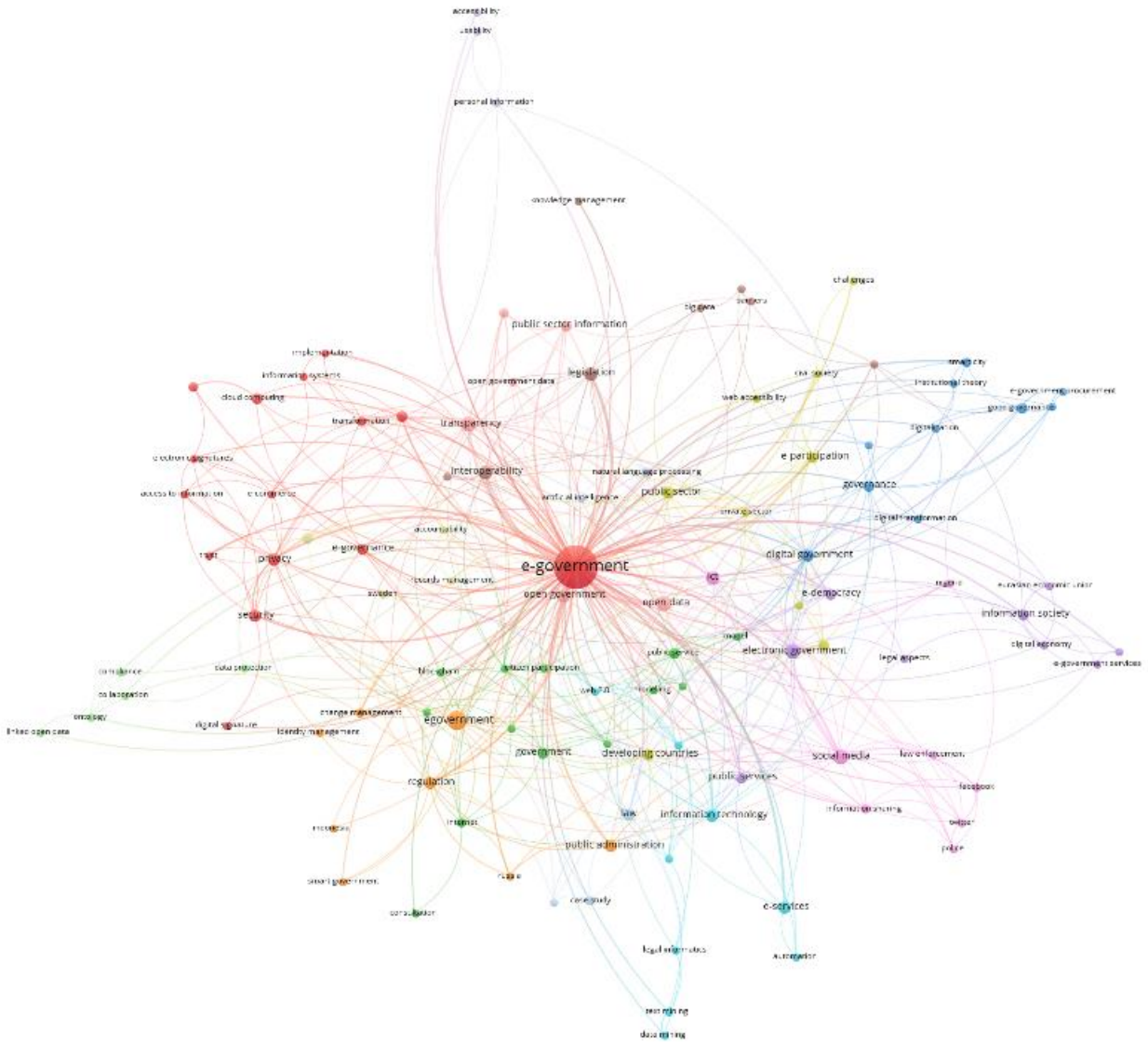

Figure 1: Co-occurrence analysis map (source: own contribution by VOSViewer)

Figure 1 shows the keywords and their inter-connectedness. It includes a total of 112 keywords, clustered into 14 modules and establishing a total of 473 edges between each other. The biggest module gathering the most keywords is the red cluster. This cluster is gathered around the core keywords of "e-government" and "e-governance" and deals with a wide range of topics including transformation and implementation of different technologies, such as cloud computing, e-commerce, and electronic signature. The modules will be categorized in alignment with the 3-

dimension of managerial, political, and legal aspects; however, the biggest, red cluster is a mix of the three containing some of the managerial aspects (e.g. transformation), political (e.g. trust), and legal (e.g. privacy and security). All the other modules can be categorized into three dimensions.
7 modules are devoted to the political aspects, including the orange, dark green, purple, blue, yellow, light rose and light-yellow modules. The orange cluster deals with the question of smart government and public administration from a regulation perspective. The dark green module consists of the words "blockchain", "consultation" and "citizen participation", while the purple consists of the "e-democracy" and "information society". The blue module deals with the general concepts of "digital government", "digital transformation" and "good governance", while the yellow with the more specific "civil society" and "participation". While the light-rose cluster consists of the keywords "transparency" and "public sector information", the light-yellow consists of the "accountability".

5 modules can be classified as legal perspectives, including the light-green, light-blue, brown, pink, and light-purple modules. In these modules, the keywords focused on the legal and privacy issues, such as in the light-green module (e.g. data protection), in the brown module (e.g. legislation, big data), and the light-purple module (e.g. personal information, accessibility). The light-blue module (e.g. law, artificial intelligence) and the pink module (e.g. social media, information sharing, police) deal with more specific questions related to technological advancements very much present in every-day use.

Following this categorization, only 1 module is centered around the managerial aspects. This is the turquoise module with the keywords, for example, "automation", "e-services" and "information technology".

Turning to the keywords of 2020 and 2021, although they are not included originally in the database due to their incompleteness, some interesting finding can be drawn. The latest leading words are network security, security of data, interoperability, and crime. Besides these, several market leading emerging technologies are presented including artificial intelligence and cloud computing. The keywords can be seen in Figure 2.

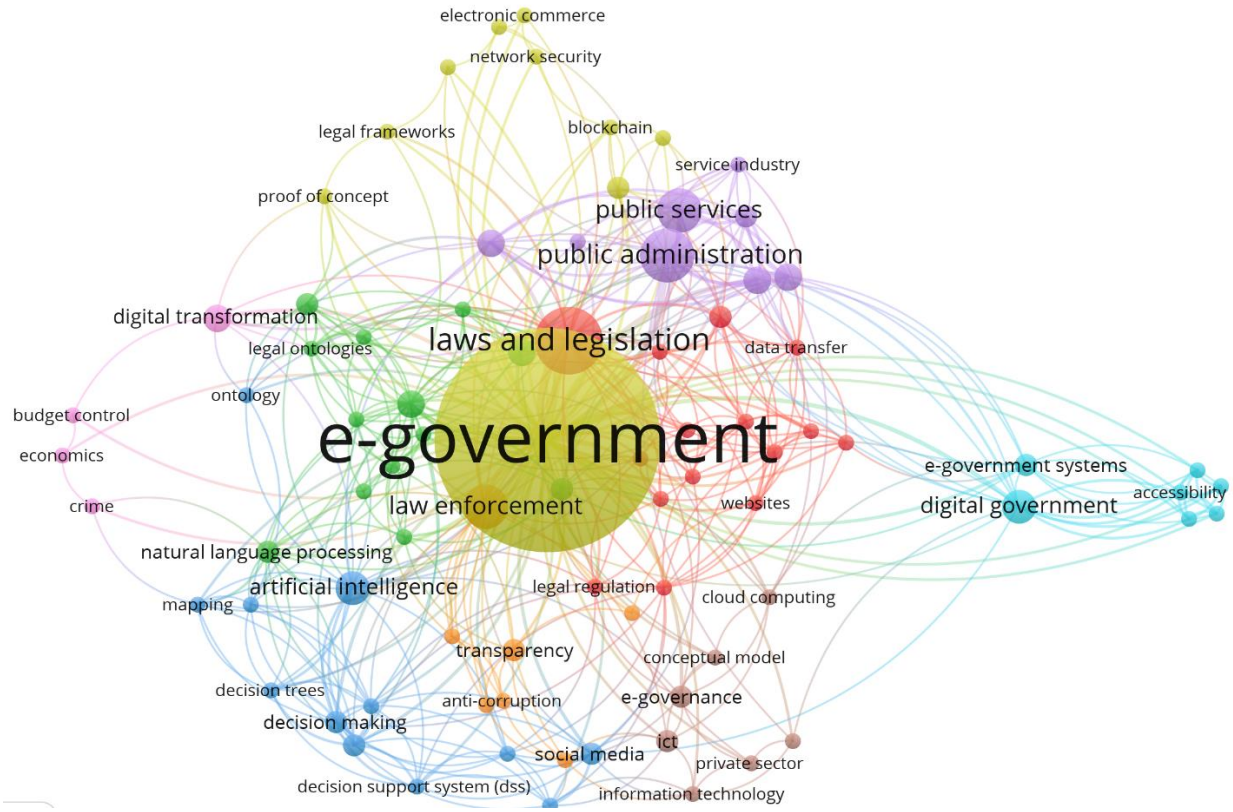

Figure 2: Co-occurrence map with keywords of the publication year 2020 (source: own contribution by VOSViewer)

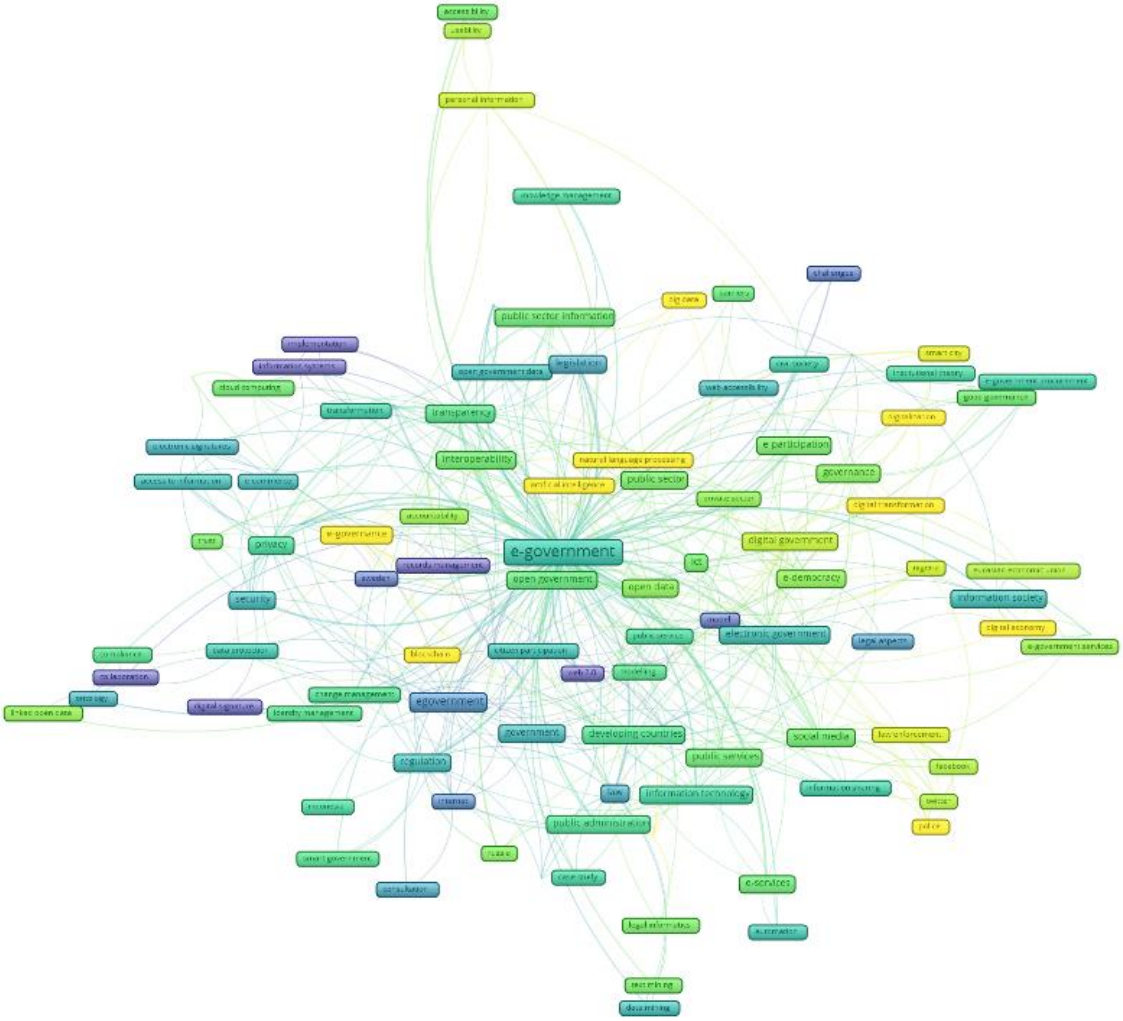

Figure 3: Overlay frame map (source: own contribution by VOSViewer)

After the thematic classification of the keywords, it is worth analyzing them from a chronological aspect. Figure 2 contains the same keywords as Figure 1 but from an overlaying perspective. It is interesting to identify the time horizon of these keywords, and how the new joint research tracks come up with new questions and issues. The analysis is conducted between 2012 and 2018.

Some of the first keywords are for example “records management”, “web 2.0.”, “implementation”, “digital signature”, and “information systems”. Then, a newer generation of keywords contains the words “legal aspects”, “challenges”, “e-government” and “consultation”. They are followed by the words “information sharing”, “automation”, and “civil society” (first appearing around 2015). Then, the concepts of “change management” and “identity management” have been included (first appearing around 2016). In 2017, new research tracks included the “social media”, “e-services”, “legal informatics” and “text mining”. The latest joining keywords are “natural language processing”, “artificial intelligence”, “big data”, “smart city” and “blockchain”.

Studying the chronological order, it is important to note that the research field has its roots in the 1990s, but it is nevertheless interesting to see the new-comer research tracks in parallel with the technological advancements.

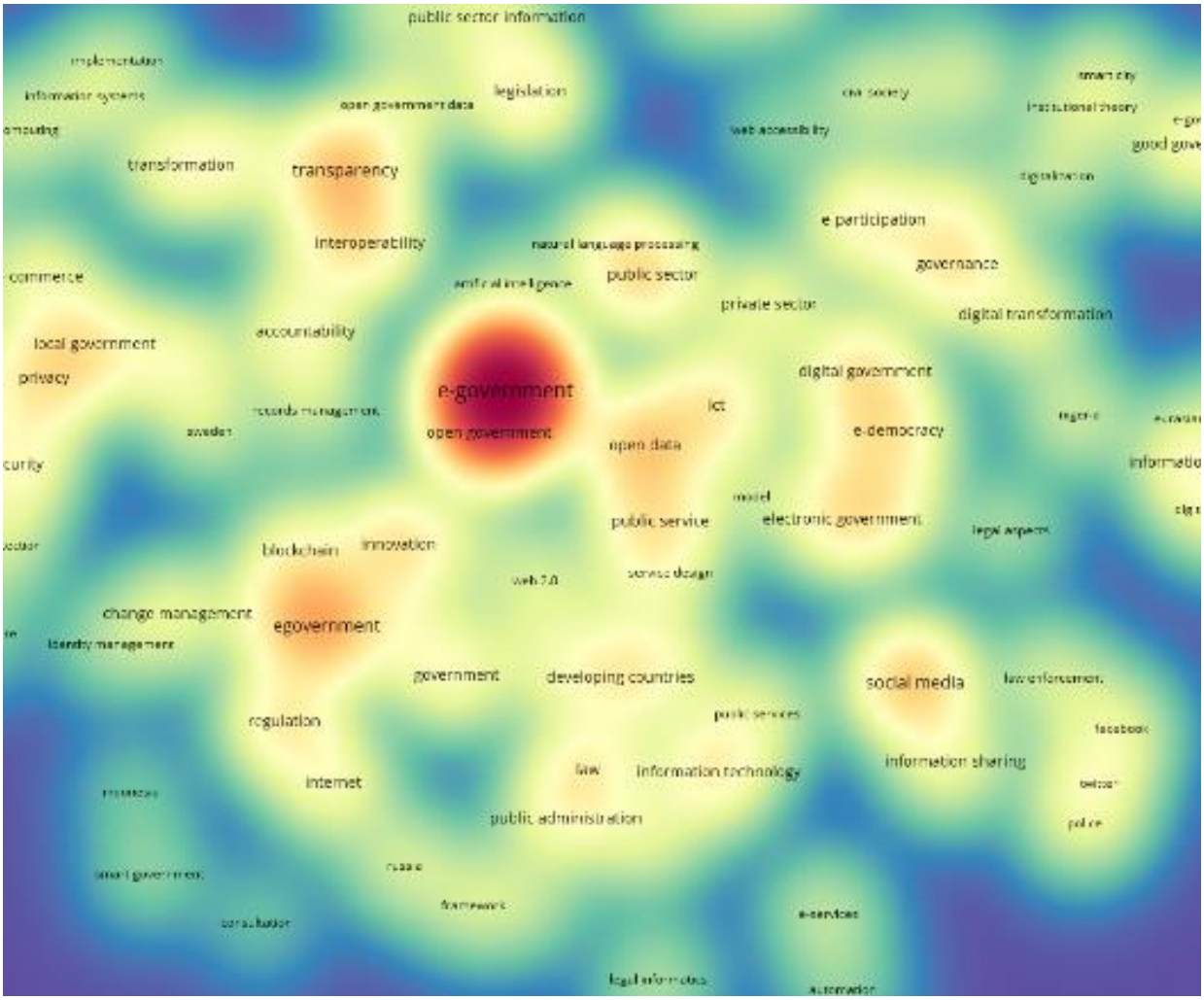

Figure 4: Density heatmap (source: own contribution by VOSViewer)

Figure 3 shows the density map of the same keywords, analyzed previously in Figure 1 and Figure 2. This heatmap helps to identify the key research clusters, being the most actively researched. The "e-government" and "open government" concepts have the strongest density, meaning the highest number of linked keywords. These two keywords are in the core, gathered around some of the actively studied research clusters.

6 bigger clusters can be identified on the heatmap. The most closely connected to the core concepts is the module containing the keywords "open data", "public service", and "service design". Another strongly interrelated cluster consists of the keywords "blockchain", "innovation", "regulation". Other research core points can be found related to the "social media" and "information sharing", "e-democracy" and "digital government", "transparency" and "interoperability", "local government" and "privacy", and "public sector" and "natural language processing".

5. Discussion and conclusion

The e-government as a concept of modernization in public administration is essential for many countries, primarily including the developed states. Its main driver is the growing demand from the side of the citizens, which causes pressures on the government to provide better services, more efficiently and cost-effectively. This can be reached by the support of technology and

communication systems. These technological advancements create development opportunities but require new methodological background and a differently organized leadership. The research field has its roots in computer science, social sciences, and business management studies, being a multidisciplinary field gathering scholars with various research profiles. Extended literature exists attempting to cover the existing literature on e-government research publications.

This present study aimed at providing an overview of the e-government research field from a public administration aspect, characterized and specialized to the implementation of new policy regulations. Research findings demonstrated a fragmented picture of the most active institutions, and a primary computer science dominated publication pattern led by conference proceedings. Topic clusters, topics, and research tracks have been analyzed based on a 3-dimension model focusing on the research foci of the publications. This includes the managerial, political, and legal aspects. The wide collection of topic clusters has a strong managerial focus, while more specific research topics are devoted to legal issues. This can be explained by the more general focus of managerial sciences, while the legal and political issues are characterized by more well-defined issues. This means on the other hand, that the managerial perspective plays a role in gathering a large number of publications as an umbrella aspect. Keyword co-occurrence analyses shed light on the importance of political perspective involving most of the modules with different specific issues. The overlay analysis framed and chronologically ordered the research tracks between 2012 and 2018. In this analysis, we could see the new-comer issues of smart city, blockchain, artificial intelligence, and natural language processing which are some of the biggest breakthroughs of recent years in technology. Finally, research core points were identified as well.

The research limitations are found in its specific nature, concentrating on the public administration related e-government publications, while its strength is found here as well. It provides scholars and practitioners various research tracks and gives hints on the best-fit literature.

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HOW IS ICT SHAPING THE ECONOMIC LANDSCAPE IN TRANSITIONAL BANGLADESH?

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Abstract
Information communication technology (ICT) has a significant impact on the national economy of Bangladesh. Nowadays, people recognize ICT as a critical driver for the governance and economy of Bangladesh. Though ICT is crucial in representative and democratic governance, it also persuades significantly in the business and service sector of Bangladesh. The present study focuses on the nexus between ICT and the economy, which shaped the economic governance landscape in transitional Bangladesh. The study endeavors to answer the questions on how ICT is triggering the economy and economic governance and how it indicates the future role of ICT in management and development. The study followed the content analysis method and was primarily based on secondary data sources to reach the inferences. The results found ICT a comprehensive platform that includes the different stakeholders and emphasized the trade-off between them and the national economy. It is also found that ICT helps the government identify the synchronized ideas of various stakeholders that coordinate their actions and produce services for home and abroad. The study concludes by arguing for the management of ICT and wrapping of multidimensional data, and it could likely boost the economy and incentives required for the government to act in support of governance in the future.

1. Introduction

Bangladesh is one the fastest growing economy of third-world countries. It has overcome many challenging barriers in transforming from an under-developed country to a developing and approaching a middle-income country by the next few years. The political stability and assertive attitudes towards foreign direct investment have pulled the country to achieve this alteration within a short period during this journey. The densely populated country also gets a continuous dividend from her working labor forces; however, most are unskilled labor. In these circumstances, Information communication technology (ICT) is booming its economy by the many unexpected and programmed economic dividends by her young generations. As a result, the government has to focus on their well-structured policy and programs where the whole world is shifting the governance pattern from a traditional to a digital one. The political manifesto of the current government was the digital transformation of governance and economy to strengthen the governance for social and economic security and minimize the inequality for the mass people as inequality prevails and hinders the more significant part of her population from many opportunities and services. To encounter all these barriers, the government primarily focuses on initiating digital service delivery in different government and public offices as pilot projects. Besides, many skilled

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people, especially the young generations, are involved in outsourcing and making money through online service delivery. As a result, within a few years, the contribution of service sectors sharply increased their stake in national GDP and continuously supporting to pile the investment in our national economy for long and self-sustained development. The increasing rate of mobile and internet subscribers is the sign of Bangladesh is the growing economy among the nations that have made a remarkable success in the last few decades. The present study aims to identify the triggering factors of ICT that boost the economy and shape the current landscape of economic governance in Bangladesh.

Like other South Asian countries, Bangladesh implemented ICT policy and different acts to meet socio-economic problems and accelerate the economy. These policies and acts also get some success and few failures resembling other neighboring countries. It is pertinent to include all segments of the population under the coverage of service in a country irrespective of caste, religion, and region to get a benefit. However, it is a great challenge for a government to ensure the inclusion of all people within a policy framework. To overcome all difficulties again, ICT can be a lifeline and can show a new moon for the government of developing and underdeveloped countries. Though many social science scholars and policy-makers were concerned about the equal distribution of internet access, the issue still is considered a solid barrier to the successful implementation of ICT policy. The current study attempts to exemplify the ICT role in the case of Bangladesh and how it comprised all barriers into an opportunity to shape the economy to strengthen for future sustainability.

2. ICT- Policies, Laws, and Acts in Bangladesh

Bangladesh had started its journey towards digitalization from the end of the last century by the pioneering role of the current government when they came into power after 25 years of liberation. The ruling party is now trying to strengthen their long-cherished desire to make Bangladesh a developed and prosperous country called “Sonar Bangla,” the golden Bangle that was the commitment from the father of the nation before liberation. Bangladesh got independence under the leadership of Bangabandhu Sheikh Mujibur Rahman and his party Bangladesh Awami League, the current ruling party. The government is adamant in its goal to make Bangladesh a digital country. In response to it, the government initiated single-minded ICT plans to eradicate poverty and connect the society in a single wave of governance which was their electoral commitment before coming into power. Digital Bangladesh has become a fashion among the ruling party politicians when they talk about the development of the government in any social or public media. Though the policies formulated and few implemented, those did not focus on the digital inclusion and empowerment of the mass people of Bangladesh before 2009. The current government made historic efforts towards the digitalization of the country while both the youth and society were waiting for such a scheme. It will lead Bangladesh into the global market with its’ young and energetic labor force to earn more and more foreign currency through digital labor supply and establish a solid and efficient service pool in different ministries and departments of the government.

Year	Policy/law	Implementing body/organization	Objectives
2018	Digital Security Act	Ministry of Post and Telecommunications, Ministry of Science, Information and Communications and	● To identify, prevention, restraint, judgment, and other subjects related to national digital security and digital crime

		Technology	
2016	Digital Security Act	Ministry of Law, Justice	● To legalizing and ensuring the security of ICT
2010	● Post Office Amendment Act ● Telecommunications Amendment Act ● International Long Distance Telecommunication Services (ILDTS) Policy ● Bangladesh Hi-tech Park Authority Act	Prime Minister's Office (PMO), Ministry of Post and Telecommunications, Ministry of Science, Information and Communications and Technology and other ministries, like Finance, Industries, Law Justice.	● To accommodate the new changes in the sector ● To accommodate the new changes in the sector ● To facilitate low-cost service including VOIP services, so that the vision of Digital Bangladesh comes into a reality ● To boost up hi-tech industries and services in Bangladesh
2009	● National Broadband Policy ● Right to Information (RTI) Act ● National ICT Policy ● Bangladesh Telegraph and Telephone Board Amendment Act ● Technology Amended Act	MoPTIT and Bangladesh Telecommunications and Regulatory Commission (BTRC) Ministry of Law, Justice and Parliamentary Affairs	● To ensure easy accessibility to the internet and effective service delivery ● To provide legal power to citizens to seek public service-related information ● To provide an up-to-date and comprehensive framework for the development of ICT with action plans consistent with the vision of Digital Bangladesh ● To accommodate the new changes in the sector ● To update the ICT Act 2006 to accommodate the new changes
2008	• ICT Policy (Review) • Secretariat Instructions		• To expand and diversify the use of ICTs to establish a transparent, responsive, and accountable government along with developing skilled human resources and enhance social equity • To legitimize the use of ICT in administrative activities and communications
2006	ICT Act	Ministry of Law, Justice and Parliamentary Affairs	● To ensure legal recognition and security of information and communication technology
2005	Copyright Amended Act	Ministry of Law, Justice and Parliamentary Affairs	● To protect intellectual property rights computers, software, e-mail, websites, and other modes of electronic communication Technology

2002	ICT Policy	MoPTIT, BTRC, Bangladesh Computer Council (BCC), and Prime Minister's Office (PMO)	● To promote and facilitate the use of ICT in all sectors and ensure transparent and efficient governance
2001	Bangladesh Telecommunications Act	MoPTIT and BTRC	● To form an independent commission to facilitate telecommunication services across the country
1998	National Telecommunications Policy (NTP)	MoPTIT and BTRC	● To ensure the rapid growth of telecommunications technology to ensure socio-economic development

Table 1: ICT policies, laws, and acts in Bangladesh
(complied and modified by authors from ICT policies, acts, laws) [1], [2]

The government has to formulate further acts and policies to support digital Bangladesh. Many new efforts added and yield benefits to the rural people who were primarily out of the purview of governmental service traditionally. Based on the (Access to Information) A2i project of the government, more than 5000 digital centers have been established to connect people and provide service from door to door to the mass people. Several financial services are in operation in Bangladesh that connected a significant part of the population who were outside of the financial inclusion in the national economy. For example, banking becomes more and more flexible in Bangladesh due to its digital transformation and people becoming more interested in institutional financial services for their economic activities and transactions. It is a continuous process, and challenges are there; the government is approaching digitalization and transformation and dreaming of being a self-reliant country soon and will be developed shortly if other things remain constant.

3. Research Methodology

There are many crucial methodologies to evaluate ICT performances in an economy, while this study is mainly content analysis based on secondary sources of data. As many dimensions are involved in the economic landscape where ICT is vital nowadays due to its array and scope in the modern democratic governance system. We include different types of sources: published articles, governmental reports and policies, newspaper articles, academic journal articles and textbooks, web pages, etc., for this review. The sources were selected based on their inclusion criteria for the study where the conditions are: all sources related to ICT, only English literature are selected, the journal articles are not only Bangladesh perspective while reports, policies, and news articles are solely Bangladesh related. Though the ICT is our central theme but to elucidate the extensive role of ICT, we include other aspects of ICT to get more widespread data to make our discussion nuanced and authentic.

4. Results and Discussions

Bangladesh earned about $1 billion by exporting the ICT product while more than a hundred thirty ICT farms produce ICT products (i.e., software, IT solutions, IT security, etc.) for domestic and international markets. The growing local and international demand for ICT products creates an excellent opportunity for the educated and talented Bangladeshi youth to involve in the economic process without any governmental intervention, which increases the economic dividend for the

government. At the same time, it does not need to invest a lot for the introduction. However, to make a sustainable economy in the twenty-first century, it is inevitable to focus on ICT and its issues for long-lasting benefits for the economic growth and development in governance. It is expected that within this year, the earning from the ICT sector will reach $5 billion.

In contrast, the mounting asset of ICT supports the crucial pillars that ultimately transform Bangladesh's economy into a digital one. Therefore it will underpin the knowledge economy of Bangladesh for future sustainability by the year 2041. The current prime Minister of Bangladesh declared the visions for "*Digital Bangladesh*" where it identified human resources, citizens, and digital governance for the development of human resources, involving and connecting people and digitalization in government where the advancement of the ICT is vital to meet these targets for practical and viable transformation.

4.1. ICT and Development of Human Resources

The demographic structure of Bangladesh is one of the prospective ones that will benefit in the coming years as the most significant numbers of youth are educated and forthcoming for the economy and transformation. To make this transformation sustainable, the government has to have political will and policy guidelines for the future. To support this, the government of Bangladesh initiated different rules, regulations, and policies to strengthen national development's decisive objectives and goals. The demographic structure of Bangladesh has surprisingly created more opportunities even in many adverse local and global crises. As a result, the government gets extra benefits from her recent demography.

The population size of Bangladesh opens numerous possibilities for the future. The Government of Bangladesh (GoB) desired to be a global gateway for the digital world because ICT sized modern life and governance, and all economic activities are attached with it. Various initiatives have been initiated to promote an expert, organized, and digital-ready pool of endowments to respond to government desires. However, the higher education sectors of Bangladesh, not totally science, technology, and engineering centered, produce more than half a million university graduates every year; thus, unemployment is increasing among the educated and graduates along with their frustration. It was not applicable for those who graduated from a science-based subject while many are from arts and humanities backgrounds but eventually switched their career in the ICT sector through post-graduate training from different governmental and non-governmental organizations in Bangladesh. There are several dedicated foundations and advanced training programs that are operational. It is imperative to increase this talent pool's numbers to deliver value on a global scale.

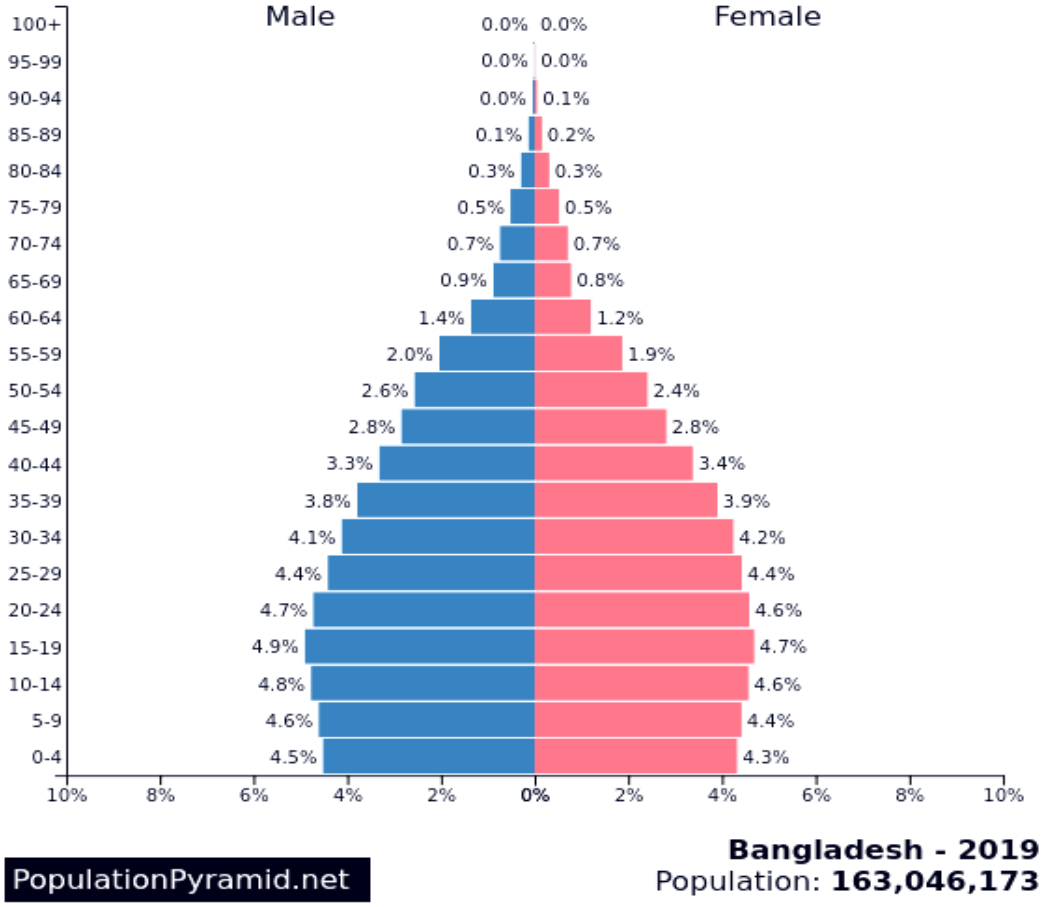

Figure 1: Population Pyramid of Bangladesh as 2019 [7]

The increasing numbers of trained ICT personnel boost the sector every year to capture the global market to meet the local and international demand for ICT products. Last year Bangladesh qualified and produced more than sixty-five thousand ICT experts by its dedicated training program for strengthening the preparation for the establishment of a global ICT hub. All of them are trained in Information Technology (IT) or Information Technology Enabled Services (ITeS). Based on the report of Oxford Internet Institute, Bangladesh was the second-largest country from where the online workers worked in the world online pool. As a result, the educated youth and the government are concerned about the prospects of this sector. In many universities, the government established specialized labs to promote and augment the skill of ICT.

Besides, many informal training centers also provide training for the interested youth that add a new speed to this sector. Similarly, the government also invested in frontline tech centers with the partnership of global leading technology partners like IBM. In preparation for the ICT sector's future sustainability with its human resources, Bangladesh has a strong focus on skilled and trained professionals in embryonic technologies- Big Data, Data Mining, Artificial Intelligence, Blockchain, and the Internet of Things.

It is essential to strengthening human resources as it is considered the lifeblood of any country or organization. To make a dynamic and develop the country and a proud nation in 21st century ICT is inseparable from shaping the society and economy. So we can say that Bangladesh is on the right

track to prepare and furnish its workforce in leading to the global competitive online market to earn more foreign currency to boost its economy with the earnings from other subsectors.

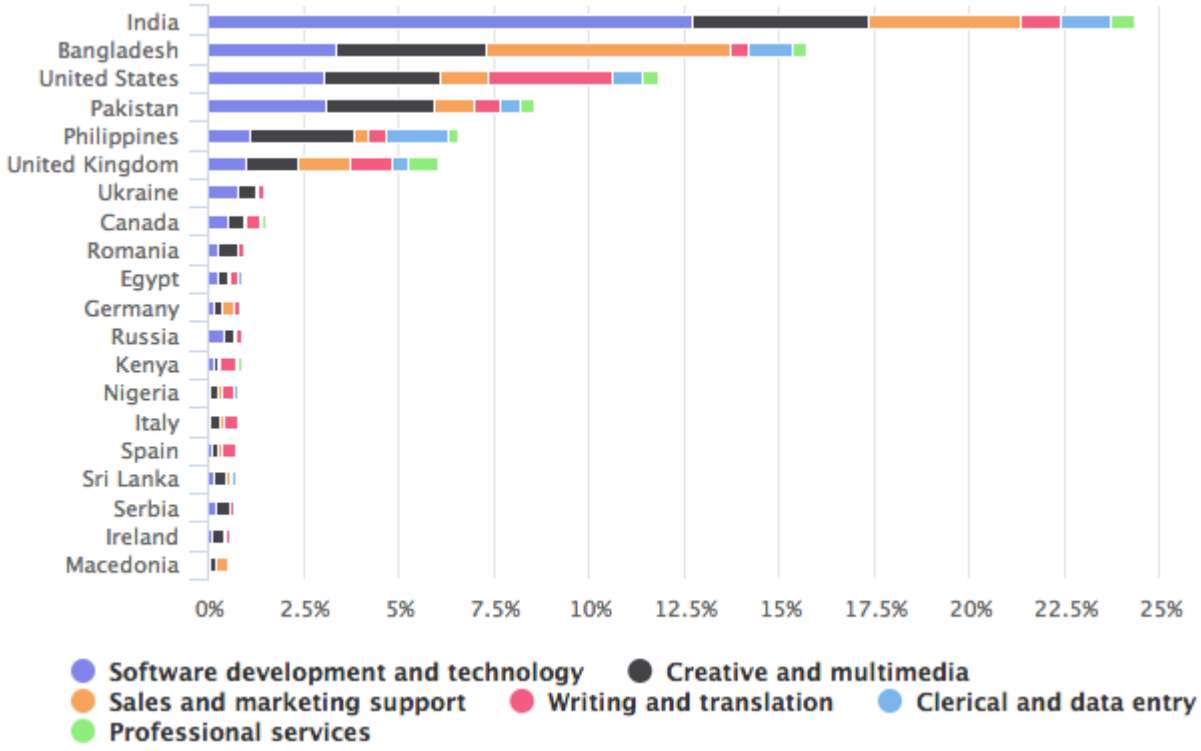

Figure 2: Online Labor Index top 20 worker home countries.
The image is taken from Oxford Internet Institute (OII) website. [9]

4.2. Connecting Citizen for Sustainable Development through ICT

Democracy is not just a form of government nor a culture of modern politics but itself a way of life that people would like to live in every corner of the society throughout the world. Many countries fought for their rights and dignity, and many left their country due to a loss of connectivity with their government. Many countries of the world imposed suitable policies in their governing structure to involve and connect their people to get more and more support from them and produce prioritized and cost-effective services for their citizens efficiently. Modern life is becoming more challenging in the past; thus, the government must be more cautious in spending money. ICT made a revolution by cost-cutting instruments and a mechanism to connect their citizens and efficiently respond to citizens even in an adverse situation.

By this year, the government of Bangladesh is committed to connecting every citizen of Bangladesh through internet connectivity. However, Bangladesh is one of the top mobile markets in the Asia Pacific region, making it easier for the government while people are coming to step forward to respond.

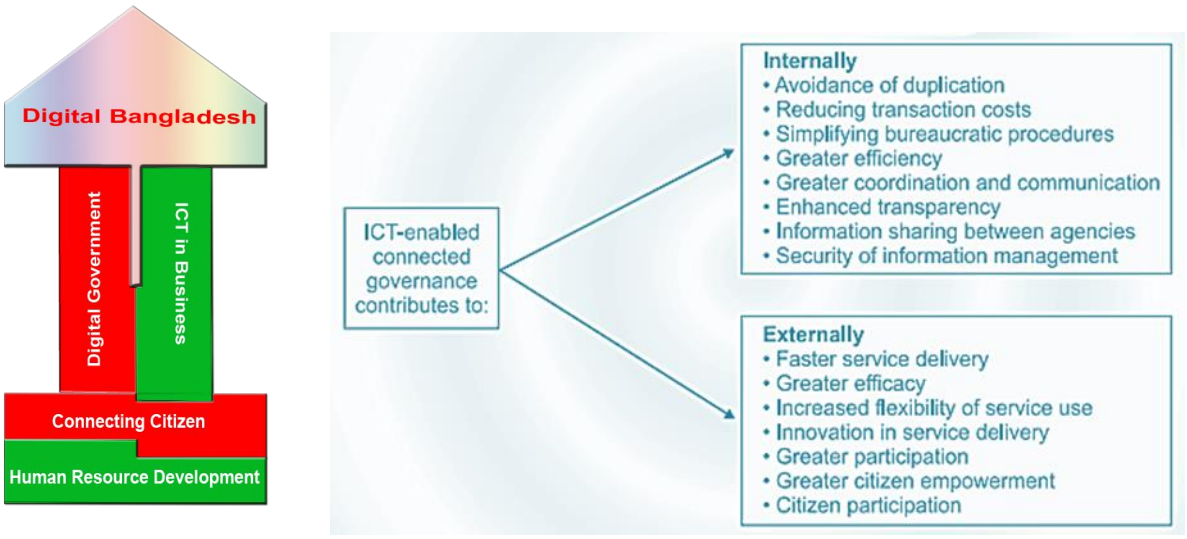

Figure 3: Digital Bangladesh and Role of ICT in Governance [8], [4]

In Bangladesh, about 160 million mobile subscribers while ninety-three million people are connected with internet facilities. The seamless connectivity also benefits the people with high-speed internet and most advanced facilities by the positive attitudes of the government. Two submarine cable connections also added more and more suitability for strengthening the ICT productivity of the country. Due to this, the people living in remote areas are also connected to the high-speed internet facility. Furthermore, the government creates opportunities to attract investors and interested individuals and groups from home and abroad by establishing twenty-eight high-tech parks to guarantee a gainful space for companies. The government is attentive to the booming atmosphere for the associates and financiers who wish to take advantage of the opportunities that Bangladesh offers.

4.3. ICT in Governance

E-governance is one of the primary building blocks for Bangladesh towards digitalization. Bangladesh is approaching forward and driving its steer to the digitalization that is strengthening and hastening the local economy at the regional and global level. By definition, e-governance is simply applying ICT to all aspects of government business where it makes sense to improve the efficiency and effectiveness in the achievement of policy and program outcomes. As Riley defined, E-governance is “an opportunity for governments to get closer to the citizen and build a partnership with diverse communities of interest, practice, expertise, conviction, and interdependence.” [5].

Participation Indicators	Conventional Governance Models	Digital Governance Models
Mode of Participation	Representative	Individual / Collective
Domain of Participation	In-Situ	Ex-Situ
Approach to Participation	Passive / Reactive	Pro-Active / Interactive
Impact of Participation	Indirect / Delayed	Direct / Immediate

Table 2: Comparison between Conventional and Digital Governance Model

The government of Bangladesh is driven to digitalization in governmental portals and trying to incorporate innovative services through ICT. By 2023 the government wishes to start digitalization in the passport and visa application; however, the government has already made few steps to make it more convenient. In one portal and articulation of more than 45000 websites of government offices are now under the umbrella of digitalization. In rural areas, the government also established more than 5000 digital centers countrywide to create an opportunity for digital services for the citizens to minimize the digital divides. These digital centers are serving mainly rural areas to connect the rural community in the governance system. Every union (the lowest tier of local government) has at least one digital center where people usually visit to get their digital services.

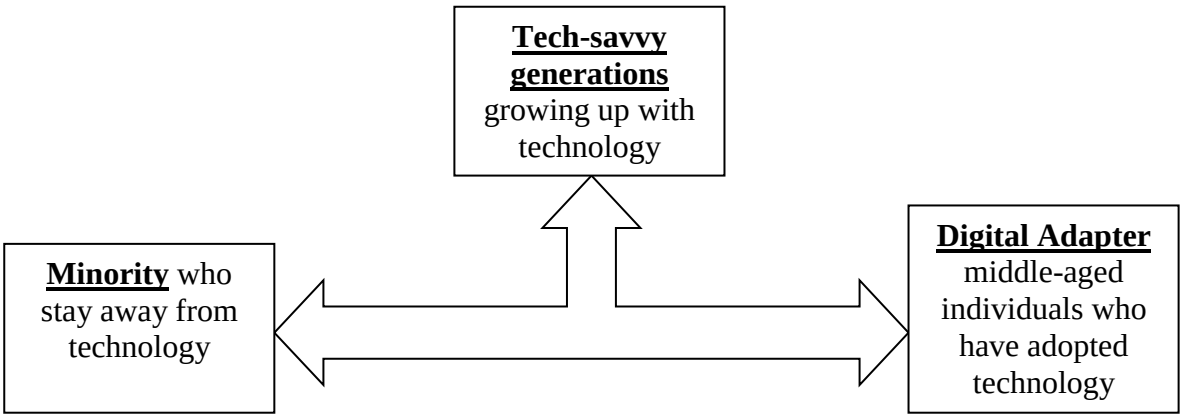

Figure 4: Design for citizen inclusion in digital transformation

Bangladesh National Digital Architecture (BNDA) confirms the interoperability for e-governance and recognized by the WSIS (World Summit on the Information Society) for its initiatives for digitizing the governing system since 2014. The digitization process also extended by providing digital IDs to 100 million people of Bangladesh, one of the biggest volumes in the world. As a result, people can be reached and connected without any middleman with the services in and outside the country. To accelerate the service and connectivity within different ministries, the government established a Digital Service Accelerator to expedite and promote e-services of various ministries. The government also designed the service to connect a diverse group of people based on the social strata and class, which yields more productive results towards the goal and transformation for digitalization.

4.4. Development of ICT Industry in Bangladesh

The ICT industry in Bangladesh is swiftly emerging and becoming a vibrant one as it is the fourth pillar of the digital transformation of Bangladesh. Through continuous support from the government, the ICT industry has become strengthened nowadays as it has become more viable to deliver innovative and faster service delivery than earlier. Bangladesh provides services in different domains comprising financial, telecommunication, healthcare facility and IT, ITeS, and some leading global companies.

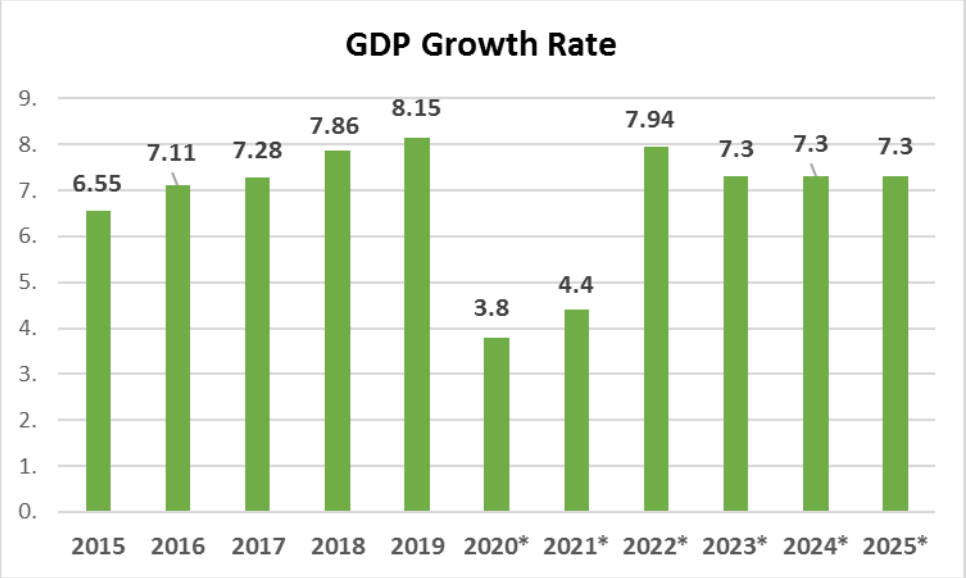

Figure 5: GDP growth rate of Bangladesh [3]

Bangladesh is experiencing one of the fastest-growing economies globally and earning the right to be called one of the prospective countries in the future. It maintained a good and steady economic growth rate in the last couple of years and strengthened the future with solid support from diversified areas of the economy. Due to its speedy and balanced economic growth, Bangladesh became the 2nd largest economy in South Asia [10] and 41st globally and will be 25th within the next ten years [6]. After this growth, the most potent and vigorous factor is the well-designed use of ICT to incentive progress in every area.

Figure 6: Our dream Trajectory

5. Conclusion

To conclude the paper, the ICT policy has made a tremendous success in the economic sector. However, it needs many more reforms, including different segment people and reducing the inequality and empowerment of the disadvantaged group of people for maximum output. Development is a multidimensional concept that requires overall development. Digitalization only cannot make it possible without good cooperation with other policies and ministries. Digital transformation can boost the process if the infrastructure is well equipped to implement digitization in every sector of Bangladesh. It is essential to reach and connect mass people with the governing process. It will empower them through connectivity, which will allow them to contribute to strengthening democratic governance today and tomorrow for a better and developed nation. Finally, it can be said that ICT played a crucial role in the economy as it is the driving force of a government. In the case of Bangladesh, ICT needs continuous support from the government side as it can play its role. More and more youth could get a chance to produce more earnings for Bangladesh to reshape the economy into a developed one.

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Smart Cities and Smart Regions

PUBLIC-PRIVATE PARTNERSHIP FOR SMARTER CITIES

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Abstract
The paper focuses on the role of public-private partnership as a tool that can facilitate smart transformation of cities and regions ensuring wider range of opportunities for various stakeholders including citizens, business actors, authorities, educational institutions, NGOs and so on, as well as create a more sustainable economic and social environment. Particular attention is paid to the experience of the leading smart communities in different countries, in terms of the applied models of private-public cooperation. The SWOT-analysis of the PPP concept in smart cities is conducted based on which the conclusions regarding its impacts and potential are made. Based on the recent trends in urban development the importance of searching for new approaches to the city governance, in order to deal with the challenges more efficiently and provide better services for the citizens, is highlighted. The concepts of Smart Cities are viewed as powerful vehicles for fostering urban prosperity.

1. Introduction and Research Context

The exponential development and extensive dissemination of the ICT (information-communication technologies), occurrence of their most advanced forms such as Internet of Things, Artificial Intelligence and other disruptive technologies do actively fuel the relatively new phenomena of smart cities, which require searching for out-of-the box strategies and solutions in the fields of urban administration and social policies. [40] The UN resolution 72/228 Science, technology and innovation for development from 20 December 2017 reaffirms «the central role of Governments, with active contributions from stakeholders from the public and private sectors, civil society and research institutions, in creating and supporting an enabling environment for innovation and entrepreneurship and the advancement of science, technology and engineering, in accordance with national priorities». [36] This approach is revealed in the Public-Private Partnership (PPP), which allows engaging multiple stakeholders in the smart transformation processes and is widely applied by the municipalities in numerous countries. [11] PPP is viewed as a prioritized form of implementing multi-stakeholder projects, especially at the initial stages. [20] The municipalities that are less advantaged or are associated with weak economic conditions are provided with a chance to make smart quantum leap and serve their citizens better as a result of crowdsourcing and attracting investments instead of being left on the back-burner. [2]

At the same time, PPP is applied case-by-case and may significantly vary in terms of its structure and realization, which also impacts the final outcomes. [19], [42] So, there is a strong need to consider the particular PPP practices applied by the leading smart communities as well as to research pros and cons of PPP as a tool enabling smart transformations. The SWOT analysis

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derived from the literature review as well as particular smart city examples is to be conducted. The SWOT methodology was chosen as it allows detailed consideration of the impacting factors, in terms of the multidimensional perspective, which is needed to draw the research conclusions. For the purposes of this paper, the examples of the world leading smart cities such as London, Bristol (the UK), Barcelona (Spain), and Amsterdam are considered to determine the approaches to PPP applied. There are two reasons why these cases were selected for analysis: all of these cities implement and emphasize on the importance of PPP, and the leadership roles within the PPP seem to be taken a bit differently, so it is important to analyze and reveal whether the difference in approaches to PPP is present. [6, 3, 16, 24, 34]

2. Research Findings

2.1. Defining Smart Cities

Although there are quite many definitions of the smart city provided on a case-by-case basis, the majority of them focus on pointing out the essential components of a smart environment. [12], [28] According to Deloitte, smart city refers to investments in certain components triggering sustainable economic growth and better quality of life achieved through participatory governance, wise allocation of resources, and innovative management. The inclusivity is a vital characteristic of smart cities. [33] The key investment areas are as follows:

a. human and social capital;
b. traditional infrastructure;
c. disruptive technologies.

The given definition emphasizes on investment, participatory governance and allocating resources on the cooperative premises as indispensable aspects of Smart municipalities. According to the IBM report on Smart cities, the key dimensions of Smart-cities are smart-manufacturing, smart health, smart buildings, open data, digital citizens, smart transportation, smart energy utilities, mobility or Wi-Fi, and smart government. [8]

Similar approach of defining a smart city through its components is present in the work of Meijer and Bolivar (2015), where smart city is viewed as a holistic combination of technology, human resources and collaboration. [26]

2.2. PPP as a Core Element of Smart Cities

The PPP can be defined as a durable collaboration between public and private actors related to providing common services, allocating risks and investments or joining efforts to achieve socially valuable outcomes. [20] Among the typical smart-city benefits that are already becoming visible, there are co-creative decision-making and participatory relationships between public and private actors. [4] Smart-city means interplay of various stakeholders working together in a framework of partnerships in different forms. According to Selada, a city should not be considered as smart, if the stakeholders are not involved in the innovative processes. Successful implementation of smart city concepts is based on the Quadruple Helix model that provides cooperation of academic circles, industry, civil society, government and people. [31] The key smart city stakeholders or interrelated and interdependent actors are mentioned in Table 1. All of the elements are equally meaningful, though the citizen-centric approach is a key prerequisite of good governance. As in terms of PPP, more attention is usually paid to the entrepreneurial or citizen aspect, but there are researches

emphasizing on the importance of considering political and civic dimensions of smart transformation. [10] The four modalities of smart city such as the service-user, entrepreneurial, political, and civic are considered to be arriving from the particular techno-public assemblages consisting of issues, people, practices, and space.

Investors	**Research Institutions**	**Digital Agencies**	**Technology Vendors**
Manufacture & Construction Companies	**NGOs**	**City Government**	**Public Housing Associations**
Political Circles	**Citizen or User**		**Energy Providers**
Public Transportation Providers	**Startup Incubators**	**Health Care Providers**	**Banks & Insurance Companies**
Telecom Providers	**Hotels, Museums, Theaters, Stadiums**	**Logistics Providers**	**Retailers**

Table 1: Smart City Actor Map [28], [10]

Ruhlandt mentioned (2018) that the essential elements of smart cities are stakeholder involvement, collaboration, and engagement in decision-making. [30] The report "Mapping smart cities in the EU" emphasized that a smart city is a multi-stakeholder and municipality based partnership. [26]
In context of the survey conducted by Philips, answering the question which stakeholder do they turn for advice and guidance related to smart city implementation, the municipalities of the leading smart cities focused on businesses (26%), city leaders (16%), private companies such as utilities (15%), citizens (13%), planners (12%), consortiums (10%), other (4%), NGOs (2%). At the same time, the survey proved that one of most common blockers to Smart-city development is the lack of stakeholder support. (5,1%) [32]

Lack of resources may pose a significant challenge to the smart concept implementation for the public authorities. PPP as a primary tool that should be used by the regions or cities in particular with weak economies and especially at the initial stages of smart transformation, also facilitates smart specialization and further economic growth, while the less advantaged communities turn into the investment-attracting spots. [29]

Through resorting to PPPs and crowdsourcing, cities are more likely to provide better public services and to build a long-term investment environment taking advantage of the private sector's "know-how". [27] Moreover, the smart city concept is viewed as a promising investment tool. A Chair of the Scottish Cities Alliance and Leader of Dundee City Council, Councillor John Alexander emphasized that partnership between cities provided the community transformation bringing additional investments and positive community effects. It should be noted that the Scottish

Cities Alliance includes Aberdeen, Dundee, Edinburgh, Glasgow, Inverness, Perth and Stirling and the Scottish Government. The collaboration takes place in three directions such as Investment Promotion, Hydrogen, and Smart Cities. The Smart City concept implementation through the intercity partnership has brought 50 mln (of which 20 mln are investment of European Regional Development Fund) of pounds of investment in the city economy. [1]

It is worth noting that it is discovered that the smart city performance is largely triggered by the four main structural aspects of PPP such as deep involvement of numerous private partners, top-level planning by the local authorities, government-dominant infrastructure construction as well as hybrid organizational platform being a general contractor. At the same time, the correlation between transaction costs and governance structure of the PPPs was found. The success of the smart PPT is determined by the role and responsibilities undertaken by the government. [21] In context of the PPP, there are six key roles to be played by the city government such as connector and protector, director and regulator, strategist and advocate, solution enabler, and steward. It is empirically proved that the sustainability aspect of smart cities comes from dynamic processes driven by PPP in the framework of an open innovation platform. [19]

Therefore, PPP is an indispensable aspect of a smart city while its efficiency is determined by its structure and particular mode. Nevertheless, to procure smart city projects various tools may be used and one of the alternatives to PPP is Multi-Attribute Utility Analysis (MAUA), which was successfully applied to 8 types of common smart city projects in Hong Kong. It was shown that not all projects are best suited to PPP, so this methodology gives a space for preliminary estimate of PPP efficiency emphasizing on the importance of considering alternatives leading to a compromised solution that both public and private sectors would accept. [18] There are also some challenging issues related to defining particular aspects of PPP. According to Vrabie, based on the interviews conducted in Bucharest, Romania, there are 5 main operational areas to be considered in terms of partnership agreement between a town hall and other entities (business, civil society, private companies, etc.) such as degree of commitment, leadership hierarchy, decision-making, liability and flexibility. [39] Taking into account the diverse components of PPP, referring to particular examples of smart cities is highly relevant.

2.3. The Leading Smart Cities Experiences

The cases of 4 smart cities such as Bristol, London, Amsterdam and Barcelona are considered in order to analyze the partnership structures and approaches used by these cities. The choice was based upon the criteria of cities recognition as smart ones as well as their internal positioning. [6, 3, 16, 24, 34]

2.3.1. Bristol

Bristol is being consistently ranked as one of the top smart cities in the UK and the world. In 2015, it was awarded European Green Capital status. [15] [10] In context of the multilateral partnership structure, where the city council is viewed as one of many actors, of which no-one prevails, smart city activities in Bristol are characterized by the two key dimensions. Firstly, the council and the University of Bristol cooperate in the framework of «Bristol is Open» partnership, which focuses on providing digital infrastructure. [6] Secondly, there is the «Connecting Bristol» initiative that mostly relates to citizen and SMEs engagement. There the leading roles are performed by enterprises, e.g. Knowle West Media Centre. [9] So, the smart activities are based on the decentralized partnership model rather than orchestrated hierarchically by the council. The private, public and charitable organizations are equally influential and meaningful in the smart city concept

implementation and coordination. Particular attention is paid to facilitating multilateral dialogue with the city stakeholders. At the same time, the informational portal, Open Data Bristol, where the city council publishes the open data of different types is controlled by the private company Open Data Soft. [24] In accordance with the General Data Protection Regulation (GDPR) adopted in Britain in 2018, the city council is a Controller, i.e. it holds overall responsibility for the data protection, while the private company is an Operator. [6, 38] In case of any failures of the private partner the municipality would be liable for it that may cause both material and reputation losses. At the same time, the Bristol city council is very careful with the private partnerships related to the implementation of digital solutions. The multidimensional analysis is conducted to check the reliability of the partners. The council is vigilant in terms of using cloud technologies and hosting of the web-services such as Amazon. In this context, the strategy of reductionism and end-efficiency prevails over the declarative implementation of innovations at the expense of the security components. The smart city assemblages are viewed as based on the partnerships among the decentralized agencies and stakeholders rather than being imposed from the above through a certain centralized hierarchical model. [10]

2.3.2. London

Smart London is associated with a collaborative and entrepreneurial mode of governance. [24] The innovations are aimed at responding to the expected population growth while fostering sustainable economic growth. The smart initiatives in London are steered by the Greater London Authority (GLA) and specially the office of the Mayor of London that are placed at the heart of PPP leadership structure. [24] The cooperation with numerous stakeholders such as leading researchers, tech companies and others is happening through the Smart Board and project partnerships. It is worth noting that the GLA gives impetus and facilitates smart results rather than imposes directives. The cooperative governance strategy leads to attracting investments in the city infrastructure on the sustained basis and effectively revitalizes the city economy. London has been referred to as a "honeypot of technologies and partnerships." [34]

2.3.3. Amsterdam

Amsterdam Smart City is positioned as a unique partnership between business, authorities, research institutions and the people of Amsterdam. [3] The focus is made on the aspects of open data, better working, living and mobility. The city is defined as an urban living lab providing businesses with opportunities of testing and suggesting innovative solutions. The partnerships do mostly take place in the fields of citizen participation, sustainable energy, e-health solutions, education, and transport. The smart platform also provides cooperation among national and international stakeholders. The Edge, in Amsterdam, is not only the greenest office building in the world, but also the most connected one. It is a living lab for innovative applications of the Internet Of Things in office environments. The building has a floor space of 40.000 m, houses for 2.500 people and is equipped with 30.000 sensors. As Bloomberg stated, it is the most connected office space in the world. [32] The living lab model is getting higher popularity as a practical embodiment of smart cities allowing targeting the actor components more efficiently from smart construction to academics.

2.3.4. Barcelona

Barcelona has been recognized as the third smartest city in the world. The typical feature of its success is the buy-in from the very top. The mayor and the city's innovative chief technology officer have created the change-triggering environment through the authority-led partnerships. According to the survey, the respondents pointed out monitoring meters and optimized energy

consumption, as well as a comprehensive future vision to be among the most impressive aspects of their city. [16] It should be noted that Barcelona is often referred to as a personal success of the innovative chief executive that means a huge role of the centralized hierarchical approach in the smart processes. The city has adopted a common strategic vision that guides various stakeholders, so they are mutually contributing to its implementation while the objectives and indicators are set by the city council team.

2.4. SWOT-Analysis of the smart PPPs

As revealed by the SWOT-analysis based on literature review, PPP has very sound strengths such as attracting investments and leading to higher economic growth, not the least due to cost savings. [1, 29, 33] Moreover, it is associated with better understanding of the citizen needs and facilitating a citizen-led democracy. Smart city partnerships are often aimed at implementing sustainable solutions such as, for example, renewable energy infrastructure, which have positive synergy effects on the environment achieved through crowdsourcing and involvement of various stakeholders. PPP means practical implementation of Quadruple Helix model ensuring cross-sectoral cooperation of research institutions, business actors, people and public authorities that provides more efficient and multidimensional project implementation. It also improves the inner-city social environment. The inclusivity that is one of the fundamental objectives of smart cities is practically reached through the PPP [29]. PPP allows job creation and increases the existing opportunities for citizens, providing sound social value.

Strengths	Weaknesses
• Increased investments and higher economic growth [1, 29, 33] • Costs Savings [1, 29, 33] • Involving various stakeholders [1, 29, 28, 33] • Promoting Sustainability [41, 6, 4, 15] • Practical Implementation of the Quadruple Helix Model [41, 6, 4, 15] • Inclusion [29, 32] • Multiplying Social Effect [22, 15, 3, 1, 13] • Facilitating citizen-led and citizen-oriented democracy [22, 15, 3, 1, 13] • Crowdsourcing • Jobs creation [37] • Co-creative decision making • Effective cross-sectoral partnership	• Private partners controlling the vitally important public city infrastructure • Higher dependance on the external resources and stakeholders [35] • PPP fits not all the smart city projects [18] • Lack of the unified understanding of PPP mechanisms • Uncertain Leadership hierarchy [3, 24, 6, 11] • Financial input from the municipalities may remain high [35] • Lack of unified monitoring and set indicators [43]
Opportunities	**Threats**
• Wider opportunities for international and intercity partnerships (city-2-city city 2 foreign city, city-state) • Creating inter-city smart clusters and facilitating inter-city cooperation [1] • Deriving benefits from smart specialization [29] • Developing PPP in the field of AI, Big Data, Open Governance [6] • Positive transformations of communities [6, 3, 16, 33] • Reaching the synergy effect of multiplied resources [1,29, 13, 33]	• Partnership and resource management risks • Socio-political risks • Security threats, especially in the field of Data Privacy • Lack of education and smart city planning skills of municipalities [32] • «Outsourcing trap» [35] • Municipalities may lose their responsibility to protect role • Unpredictability of the PPP outcomes [43] • Risks for municipalities to lose political leadership over the fundamental infrastructure [35] • Conflicting Stakeholders Goals [35]

Table 2: SWOT-analysis of the PPP (Created by author based on the literature review)

The crowdsourcing and joint resource allocation also present a strength point. However, this advantage also poses the risk for the municipality to lose control over the processes, for which it is accountable. In the PPP framework, private partners may control the vitally important public city infrastructure. At the same time, the city councils are liable for the failures of the private partners that may cause the material as well as reputation losses for the public actors. The study of PPP-related threats, in terms of broadband infrastructure, which may be considered as quite a common project type for smart-cities, clearly indicates the partnership and resource management risks. Moreover, the conflict of interests may occur that will negatively impact the realization of its functions by the public partner. The municipality may face the so-called «outsourcing trap» while it transfers its key responsibilities to other stakeholders, so its impact, not the least in terms of reputation, will depend on the third parties whose activities they can impact and control only to certain extent. [35] Thus, the municipality may lose its control over the vital infrastructure, while it is still responsible to the citizens for wise handling of the infrastructure issues. As the control

system is distributed among numerous small-hand stakeholders, monitoring and setting unified performance indicators may be challenging. [43] The uncertainty and polysemantic nature of operational roles and functionality distribution among numerous stakeholders also lead to security threats, especially in the field of data privacy.

The PPP requires a system of controlling and preliminary analysis. To this end, there is a strong need that the municipal authorities have strong competence, education and skills that are sometimes lacking. Moreover, PPP should be considered through its applicability to particular cases as it was mentioned that sometimes the other models are claimed to be more appropriate. [18] The cases of four smart cities considered in this paper also showed that the mechanisms of interactions under PPP are defined case-by-case that leads to the lack of legal certainty. There is no unified leadership hierarchy as well as no single approach to the functions of the authorities. [16, 3, 24, 6] Lack of the unified understanding of PPP mechanisms may lead to its improper implementation and therefore negative consequences for stakeholders. As the control system is distributed among numerous stakeholders it may be more complicated to predict the final project outcome. At the same time, the opportunities such as developing AI solutions, deriving benefits from smart specialization, creating inter-city clusters both within one country and internationally are highly promising. Deriving benefits from the synergy of joint resources also intensifies the positive transformation of the communities. Overall, the positive effects of PPP prevail though the risks still exist being mostly related to the operational, technical and strategic mistakes that may occur at different stages of the PPP life-cycle. It is up to the municipality to take measures to resolve the challenges and avoid the potential threats through wise and systemic efforts paying precise attention to the challenging PPP aspects.

3. Summary and Suggestions for Further Study

Implementation of Smart-city concept in its comprehensive manner means keeping up with the recent urbanization trends. PPP is viewed as an essential underlying mechanism present in smart municipalities that presupposes wide cooperation of diverse stakeholders as well as a tool that can foster smart transformations of a city through the power of joint resources, co-creative decision-making and risk allocation. As PPP provides wider opportunities for the cities, it is also defined as a promising strategy of fostering city smart transformations while turning the municipality into the investment-attracting spot. Researching the experiences of the leading smart cities such as London, Bristol, Barcelona and Amsterdam has revealed that PPP is a commonly applied practice. At the same time, the PPP takes rather unique embodiment in each of the considered cases, in terms of the leadership structure and coordinating roles. In Barcelona, the PPPs are centric-based, initiated and coordinated by the city council. In Bristol, more freedom is given to the private stakeholders that can themselves coordinate smart city projects. In London, all the smart partnerships are carried out by the authorities but their role is rather advising than imposing partnership vision. Although PPP has numerous advantages including economic, social and those related to city governance, its implementation largely depends on preliminary analysis and distribution of leadership roles.

The SWOT analysis has revealed the positive effects as well as significant potential of PPP, in terms of social, economic, sustainability, transformative and other positive benefits. The risks and weaknesses of PPP determined in the SWOT-analysis are mainly arising from failing to implement proper monitoring, citizen-orientation, security and resource management strategies as well as risks-analysis of PPP. The strengths and opportunities will offset risks, if a municipality efficiently exercises the PPP monitoring and analysis, so it maintains its controlling and operational role, in terms of its responsibility to the citizens as a provider of vital services. Therefore, PPP is

considered as a key promising solution to reach a smart city transformation, in case of its proper implementation and risk assessment.

There is a strong need to further research the leadership structure of the smart PPPs, in order to determine the roles of the stakeholders, especially, the authorities such as the city council focusing on a higher number of cases. Also, it is important to pay more attention to creating the system of indicators that may be applied by municipalities as well as the monitoring methodology to measure smart PPP efficiency. Another interesting study direction is defining correlation between PPP implemented by a smart city and level of trust in the public partner (city council) expressed by the citizens. It may be relevant to measure the citizens attitudes towards PPP and the outsourcing mechanisms, in particular, with a view to revealing the potential "social value" impacts of the PPP. Contrasting and comparing different PPP types based on the particular projects examples is also relevant, so the pros and cons of each of the types can be discussed in a more detailed way. Furthermore, more consideration of challenges and possible response practices of the public authorities associated with the PPP life-cycle stages is needed.

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ARE SMART VILLAGES JUST SMALLER SMART CITIES? CALL FOR A REGION-TYPE-SPECIFIC APPROACH TO THE SMARTIFICATION OF COMMUNITIES

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Abstract
This paper presents a conception for a region-type specific approach for understanding and developing region-specific smart communities in predominantly rural areas. The concept is based on a discussion of the topic of smart communities from the points of view of (1) data economy, (2) regional communities, and (3) smart technologies as well as a discussion of "smartness" in context of smart communities. The paper points out the lack of differentiation between the different smart-community types in current models and typologies and argues that even a differentiated view is not sufficient in face of the high level of connection and interplay between the different communities. The paper proposes to develop a region-specific smartification model that considers the region-specific context and interaction with more urbanized regions, especially for rural areas.

1. Introduction

The idea of making communities "smart" has been considered with regard to different types of communities and regions, most commonly as smart cities, but also smart villages, or smart rural areas. The topic has been approached from different angles, often with a clear focus on technical solutions and concrete applications, but also many non-technical dimensions as well [25]. However, smart communities present complex socio-technical systems, typically facing difficult problems; for this reason, "smartification" ought to be approached systematically, from point of view of governance and e-government [20]. Typologies and models play an important role in mapping existing knowledge, providing a foundation for sharing insights, as well as gaining a deeper understanding of the field [18]. Among the different types of smart communities, smart cities have been particularly well researched, which means that typologies and models from this area are mainly concerned with smart cities. Other community types, such as smart villages, are attracting increasing attention in research and practice. This raises the question to which extent existing research findings related to smart cities are applicable and relevant to other community types [31].
This paper will address the following questions:

- What are region-type specific characteristics of a data economy for rural regions?
- What are the different characteristics of a data economy for each type of region, in terms of needs and application areas, data ecosystem and its actors, digital technologies and ICT infrastructure?

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- Is there a need for region-type-specific implementation models for data economy?
- Is there a need for new typologies, taxonomies and morphologies or are already existing models sufficiently suitable?

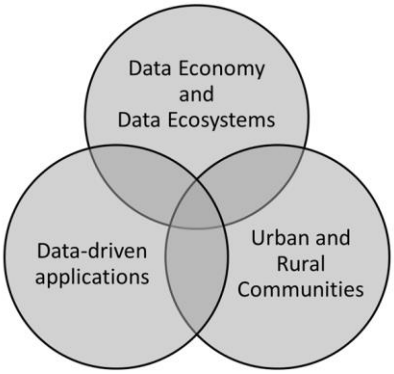

Figure 1: Areas related to Smartification of Communities

To address these question, section 1 first addresses smart communities based on three related topics: (1) data economy and data ecosystems, which explores the economic issues and opportunities of greater reliance on digitization and datafication, (2) the different types of urban and rural communities and their implication of smartification of communities, and (3) a discussion about data-driven applications (see Figure 1). In section 2, we discuss the differences and similarities between smart communities, such as smart cities and smart villages. In section 3, we consider whether typologies and models related to smart-cities are directly applicable to smart communities of a different region type. Finally, in section 4, a region type specific model is introduced and presented for discussion.

1.1. Data Economy and Data Ecosystems

The term data economy is used in many different ways and in this article, we focus on its use in the economic policy debate, taking the European Union's data-related policies as a guide. [6–8] The European Commission defines the term "data economy" as follows. “The ‘data economy’ is characterised by an ecosystem of different types of market players - such as manufacturers, researchers and infrastructure providers - collaborating to ensure that data is accessible and usable. This enables the market players to extract value from this data, by creating a variety of applications with a great potential to improve daily life (e.g. traffic management, optimisation of harvests or remote health care)."[6] The focus of this definition is on the relevance of data ecosystems, with the purpose to improve daily life of the ultimate users, namely the European citizen. From our point of view, such a goal of value creation for the citizen implies a value co-creation mechanism based on a service-dominant logic. [3] This approach is reflected in our basic model in Figure 6.

To understand the value of data and the range of data-driven economic activities, Géczy [10] described four dimensions of a data economy, namely trade, labour, education and government (see Figure 2). This conceptual framework underlines the importance of a comprehensive approach to smart community development that involves all actors in the respective data ecosystem and remains open to further dimensions of a data economy. In the strategies of the European Union, the focus also includes all four dimensions. The focus on data-driven products and services and above all the creation of a single European data market are particularly worth mentioning here. [7]

In the literature, smart communities such as smart cities are also consistently proposed as holistic approaches in the context of data economy as by Géczy.[10] The U.S. Nation Institute of Standards

and Technology's (NIST) Smart Cities model, as one of the most referenced models, includes the six components of government, economy, mobility, environment, living, and people. Khatoun et. al explicitly pointed out that this holistic approach is necessary, but often falls short in practice. In this context, reference is made to The Policy Department of the European Parliament, which found in 2014 that only 34% of smart cities in Europe take all six components into account in practice. [14] In comparison, Söderström et al. also point to the ambiguity of covering so many different dimensions. [29]

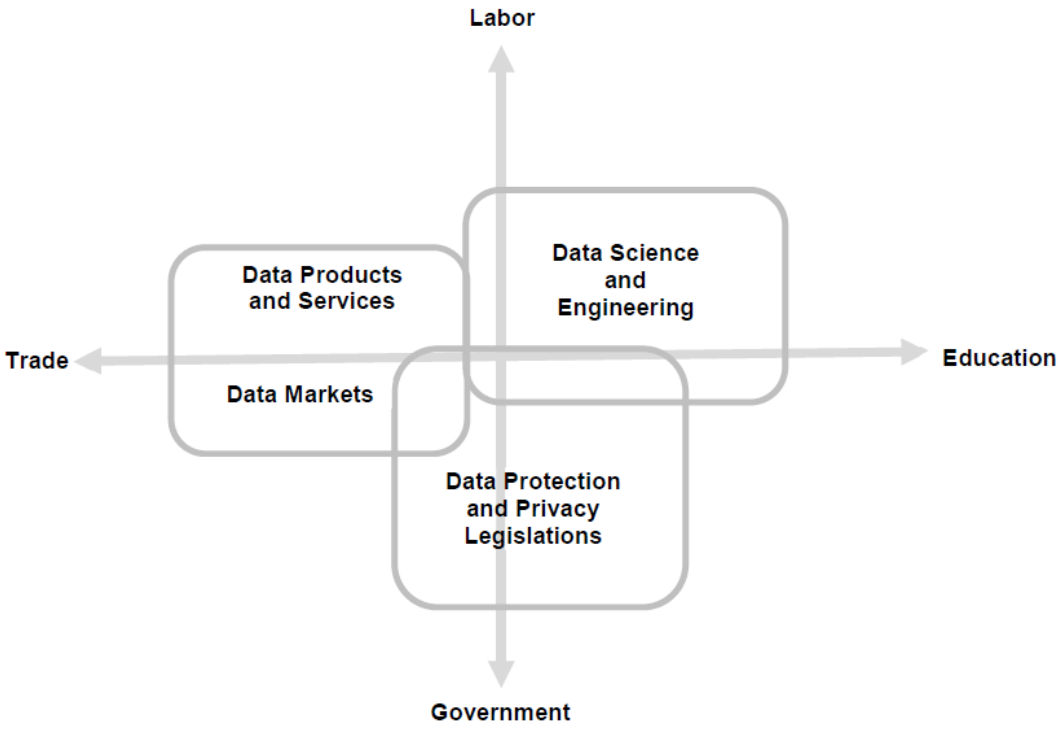

Figure 2: Data Economy Dimensions [10]

1.2. Urban and Rural Regions

The classification of regions to explain differences between rural and urban regions is an established approach in economic analysis and policy. The OECD has introduced a regional typology that initially uses three types of regions, namely predominantly urban (PU), intermediate (IN) and predominantly rural (PR) [23]. The main distinguishing criterion is based on the percentage of the regional population living in urban or rural communities. This concept was extended to include an accessibility criterion in the form of distance to a populated centre. The resulting classification consists of five region types: Predominantly Urban (PU), IN close to a City (INC), IN Remote (INR), PR close to a City (PRC), and Predominantly Rural Remote (PRR). [23] As an example, we can view the Lower Austria region, which is located around the predominantly urban (PU) city of Vienna. The regions within Lower Austria are classified as Intermediate close to a City (INC), Intermediate Rural (INR) and also Predominantly Urban close to a City (PRC). One region is classified as Predominantly Rural Remote (PRR). This shows that different region types do not exist separately, but form intricate networks.

We assume that the OECD typology of regions for explaining economic and labour market development is also a suitable basis for developing a region-type-specific data management model for the smartification of communities. The necessity to consider urban and rural spaces simultaneously is supported both by literature [28, 30, 32] and by European Union initiatives regarding smart villages [9, 27] and smart rural areas [5].

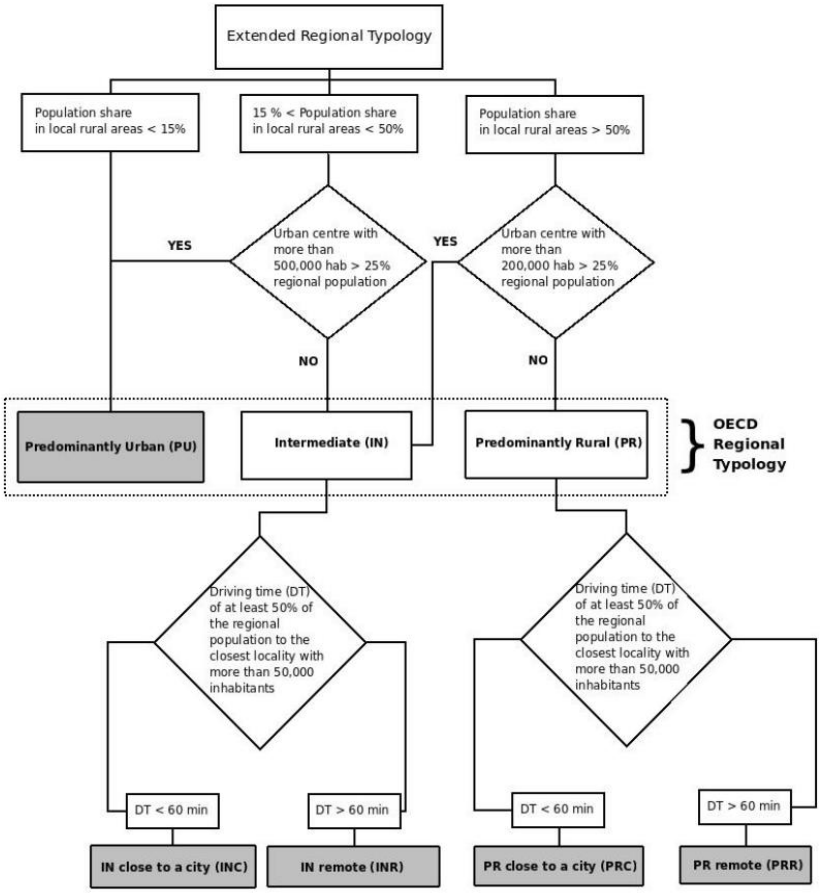

Figure 3: OECD's Extended Regional Typology [23]

1.3. Data-Driven and Smart Application

The ability to realise the potential of the data economy in the quest of improving the living and working experiences of citizens in different rural and urban settings rests to a large degree on technology. Whereas automation, in the sense of "using machines/computers/robots to execute or help execute physical operations, computational commands or tasks"[22] has a long history of application in various urban and rural context, there has been a rising increase of interest in application that make an explicit use of data. There is no clear definition or even a single term that describes the technologies that provide benefit through collecting, processing, and presenting data; in the literature and public discourse, these may be termed "data-driven", "data-intensive", or simply "smart", with the latter term being increasingly popular, but also extremely ambiguous [25].

Such data-driven applications have been developed to take advantage of the increasing availability of data, which is driven by number of factors: Due to digitalisation, large amounts of data are now directly available in digital form (e.g messages, but also accounting or transactional data). In addition, meta-data data that describe different aspects of our daily lives are actively collected as a form of datafication [2]. Finally, there are data collected and exchanged by machines [15]. The

applications have, in general, two broad goals: to manage the (often complex) data streams as well as the data themselves and to provide means of effective and efficient data analysis [12]. These can be broken down into more detailed tasks, amounting almost to a process of data utilisation [12, 15, 24, 25] (see Figure 4).

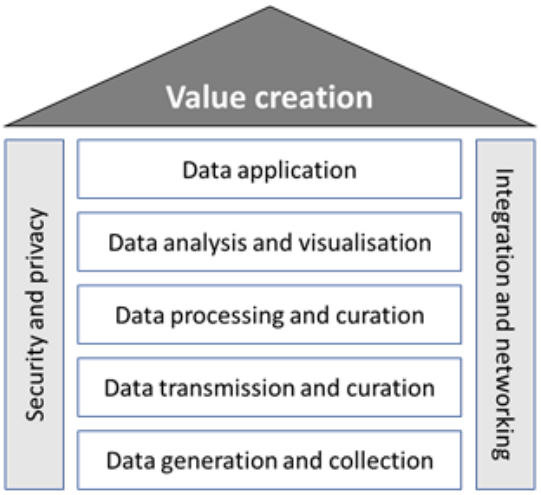

Figure 4: Areas related to Smartification of Communities (author's chart)

Besides the reliance on data, the "smartness" of data-driven applications is often explicitly named. The general term of the term "smart" is very loose and often serves merely as a marketing narrative [29]; however, the literature does provide clearer definitions of the term. According to Martin et al., "smart" applications possess "self-managing capabilities" (such as self-diagnosis, self-correction, and self-control) and are therefore able to react dynamically to diverse situations, even improving their response through learning [19]. For Jovanović and Vollmer, "smartness" can be driven by three dimensions – technologies can be "smart" if they are integrated and interconnected, intelligent, or autonomous, but they do not have to possess all three properties to an equal degree – their "smartness" can be cantered even on a single one of them [13]. Goddard et al. stress the ability to interact with the environment but also the capability to perform the action as a feature of "smartness" [11]. Overall, the represented discussion of "smartness" in context of technology is very much feature-driven, cantering on performance and features of smart technologies. As we discuss in section 2, this definition cannot be directly applied to the concept of smart communities.

2. Types of Smart Communities - and the other Meaning of "Smart"

The term "smart" in connection to smart cities, smart villages, or smart rural areas does not have the same meaning as with regard to "smart" technology. Here it is a part of a broader narrative [25, 29]. There can be a number of meanings, even totally unconnected to ICT, implied by the "smartness" of a community, such as [34]: (1) systematic planning and infrastructure development, (2) citizen empowerment, (3) government and efficiency, (4) sustainability and resilience, (5) data and technology. These dimensions of "smartness" often overlap or interact with one another; notably, the use of data and technology can occur in conjuncture with another dimension. Overall, the aim of smart communities is increasing the quality of life of the inhabitants as well as the sustainability of the community itself [34].

These overarching, general aims seem to be shared by different types of smart communities, such as smart cities, smart rural areas, and smart villages. But in other respects, it also seems difficult to distinguish between the goals and implementations for the different types of smart communities.

Even when the indicators used to compare smart cities and smart villages are analysed in more detail, similarities remain. Sharifi [27], reviewing indicators for smart cities, identifies as relevant indicator categories economy, people, governance, environment, living, mobility, and data. In comparison, Mishbah et al. [21] draw up a conceptual model for smart villages and come up with nearly the same set of categories. Does this mean that the different types of smart communities do not need to be treated separately? There is no clear consensus in the literature on this. Cvar et al. [4], while acknowledging the differences between smart cities and smart villages (mentioning different levels of infrastructure concentration), suggest that technical solutions are transferable and even applicable independent of culture or context.

Other authors point out to differences between the types of smart communities:

- **Different goals:** The research on the different types of smart communities is driven by different aims: research on smart megacities gravitates towards increased efficiency and improved infrastructure [31], smart cities research is concerned with sustainability [31], and research on smart villages (at least in European context) is focused on preventing the depopulation of rural areas [32]. This mirrors the different key concerns of the communities and implies that some generally applicable concepts and implementation, might not be equally relevant for all types of communities.
- **Different needs:** Although the categories of a "good quality of life" might be comparable across different types of communities, there are intrinsic properties that lead to different concrete needs. Maja et al. [17] systematically compare indicators for smart cities and smart villages, showing differences such as connectivity to infrastructure or even vulnerability to environmental changes.
- **Different challenges:** The infrastructural differences also cannot be considered merely as providing a different environment - they can also represent a considerable hurdle in the implementation of smart community concepts, as disadvantaged rural areas that would most benefit from innovation at the same time require considerable infrastructural investment before it can be affected [16]. This means that some ideas, while theoretically viable for different types of smart communities, are pragmatically not applicable.

While the commonalities are at a higher level of abstraction, the differences are at the level of the more immediate goals, needs, and challenges faced by communities of different region types. From the authors' perspective, this is an instant indication that smartification research does not yet adequately account for region-specific differences in its models.

3. Models and Typologies

In acknowledgement of the complexity of the topics related to smart communities, models and typologies have been developed that describe the different facets that need to be considered. Due to the early focus on smart cities, these typologies are often related to city-level smart communities. In sections 1.2 and 2, we have already discussed the differences between communities of regional types and their smartification. In this section, we discuss, whether existing typologies that were typically developed for smart cities are directly applicable to other region types. For this purpose, two typologies serve as examples, showing typical issues that occur in smart-city typologies.

Abu-Matar [1] presents a reference architecture model, depicting relevant views for smart-city solutions (see figure 5). Although strongly technology-driven, the model depicts a number of non-technical views, such as the participants and the related business processes. The model appears

applicable to any smart community, but it does not explicitly include the concerns and the context that communities of different region types have. Higher-level (strategic) goals are not present as a view; only the capability (i.e. the problem-solving functionality) is considered. Governance view is also missing from the architecture as are considerations of the overall ecosystem and interplay with other communities.

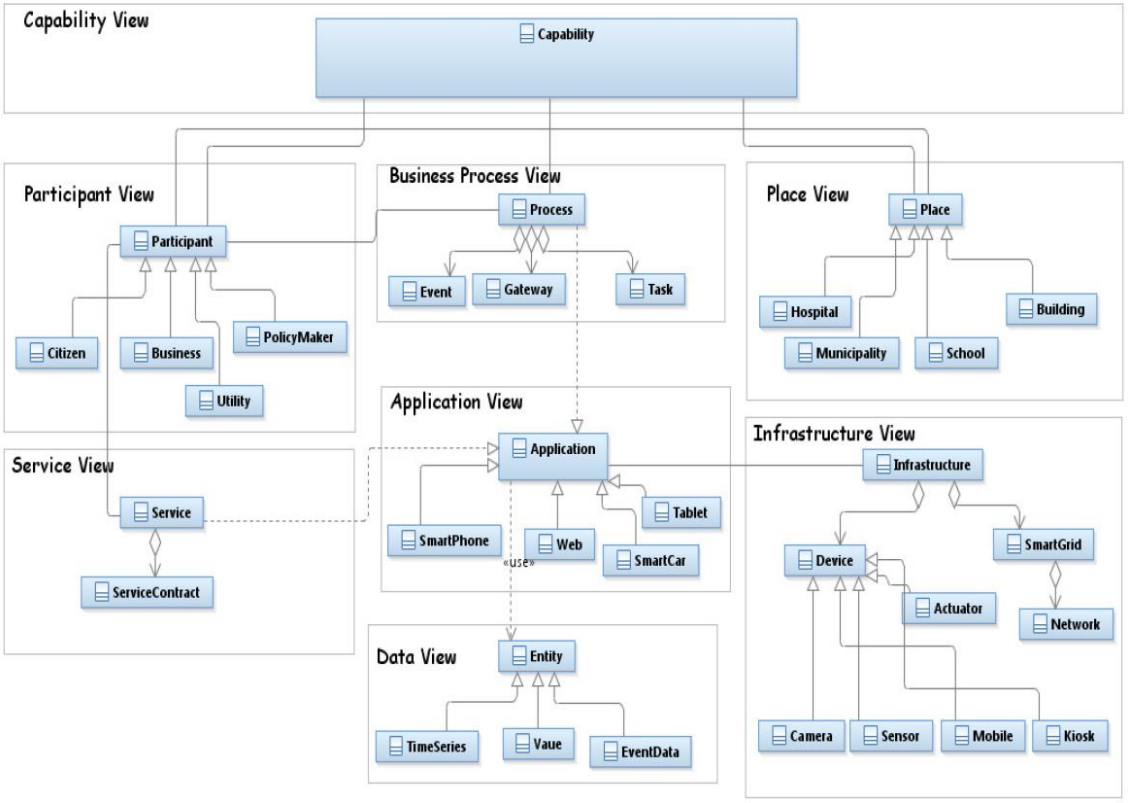

Figure 5: Smart City Reference Architecture Meta-Model by Abu-Matar [1]

In comparison, similar issues can be seen by Wolff et al. [33], who provide a user-centric typology for categorising smart-city applications based on the process of data processing, assuming that the main purpose of smart-city applications is to allow the users to benefit from the data (human-data interaction). The typology describes smart applications through nine properties, connected to the data-processing process. The overall typology is generally suited for classifying any kind of data-driven applications and its relevance to smart cities is only visible in the offered subcategories. From the authors' point of view, this model implies uniform objectives and needs for all types of smart communities. However, this assumption was challenged in section 2. The typology is focused on applications and neglects categorical distinctions by smart-community type. In addition, it is assumed that the data are both generated and used within the community - interconnectedness with other regional communities and the supra-regional character of date ecosystems is not considered.

Other models are concerned with describing smart community goals and indicators [17, 21, 26]. On an abstract level, the models identify the same set of overarching categories (such as economy, people, governance, environment, living, mobility, data, resources), making them appear universally adaptable, provided that the indicators within the categories are adapted to the goals of the community. Unlike technology-oriented typologies, these consider the broader views such as economy or governance, but neither the differences between communities nor the interaction with other communities of the region type are considered.

4. Discussion: Region-type-specific approach to the smartification of communities

In this paper, we have presented a discussion of smart communities, considering their regional type, their role in a broader data ecosystem as well as the role of data-driven applications in this context. We considered smart communities as complex entities whose smartification requires a holistic approach and systematic governance [20]. We were particularly concerned with the differences between smart communities of different regional types. While such differences are being considered (as is visible in the growing body of research on smart villages), we felt that the role of the regional type in the smartification of communities has been neglected. Many solutions, typologies and models focus a single community type and consider it as autonomous communities, without relevant dependence on other communities, failing to view smart villages as part of a region and ignoring their unique region-specific characteristics.

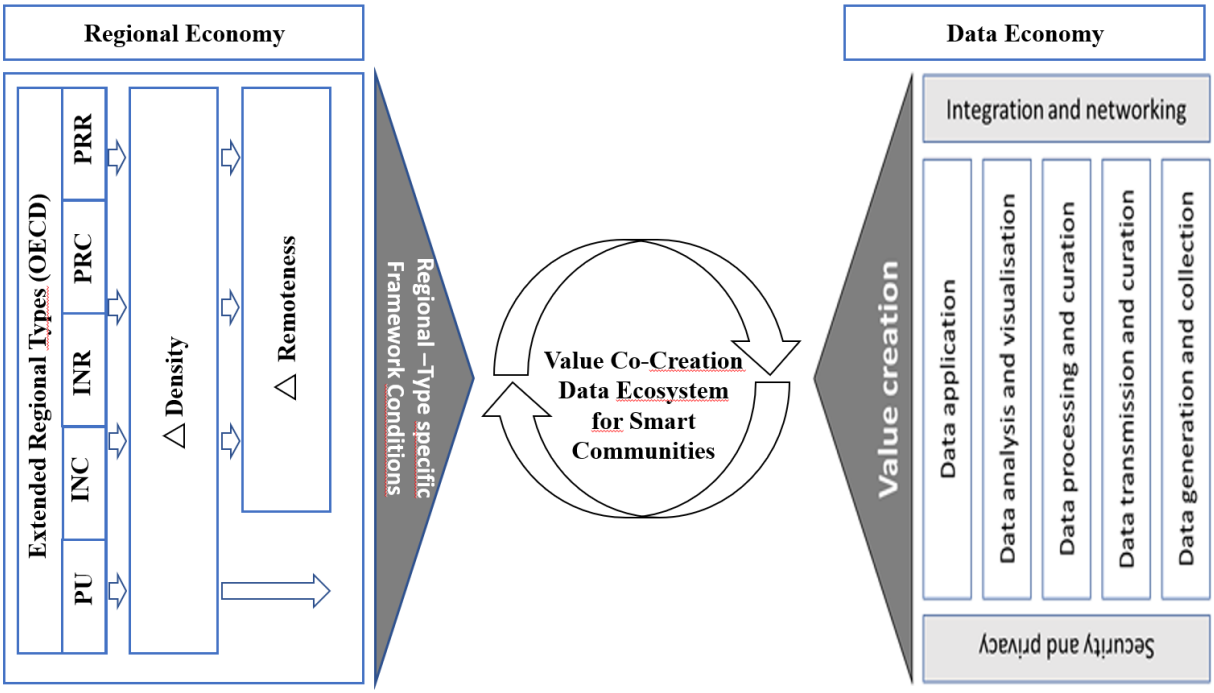

Figure 6: Region-specific-Data-Economy Model [author's chart]

As successfully applied in the context of economic and labour market analyses, regional-specific characteristics and related problems and objectives are important to understand in order to advance the smartification of communities. Srivatsa [30] points out, that the goals and problems are often directly interconnected, such as the problems of depopulation of villages and overpopulation of cities - both of which have been targeted in (separate) smartification research. We therefore consider the simple distinction between smart communities as insufficient to fully tackle the specific problems and goals for smartification initiatives. The smart communities' classification a) overestimates the degree of autonomy of single entities such as smart villages to truly generate benefits on their own, and b) underestimates the regional and supra-regional specific character of problems, goals, and data ecosystems. Both the value proposition and value creation for smartification initiatives should be region-specific rather than smart community type-specific.

The authors therefore propose to develop a region-specific smartification model that takes into account the region-specific context and interaction with more urbanized regions, especially for rural areas. The conceptual approach (see Figure 6) assumes three main variables: (1) the density variable in the form of the percentage of the regional population living in urban or rural communities, and (2) the distance variable in the form of the distance to a populated centre, both derived from the OECD's extended regional typology model. (3) The data ecosystem variable and the associated value co-creation mechanism of the actors involved is derived from the concepts of a data economy.

In conclusion, this paper suggests that smartification projects should take a region-type specific approach that considers the full and unique context of each region under consideration and understand communities such as smart villages as only part of smart regions. As a logical consequence, smartification projects should consider a whole region with all its communities of different types and not focus on individual communities of a region. The cross-regional character of data ecosystems in particular requires this. The basic region-specific data economy model presented in Figure 6 puts the focus on the process of value co-creation in the tension between a data economy and a regional economy. In this context, it is not only necessary to empirically study the value co-creation mechanisms of smart applications, but also to engage in further theory building.

5. Acknowledgements

This paper is a part of an ongoing research on data economy and data-driven applications as a part of the project Dataskop, financed by the government of Lower Austria. The project represents a cooperation between the research institutions FOTEC, Danube University Krems, IMC University of Applied Science Krems, and University of Applied Science St. Pöten. The project will explore the potential for data economy in Lower Austria, extend the theoretical foundation in this field, but also engage in the development of solutions for selected use cases from the region.

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SMART INFRASTRUCTURES FOR RURAL AREAS - BEST PRACTICES AND SUGGESTED ACTIONS FOR MOLDOVA

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Abstract
Our research is devoted to stimulating the processes of adaptation of digital innovative concepts of "Smart Village" and the operation of smart infrastructure - spatial data, in order to contribute in rural economic development and improve economic situation in rural area. In paper we describes the potential for achieving synergy in rural areas, between the projects of the programs «National Fund for Regional Development» and «National Research and Development Program» (2020-2023), through the implementation of ArcGIS - ESRI best practices and approaches to ICT adoption based on programmatic approach. Finally, our research is devoted to the recommended activities proposed to public local authorities and to local initiative groups for the digital transformation of rural villages in Moldova. This article will discuss about these issues providing examples of good practices founded in the world.

1. Introduction and context

Following the «Decision of the EU Commission for the Implementation of the Annual Action Program in favor of the Republic of Moldova for 2020» [3], non-agricultural individual activities in Moldova account for only 5% of income in rural areas and a quarter of the income of the rural population is provided with social benefits. In this regard, there is a real need for efficient digital solutions for business continuity.

The first part of our research is devoted to stimulating the processes of adaptation of digital innovative concepts of "Smart Village" and the operation of smart infrastructure - spatial data, in order to attract credit funds to finance investments.

The tasks of top and middle managers to intensify integration into the Single digital market of the EU and the digital space of Eurasia, as well as into the «European Research Area» (ERA), are caused by the emergency COVID-19, which blocks and restricts the activities of rural local governments, organizing businesses and households.

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The second part describes the potential for achieving synergy in rural areas, between the projects of the programs «National Fund for Regional Development» and «National Research and Development Program» (2020-2023), through the implementation of ArcGIS - ESRI best practices and approaches to ICT adoption based on programmatic approach.
This combination of internet-based digital tools and advanced programmatic approaches in the management of EU funds will create jobs in non-agricultural sectors, increase household income in rural areas and create rural well-being.

The third part of our research is devoted to the recommended activities proposed to «Local initiative groups» for the digital transformation of rural villages in Moldova.

Villages and rural settlements in the development regions of the Republic of Moldova are experiencing the effects of demographic changes and a decline in the population of rural areas. This trend raises several important questions for the future: What will villages look like as population's age? Will young people and families move to rural villages? Will the villages be able to maintain their infrastructure (transport, shops, healthcare, etc.)? Will there be more business in the countryside? What concepts will help revitalize villages and rural areas and keep them attractive to residents, young and old? The «Single digital market» is a planned economic zone of the EU countries with a focus on telecommunications and the digital economy. The need to integrate the development regions of the Republic of Moldova into the EU's Single Digital Market is to bring the developing national digital market of the Republic of Moldova in line with the digital age, namely: it is necessary to reduce the digital divide between the regions within the country and the EU / Eurasia regions, eliminating unnecessary regulatory barriers and move from separate local / regional, national markets to a single pan-European set of rules. The goal set by the EU is to catch up with the United States, Japan and South Korea in the Internet economy, for which it will be necessary to expand access to digital goods and services, better conditions for digital networks and services, their expansion, and a greater digitization of the economy. The need to integrate the Development Regions of the Republic of Moldova into the European Research Area (ERA) is caused by the need to eliminate fragmentation in territorial scientific research through programming / planning the integration of national scientific resources within the framework of research programs of the European Union.

The ERA is part of the more developed European Knowledge area, focused on research, education and innovation, and is part of the broader Lisbon Development Strategy, which unites these three areas in a "scientific triangle".

The best way to develop ERA is to share strategies at the national and regional levels. The key point in this progress should be that the interested regions will exchange experience, gain practical knowledge, and create interconnections between strategies to ensure the social security of researchers, additional incentives for private research and innovation, scientific cooperation with third countries, and the like.

«Roadmap for the integration of the Republic of Moldova into the European Research Area» [2] is a unique program document that innovative organizations of development regions can use for the exclusive adaptation of rural local communities to planning sustainable innovative development. The habitual expectations of rural residents of centralized approaches to solving social and economic problems are becoming a thing of the past. How can we make life in the countryside more attractive and close the gap between town and country? This question periodically forces our group of researchers to turn to the study of «Best European Practice» to develop joint solutions,

recommendations and testing of the implemented tools of the «Digital Economy» in pilot, experimental settlements, and our potential partners in innovation. The Smart village (EU) concept, referring to rural areas and communities that rely on their existing resources and assets, clearly demonstrates to us that European countries are rethinking and redefining the adopted concepts of smart cities and villages. They emphasize the need to implement Smart Specialization approaches starting with local communities, ensuring synergy of funds, local resources, technological innovation solutions and spatial planning as a basis for achieving the Sustainable Development Goals.

The United Nations «Sustainable Development Goals» (SDGs), adopted in 2015, committed the global development community to 17 interlinked goals and 169 targets aimed at improving the quality of life for all. The SDGs and their targets also aim to revitalize rural communities and their links to urban centers [15].

The Smart Village model, based on an integrated approach to digital development, is delivering accelerated impact on multiple SDGs such as health, trade, education and agriculture by expanding access to Smart Infrastructure and ensuring that the right digital solutions reach people, households, small and medium enterprises (farms), public administration. The main characteristic underlying most of these components is their interconnectedness and the generation of data, that can be used rationally to ensure optimal resources.

The main components of «Smart infrastructure» [4] of settlements «Smart village» include: smart buildings; rational mobility; rational energy consumption; rational water supply; rational waste management; rational health care; rational digital layers. It is proposed to consider the feasibility of the deployment of the specified infrastructure, within the framework of the competition for projects of the «Regional Development Fund» and the possibilities of organizing the appropriate management, through analytical processing of the generated data on the specified components, within the framework of the information systems being created in settlements - the beneficiaries of the projects, ensuring the collection, storage, processing, access, visualization and dissemination of spatial data.

Such an information system is called «Geographic Information System» (GIS). According to the territorial coverage, global GIS, sub-continental GIS, national GIS, often having the status of state, regional GIS, sub - regional GIS and local GIS are distinguished [9]. The problem orientation of GIS is determined by the tasks solved in it (scientific and applied), among them the inventory of resources (including the cadaster), analysis, assessment, monitoring, management and planning, decision support.

2. Best practices

To open up new opportunities in the area of Smart Specialization, regions and local leaders in rural areas need to analyze their position in national, regional and European value chains. Based on this analysis, the implementation of local priorities / plans for «Smart Specialization» should be coordinated with not only regional, national priorities and programs, but also with regions of other countries, since no region has complete and complex information about all opportunities for cooperation in the regional, national and European level in their areas of «Smart specialization». As potential partners for interregional cooperation of Smart Specialization, we propose to the public authorities of the Republic of Moldova for consideration, the EU project «Digital Villages» (DE) [6], coordinated by the Institute of Experimental Software Engineering. Fraunhofer (IESE), aimed

at finding digital solutions for people living in agricultural areas, with a focus primarily on rare settlements. In district centers / cities, where many people live together in relatively small spaces, different problems need to be addressed than in rural areas. The challenge here is primarily to cover distances among a small number of people. As a result, rural digitization requires different concepts, solutions and business models.

European practice shows that indicators of sustainable development are actively used in the statistical systems of some countries, not only at the level of cities, regions, but also at the levels of settlements (villages). The use of indicators provides an opportunity to assess the performance of settlements, so that specific measures can be recommended that they will subsequently take. And the indicators can be used as a tool for monitoring the progress of settlements on the way to their sustainable innovative development based on the tools of the Digital Economy in the regional, national, European framework of the «Sustainable Development Goals» (SDGs) - the «European Sustainable Development Network» [12].

The software product of the American company ESRI - ArcGIS will be helpful for visualize large amounts of geo-referenced statistical information (generated data). A wide range of spatial information analysis tools are built into *ArcGIS*, which are used in a variety of areas: land cadasters, land management; registration of real estate objects; engineering Communication; telecommunications; ecology; transport; water resources; forestry; finance and banking; education; trade and services; public safety.

The ArcGIS tools applied in process of «localization of smart infrastructure», will empower synergies between the programmatic approaches of the «Regional Development Fund» [17], «National Fund for the Development of Agriculture and Rural Areas» [13], «National Research and Innovation Program for 2020–2023» [19] and «Roadmap for the integration of the Republic of Moldova into the European Research Area 2019-2021».

The goal of Program No. 3, «Regional Infrastructure» (RDF) [20], is to create basic infrastructural conditions for improving living conditions and creating prerequisites for attracting investment to the regions, inclusive rural localities.

Exclusive digital solutions developed by potential residents of innovation incubators with the coordination of research organizations, as part of the initiation of public-private partnership projects «National Program for Research and Innovation 2020-2023», will make economic mechanisms available for various target groups in rural areas: public administration; innovative organizations; business (farms; cluster initiatives); civil society organizations.

How innovative organizations can help to local communities, villages? Within the framework of the powers established by law, the region can search for credit funds to finance investments. In the same time, as it mentioned in [1], local legislation establishes volume limits of the loan and provides the system for ensuring.

One of the forms of attracting external investments to the regions is the participation of interested local organizations in the EU Programs to which the Republic of Moldova is associated: Horizon Europe, Erasmus+, Cross-border cooperation programs and others.

From this point of view, public administrations, private farms (SMEs), civil society organizations need to be aware that the European Commission Services have identified synergies between

different EU funds. Increased innovational partnership and their impact, for combination of different forms of innovation and support for competitiveness, or promoting innovative ideas along the innovation cycle or value chain to bring them to domestic and foreign markets.

Thus, synergy is to gain a greater impact on competitiveness, job creation, including for academics and growth in the European Regions, by combining Structural Funds with Horizon Europe and other EU instruments in a strategic as well as cohesion-oriented manner. To achieve this synergy, the services of the Commission paved the way for a strategic approach in the medium and long term, starting with the stage of stakeholder engagement (the «process of entrepreneurial discovery» [7]) to form strategies for smart specialization (RIS3 - Research and Innovation Strategies for Smart specialization). Such RIS3 strategies establish a national or regional framework for investment in research and innovation not only from ESIF, but also from all funding sources. Organizations directly interested in participating in Horizon Europe and other EU programs in territories using synergies through building *«Innovative Partnerships»* [16] during the planning of *«Public Procurements»* and *«Public-Private Partnership»* projects, thus, will be able to build an incentive system local innovation. Commission Services strongly encourage synergies by combining Horizon Europe Finance and ESIFs in one project (only possible for the National Research and Innovation Program and Horizon Europe), or through sequential projects that build on each other or parallel projects, roadmaps that complement each other. In the case of the Republic of Moldova, the consolidation of financial flows can be achieved by solving local development problems in joint projects with research organizations. Thus, local communities will have the opportunity to combine the efforts of interdisciplinary, inter sectorial groups (cluster initiatives) of farms, small and medium enterprises, and several local communities in order to attract local resources and assets to provide investment in specific economic activities, increasing welfare and living conditions in the villages.

The needs to build synergy within the framework of initiation a «Public-private partnership» and organizing joint «Public procurement» with the initiation of a coordinated «Innovation partnership» between organizations located in the «Down-stream» are clear presented in the Figure 1. In addition to the established criteria, that characterize innovation, there are also new ones that are not completely established. In [8] were mentioned that M. Porter and G. Bond distinguish upstream and downstream innovations. The first combine scientific research, the second - the processes associated with making a profit. It is proposed to separate the factors that form the innovation environment in a corresponding way. In this case, the pilot territories, the project concepts of which have been selected for participation in the second stage of the competition of the National Fund for Regional Development.

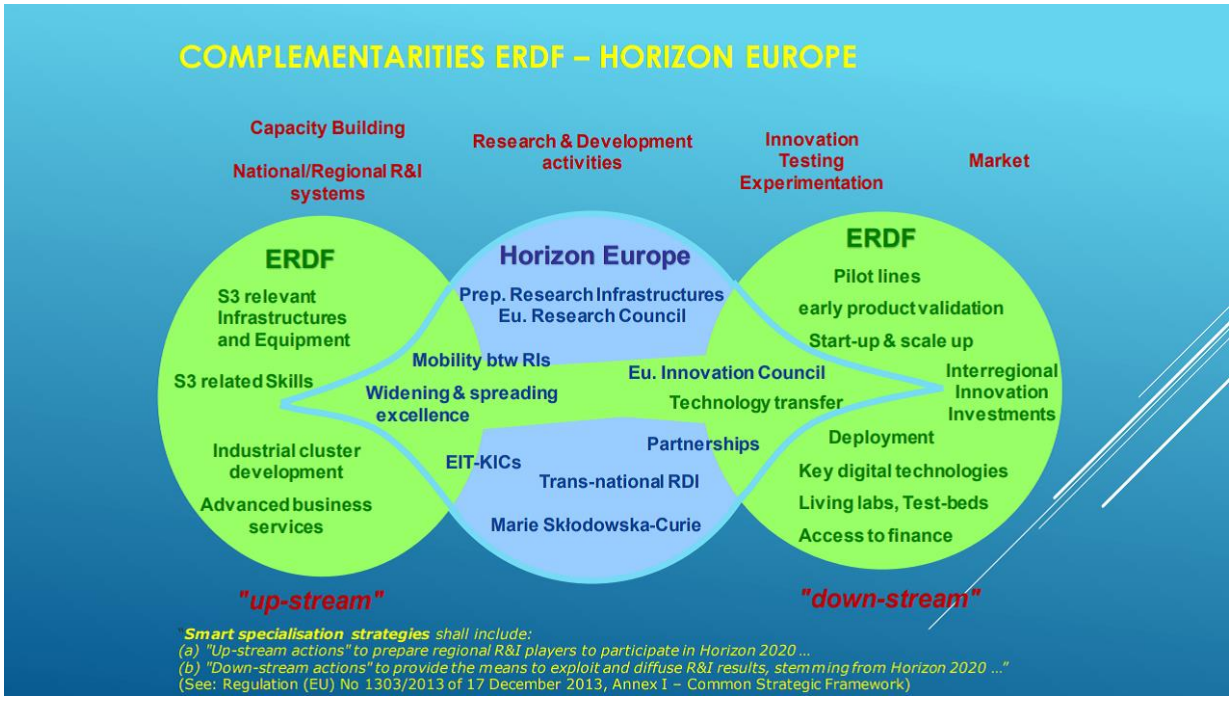

Figure 1: Complementarity between funds of "Regional development" and "Research &Development [13]

The «Stairway to Excellence» (S2E) [22] project was launched in 2014 as a pilot project in the European Parliament, carried out by DG-JRC in cooperation with DG-REGIO. It is currently being marketed as part of JRC Smart Specialization targeted support.

Opportunities for ensuring synergy between national funding and European structural and investment funds, within the framework of integration in «Digital Single Market EU», national and European programs related to research, innovation and competitiveness Horizon Europe, COSME, ERASMUS+, Creative Europe, should stimulate cooperation between public administration and research organizations to develop sectorial programs or work plans. The degree to which they comply with the implementation conditions, adequate management and the needs of the innovation infrastructure in order to conduct research, expertise, will affect the availability of villages (settlements) to international technical support tools, the formats of projects being developed, reporting requirements, auditing systems, as well as drafting and interpretation of structural funds. Thus, the effectiveness of planning the acceleration of indicators of sustainable development of smart villages by local public administrations, based on the localization of smart infrastructure, will create conditions for the formation of digital ecosystems of settlements.

The synthesis of the concept of Digital Business Ecosystem emerged in 2002 by adding "Digital" in front of Moore's (1996) "Business ecosystem" in the Unit ICT for Business of the Directorate General Information Society of the European Commission (Nachira, 2002). In truth, Moore (2003) himself used the term Digital Business Ecosystem in 2003, but with a focus exclusively on developing countries. The generalization of the term to refer to a new interpretation of what "socio-economic development catalyzed by ICTs" means was new, emphasizing the coevolution between the business ecosystem and its partial digital representation: the digital ecosystem [11].

The prototypes of the digital business ecosystem of smart settlements with spatial data infrastructure for generating, visualizing and updating data in order to make adequate decisions on financing spatial development projects in rural areas could be applied for the territories of the regions of

Gagauzia and the South of the Republic of Moldova. In the results of participation in the EU project «Trans Danube» [24] of an organization from Republic of Moldova These areas almost are prepared to implementation having a better level of readiness. The projects selected by the National Regional Development Fund at February 2021 are needed to «localize smart infrastructure» ([4], p.3.1) within the framework of the integration of cluster initiatives of farms, small and medium-sized enterprises in the «InnovFin» [14] and «COSME» [5] programs it was mentioned. After a planned and carried out feasibility study, the Association for the Development of Tourism in Moldova of the project participant identified several beneficial directions for the development of tourism on the Danube, which can be further developed at the transnational level, due to the innovative support of «S2B» [21]:

- improvement of tourist transport logistics;
- accommodation facilities for tourists;
- traditional power supplies;
- tourist information centers in museums;
- expansion of balneal-sanatorium services.

At the first stage of support, the needs for technologies, innovative management methods in settlements are investigated, based on the methodological approach of «Smart acceleration», the development of which a group of ASEM researchers can offer to «Local Initiative Groups» of selected project concepts, regional administrations within the framework of projects of the «National Program for Research and Innovation 2020-2023» with the development of exclusive local plans, roadmaps for the modernization of public electronic services in the sectors of Smart infrastructure. Innovation centers of regional universities, which are still operating in the «Start-ups». «External Offices for Knowledge Transfer» are national level organizations accredited by the European competent authorities. With the integration of regions into the «European Research Area» with the adaptation of regional dimensions adopted at the European level, the creation and exchange of data on innovative development of human settlements, between regional, national and European levels, also becomes easier.

At the second stage, using the results of «Synergy» in the initiated thematic projects of the National Program, the consortia will be able to enter the European / international networks Horizon Europe and test / demonstrate the selected Best Practice within the framework of symmetric or integrated participation in the implementation of large European infrastructure projects of the national and the «European Regional Development Fund» (as well as other national financial instruments).

Based on features of the «exclusive approach, Smart acceleration» national research organizations, responsible, according to the National legislation for the organization and accounting of technology transfer, innovation, knowledge transfer, will develop individual standards and indicators, as well as innovative and integrated strategies to maintain or improve the quality of life and social inclusion for all generations in shrinking and aging settlements, areas of development regions through the development of transnational and cross-border approaches.

3. Summary and suggested strategy for R. Moldova

Following ENRD seminar on Smart Villages [18] possible steps to solve the problems of integration into the "Single digital market" of rural areas, which should be reflected in Regional development programs to support Regional, Innovation and Agricultural policies:

1st step: Compare the existing levels (landscape) of political support for the digitization of agriculture and rural areas in your region / local initiative group.
2nd step: Determine opportunities and needs for using digitalization / localization of smart infrastructure to achieve some specific objectives of National Strategies and Regional Operational Sector Plans, through SWOT / PESTLE analysis.
3rd step: Prioritize the main types of interventions available in the Regional Operational Plans (Regional and Agricultural Policies) to meet the needs of these objectives. For instance:

- investments in small infrastructure and local public services (services) to solve problems;
- sharing knowledge and information for learning, advice and bridging skills and the digital divide;
- cooperation - including "LEADER" - for stakeholder engagement, joint capacity building, feasibility studies, pilot projects and digital centers;

4th step: formulate the necessary budget and, finally, design and implement the need for intervention.

The implementation of the LEADER approach [23] in the Republic of Moldova began in 2016. This is a European Union program, which provides the instruments for rural development, with aims to support local economic development and valorize the potential of rural areas based on the use of local resources. *«Local Action Groups» (LAG)* were created as an institutionalized local partnership. LAG members are organizations, institutions, local leaders, that are representatives of the public, business and civil sector, who jointly manage local development processes. The model of LAG functioning in Moldova was developed within the framework of the EU SARD program. At list, 32 LAGs have been created in the country.

At this stage of the scientific and technical support of the selected projects of the «National Regional Development Fund» promoted by our research group, it is proposed to consider the methodology of «Green transition and digital transformation» of villages in the context of the «LEADER» program [10].

To conclude this study, we would like to guide project leaders on the importance of planning synergy between the programs of the National Regional Development Fund (structural funds) and the *«National Program for Research and Innovation 2020-2023»,* «Roadmap for the integration of the Republic of Moldova into the European Research Area» as a necessary to use an approach to the design and implementation of *«Smart villages»* oriented towards the achievement of the *«Sustainable Development Goals»*. Design and implementation methods:

- analysis and planning;
- design and development;
- deployment and implementation;
- monitoring and evaluation.

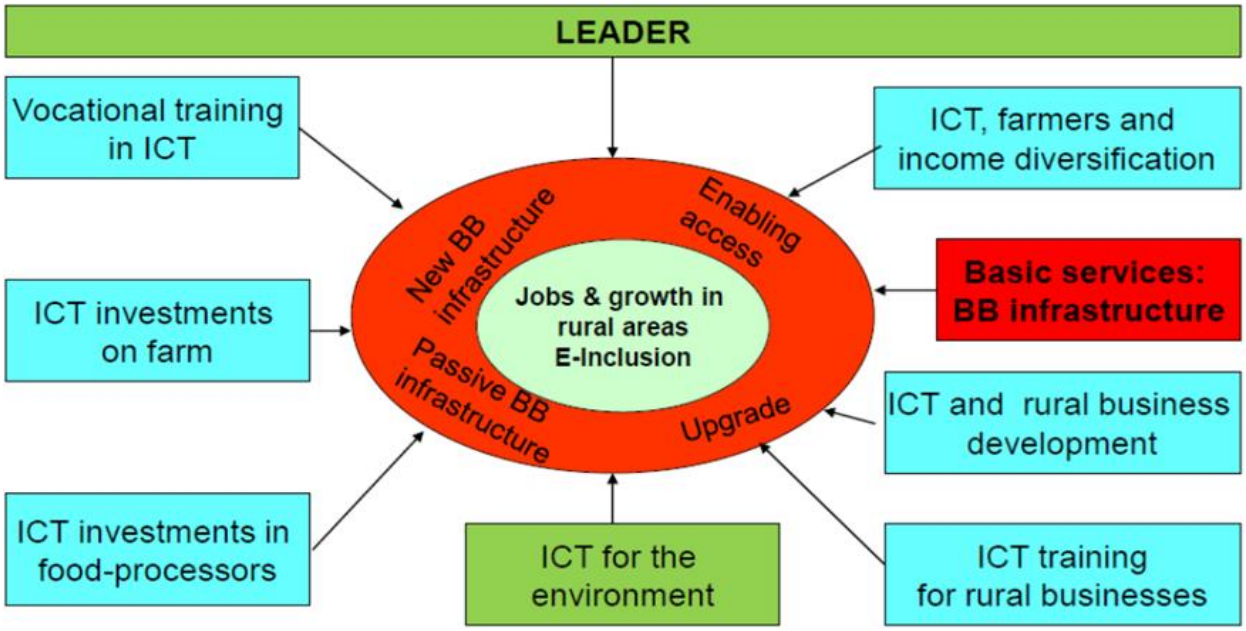

Figure 2: EU Rural Development Policy: Targeting ICT development [23]

In order for managers and leaders of potential «Smart villages» to make effective decisions, they need fast and efficient access to accurate data, which provides ArcGIS - a family of software products of the American company ESRI. Data is a strategic asset for all decision makers. This means that you need to localize the Smart Infrastructure and implement effective data systems that will be an integral part of the Smart Village system. It also involves leveraging existing systems, data, and continually improving them. Equally important, this means that the process of designing and generating data must be universally accessible for everyone to understand. Thus, there is a need to be creative in the use of visualization tools and to ensure regular data exchange with all citizens, organizations and institutions. In addition, it also means investing in developing the capacity of all policymakers to ensure their competence in generating and using data.

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Open Data, Open Government

OPEN GOVERNMENT AND CROSS-BORDER COOPERATION - PERSPECTIVES FOR THE CONTEXT OF TRANSNATIONAL POLICY-MAKING IN BORDER-REGIONS

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Abstract

Open Government (OG) as a concept for modernising the public sector is becoming increasingly prominent in recent debates in administrative science. It refers to a model of government and administrative action which, guided by the three premises of transparency, participation and collaboration, shapes the development and implementation of public policies in close interaction with actors from civil society, business and science. OG thus is not necessarily something completely new, but rather follows the tradition of various reform discourses in administrative science: On the one hand, it shows references to concepts of state theory that postulate a development from the democratic state of the 1950s, the active state of the 1960s, the lean state of the 1970s and 1980s, the activating state of the 1990s towards the digital state of the 2000s. On the other hand, with regard to normative models of public administration, in contrast to autonomous and hierarchical administration, it can be classified between the idea of a cooperative and a responsive administration (cf. [1], pp. 253). At the municipal level, the concept is connectable to concepts that see an evolutionary development from the regulatory municipality of the 1950s and 1960s, the social security municipality of the 1970s, the service municipality of the 1990s to the civic municipality of the 2000s [2]. Finally, it is relatively easy to also establish references to the more recent debates on the topos of regional governance [3], [40].

It is therefore all the more surprising that in the literature on administrative sciences; concepts of OG have so far hardly been applied to the policy field of cross-border cooperation in Europe. In the last 30 years, the action model of territorial cooperation has steadily gained in importance within the overall approach of European policies, both in qualitative terms (contribution to horizontal integration) and in quantitative terms (financial and human resources employed). In addition to numerous INTERREG funding programme areas, a large number of cross-border action structures with varying degrees of institutionalisation have developed over time at different interlinked territorial levels (inter-local, inter-regional, macro-regional) [4]. A more recent study [5] comes to the conclusion that Europe's cross-border cooperation today has a personnel capacity of over 21,000 full-time equivalents.

Using the territorial example of the trinational border regions of the Upper Rhine, the paper examines the extent to which the premises of OG are suitable for the future-oriented development of existing approaches to cross-border cooperation in a post-COVID-19 perspective. On the basis of three case studies it will be worked out which possibilities, challenges and perspectives can concretely arise in order to use the negative experiences gained in the COVID-19 pandemic for a structural and functional repositioning of cross-border cooperation in Europe. Finally, an approach

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concept will be developed, which shows how public actors of cross-border cooperation can contribute to the realisation of a new truly transnational and development-oriented governance mode through methods and approaches of Open Government.

1. Introduction

Open Government (OG) has experienced a boom as a reform concept in recent years, due in particular to the term in office of U.S. President Barack Obama. On February 24, 2009, the "President's Memorandum on Transparency and Open Government - Interagency Cooperation" launched OG in the USA as a central initiative of the Obama Administration. Here, in an integrative concept, the three key terms "transparency," "participation" and "cooperation" were formulated as normative core messages for modern democracies, with which to respond to the loss of popularity and trust among citizens [6], [7], [8].

Unlike e-government, which in its practical implementation still focuses mainly on the electronic processing of public services[2], this approach, which has since been taken up in Europe as well [9] and has even led to the global movement of an OGP (Open Government Partnership with 79 member countries around the globe[3]), is based on the assumption, that the provision of state and municipal services can be improved if the needs and potential of users are actively included in both the design and implementation of public action. By making consistent and systematic use of the possibilities offered by modern information technology for this purpose, relevant stakeholders, citizens and other target groups can be better informed about political decisions and involved in the decision-making, implementation and evaluation of government measures [11]. Improving effectiveness, efficiency and legitimacy can thus be seen as the basic intention of the concept. In this sense, various reform ideas are bundled under the OG concept today. Based on attempts to integrate information and communication technologies and with a focus on substantial changes in the political-administrative culture[12], the following three central aspects are repeatedly discussed in the literature:

- the aspects of transparency and accountability, including freedom of information and open data (government and administration should be transparent)
- the aspects of participation in the sense of open innovation processes and the inclusion of external knowledge (government and administration should be participatory)
- the aspects of cooperation within the administration and with civil society (government and administration should overcome silo thinking and cooperate - across all administrative and sectoral levels).

Beyond the three core messages, however, there is still hardly a tangible and concrete definition of open government to be found in science and practice. One reason for this may be that the term was used by the Obama administration for measures in so many different policy areas that the systematic implementation of the Obama memorandum was almost completely lost. Whether it was economic development, deregulation or improving the quality of life in general, the Obama administration lumped everything together under the term "open government." Also, the oft-repeated "triple definition" of Open Government as transparency, participation, and collaboration

[2] Cf. the still convincing conceptual framing of Reinermann/von Lucke [10] and also the conclusions on this issue in the EU eGovernment Benchmark 2019: https://ec.europa.eu/digital-single-market/en/news/egovernment-benchmark-2019-trust-government-increasingly-important-people (as per 7 April 2021).
[3] Cf. https://www.opengovpartnership.org/ (as per 7 April 2021).

cannot ultimately be seen as a coherent model in itself, but rather represents a series of keywords, each of which must then be further differentiated. Following *Pasutti* [39] , Open Government can be summarized as an approach that opens up the actions of government and administration to the population and the business community. In doing so, the entire public sector, i.e., politics, government, administration and the judiciary, is to become more open, transparent, participatory and cooperative. Open government thus encompasses both government attitudes and legal, financial, communication measures and approaches that proactively provide transparency to citizens and other audiences about their government's activities (information), support opportunities for citizens and stakeholders from other sectors to actively participate in government decisions (participation), and promote mechanisms for creating innovative governance solutions (collaboration). Open government can thus be understood as a holistic approach that combines different concepts of a political and administrative innovation, and the whole open government approach is ultimately based on the idea of strengthening the government's problem-solving capacity in times of an increasingly complex world by involving citizens and target groups. On the larger scale of the societal macro-level, Open Government is often even seen as an approach to improving democracy through the use of new digital and procedural tools and methods such as Open Data, e-voting or optimized approaches to e-government [12][13].

Open government (OG) as a concept for modernizing the public sector is compatible with established discourses on reform in administrative science at various levels. It refers to a model of government and administrative action that shapes the development and implementation of public policy in close interaction with actors from civil society, business and academia under the three premises of transparency, participation and collaboration. Thus, from an administrative science perspective, OG is not necessarily something completely new, but rather stands in the tradition of various administrative science reform discourses: On the one hand, it shows references to concepts of state theory that postulate a development from the democratic state of the 1950s, the active state of the 1960s, the lean state of the 1970s and 1980s, the activating state of the 1990s to the digital state of the 2000s. In terms of fundamental normative models of public administration (cf. [1], pp. 253) on the other hand, it can be located as a further development of the idea of cooperative and responsive administration, in contrast to autonomous and hierarchical administration [14]. At the municipal level, in turn, the approach can be linked to concepts that see an evolutionary development from the regulatory municipality of the 1950s and 1960s, the welfare municipality with a focus on social security of the 1970s, the service municipality of the 1990s to the networked citizens' municipality of the 2000s [2] . Finally, it is also necessary to establish conceptual references to the more recent debates on the topos of regional governance[3].

The policy field of cross-border cooperation in Europe (cf. [15], [5]) has not yet been the subject of considerations on open government. This is not surprising, as the role and function of cross-border cooperation in the context of European integration has only become a focus of practical discourse and academic attention since the 1990s. This is in contrast to the actual development of this relatively new policy field and its factual importance for the territorial development of Europe. An estimated 30% of the European territory can be located as a border region at the level of a NUTS II classification. About 30% of the European population also lives in these border regions. After the Second World War, intensive domestic and foreign policy approaches to cross-border cooperation have emerged in all border regions. These have led to an institutionalization of cooperation as well as to a multitude of projects. After the fall of the Iron Curtain, the European Commission actively supported these cooperation approaches financially through the specific INTERREG funding program. Institution building was also actively promoted by providing the relevant legal instruments (EGCT: European Grouping of Territorial Cooperation). A recent study[16] concludes

that cross-border cooperation in Europe today has a permanent staff capacity of more than 21,000 full-time equivalents in the institutions created specifically for this purpose as well as at the level of the partner administrations involved - which corresponds to about half of the staff strength of the institutions of the European Union.

Evaluation studies show that cross-border cooperation in Europe is very much driven by public actors not only in its genesis but also and especially in its present form (cf. [4], [15]). This specific pattern can be interpreted by different explanatory approaches. Border regions symbolize interfaces between different political-administrative systems, between different cultures and - on closer examination - also between socio-economic realities, which in the overall picture are still characterized by a relatively low horizontal interaction dynamic. Recent studies by the European Commission as well as Euro-Barometer surveys show that these borders still constitute effective barriers in the everyday lives of European citizens and are perceived as such. It is obvious that the identification not only of citizens, but also of socio-economic and other actors is still very much related to the respective national context. Accordingly, cross-border policy approaches, even if they refer to the narrower territorial perimeter of a cross-border area, manifest themselves in the context of the inter-institutional and inter-cultural logic of different national, regional or local political-administrative systems and are thus, from a scientific point of view, located in the field of micro-diplomacy or intergovernmentalism [17].

Cross-border territories have enormous territorial development potential. A study commissioned by the EU Commission in 2017 proved that administrative borders, which still have a strong impact, lead to a loss of 3% of European GDP. If all negative administrative border effects in Europe were eliminated, this would lead to a growth boost of 485 billion euros and the creation of over 8 million jobs in European border regions [18]. If one mentally removes the national border and looks at a cross-border territory from a 360° perspective, functional and institutional scales may well emerge that lead to comparability with national standards. For example, the cross-border cooperation area of the Trinational Metropolitan Region Upper Rhine (TMO) on the German-French-Swiss border covers an area of 21,000 km², where more than 6 million people live in a polycentric settlement structure, where more than 200,000 companies of partly global importance exist, where more than 170 science and research locations exist and where important regional, national, European and international institutions are located. In addition, as part of the European Commission's reorientation of cohesion policy, cooperation patterns have emerged in many border regions that follow the logic of multi-level governance and tend to realize territorial development goals through the interaction of different sectors (politics, administration, business, science, civil society). Initial experience with such approaches, however, shows that even in these new governance patterns, a dominance of public actors can ultimately be observed [20]. Obviously, there is a particularly pronounced institutional (national) path dependency in cross-border affairs, which tends to hinder the development of existing potentials.

Against this background, it seems promising to use the premises and approaches of Open Government outlined above as a starting point for a reflection on possible innovation potentials in cross-border cooperation. To what extent can patterns already be identified in the practice of cross-border cooperation that are captured by the three dimensions of Open Government (information, participation, cooperation)? Conversely, what suggestions can arise from an in-depth examination of these dimensions for the further development of existing cross-border cooperation? And finally, to what extent can conclusions be drawn from the concept of OG that can be used to answer the more fundamental question of the impact levels of territorial innovation in a cross-border context?

2. OG Potentials in cross-border cooperation - Three case studies from the trinational Upper Rhine region

If one tries to answer the question to what extent principles of open government and administrative action in the sense defined above have already been realized in the field of cross-border cooperation or, conversely, which potentials these principles might contain for a conceptual further development, it makes sense to first recall some basic functional principles of cross-border cooperation in Europe. Cross-border cooperation has established itself in Europe after the Second World War in different phases of development as a policy field of its own, not least also of European politics. Immediately after the war, the focus was on questions of reconciliation between former war opponents, but in the 1960s and 1970s the need for a formal institutionalization was recognized. At the beginning of the 1990s, the policy field was realized in the form of concrete projects, which were conceptually and financially supported by the later European funding instrument INTERREG. Since then, project orientation can be regarded as one of the essential features of cross-border cooperation, even if (or perhaps precisely because), since the 2000s, questions of institutionalization and, in the context of the Aachen Treaty, especially of legal and administrative flexibilization have increasingly been on the agenda.

If one looks at these development phases of cross-border cooperation [4], one constant can be observed, which still represents an essential basic prerequisite or limitation of this policy field today: Cross-border cooperation operates at the interface between historically evolved political-administrative systems. Even in those policy fields where communitarization has taken place within the framework of European integration, the implementation of European policies is still dependent on the functioning of national policies and administrative systems. Similar to federal states, which do not have a continuous vertical administrative function from the central to the local level, the European Union is also structured from the bottom up in administrative terms. As a result, both the genesis and the functionality of cross-border cooperation depend on reliable contributions to action from the respective political and administrative contexts of the participating member states.

From the perspective of open government and administrative action, the first observation that can be made is that cross-border cooperation is per se a symbol of such openness. If the political-administrative systems at their external borders or at the interfaces to their neighboring systems were completely closed, no cross-border cooperation could emerge. From systems theory [21] we know about the duality of systems. On the one hand, a system presupposes the existence of a boundary to its environment, since without such a boundary a system would not exist precisely in constitutional terms. At the same time, although systems are characterized by self-referentiality, they ultimately presuppose, in order to avoid functional sclerosis, interaction with their environment at the same time. The environment of a political-administrative system in a border region has two reference levels: on the one hand, the political-administrative system of the neighboring state itself, and on the other hand, the cross-border socio-economic dynamics (mobility of labor, capital, services, etc., but also positive or negative spill-over effects) which provide the occasion for entering into cross-border cooperative relationships with institutional or personnel actors from the neighboring state. Cross-border cooperation is thus related to all three of the openness dimensions described above. This openness manifests itself in the effort to overcome the functional closedness of national political-administrative systems in order to solve cross-border problems. Thus, cross-border cooperation can be interpreted as a functional equivalence of the horizontal dimension of European integration [20]. In the following, the three openness dimensions of OG in cross-border cooperation will be examined in more detail on the basis of three action approaches from the tri-national region of the Upper Rhine (border triangle of Germany, France and Switzerland).

2.1. OG dimension transparency: Infobest as a one-stop agency in the cross-border mobility area

According to a 2019 publication by Eurostat, there are 2 million cross-border workers in Europe, i.e. people who live in one Member State but work in another. This corresponds to about 1% of the European labor force [22] . Even if these figures - like the entire extent of personal occupational mobility in Europe - may seem rather insignificant from a global perspective, they play a very important local and regional role in the border regions. On the one hand, the share of the labor force there is higher (44% of all French cross-border commuters live in the Grand Est region; the roughly 90,000 cross-border commuters in the Upper Rhine region still correspond to 3% of the cross-border labor force), and on the other hand, cross-border mobility is considerably concentrated in some border communities, where it can easily exceed 50% of the local labor force. Moreover, cross-border mobility is not limited to the aspect of occupation. The freedoms of the internal market have meant that consumer behavior in particular, and increasingly also settlement behavior, no longer stops at borders. Thus, the French customer share in the retail trade of the small border town of Kehl is 80%. 10% of the inhabitants of Kehl have French citizenship and have chosen to live on the German side of the Rhine due to the comparatively lower real estate prices. Of the total of around 484 504 immigrants to the Grand Est region in 2015, 43 006 came from Germany - making it the fourth largest group after the Maghreb, Turkey and Italy [23].

In particular, cross-border professional mobility, but also a simple change of residence, can pose a variety of administrative challenges for those concerned. Cross-border mobility still often contrasts with the historically evolved legal and administrative structures of the individual member states. Although there are indeed legal areas that have in the meantime been uniformly regulated by the European legislator, in fact most legal areas and thus also the corresponding administrations with which a cross-border actor has to deal are still strongly shaped by the national state: both social and tax law, regulatory law, residents' registration law, labor law and business law are not harmonized at the European level, but are at best coordinated by corresponding directives, the implementation of which is reserved for the member states according to their own structures and standards.

From the perspective of an actor who is mobile across borders, this very quickly results in very high transaction costs, which tend to make it unattractive to take advantage of the opportunities offered by, for example, a cross-border labor and consumer market. It is not only the fact of dealing with a different administration that can be problematic - it is much more difficult that the administrative structures of the neighboring state usually exhibit major structural and functional differences from the respective home context. In addition, it is not uncommon for cross-border jurisdictional problems to arise between the administrations involved. Also, and especially in terms of language, citizens very quickly encounter hurdles when they are confronted with neighboring administrations. Administrative forms, as well as digital solutions developed as part of national e-government approaches, are generally not multilingual. In addition, there are differences in administrative cultures, which point to fundamental differences that still exist, for example, with regard to the position of a citizen in communicative dealings with an administration. Since there is no uniform administrative procedure law in Europe, very many cross-border administrative processes are not defined as business processes. Differences in responsibility between state administration and local authority administration on the one hand, and different criteria and standards on the other, contribute to the difficulty of cross-border mobility. In addition, cooperation between competent specialized administrations in the cross-border perspective is often still based on voluntariness as well as on patterns of informal administrative action. Individual employees may well have occasional contacts with their counterparts in neighboring countries, but as a rule this does not lead

to the development of reliable administrative relationships, since even informal administrative action can rarely overcome the great diversity of national administrative systems in Europe.

In view of the great importance of cross-border mobility on the one hand and its practical administrative challenges on the other, an approach to a solution was developed in the cross-border region on the Upper Rhine already at the beginning of the 1990s that is strongly oriented to the idea of the One-Stop Agency[4]. Just as it is common today in many administrations with public traffic to set up service areas where administrative customers can deal with their concerns centrally in one place without having to switch between many different administrative offices (principle of the citizens' office), 4 cross-border information and advice centers (Infobest)[5] were set up along the border in the Upper Rhine. Three of these Infobest offices were symbolically housed in former customs buildings. As contact points for everyone, these facilities represent focal points in the cross-border area where citizens or other actors with a cross-border orientation can obtain both initial advice and an explanation of cross-border procedures and responsibilities. Each Infobest has fully bilingual staff recruited from the respective partner countries (Germany, France, Switzerland) and thus able to explain their own political-administrative context to a client from a neighboring country, as well as to establish the necessary initial institutional contacts. The free advisory services of the Infobest offices relate to general information on the neighboring countries and, among other topics, in particular to the areas of social security, employment, taxes, moving to a neighboring country, education, vehicle purchase or transfer, and traffic. Over the years, bilingual fact sheets have also been developed for central topics; the corresponding national administrative forms are also available on site so that they can also be explained using the example of a specific individual case.

In contrast to what is usual in a classic citizen service office, administrative processes cannot be accepted in the Infobest offices for binding processing or forwarded to the respective responsible administrative offices. The structure therefore does not have a link between a generalist front office and specialized processing in the back office. Rather, Infobest is a general information and consulting office supported by the local authorities, which does not replace the respective competencies and distribution of responsibilities of the involved specialized administrations. Its range of services is limited to problem analysis, presentation of responsibilities, and referral to the administrative offices responsible in the respective national context.

Through its intensive involvement in cross-border issues and the informal communication relationships built up over the years, Infobest also performs a networking function between the administrations of the three neighboring countries on the Upper Rhine. In addition, the Infobest offices regularly hold cross-border consultation days on their premises, bringing together representatives of the respective specialized administrations (for example, pension insurance or financial administrations) from the partner countries, thus creating a virtual cross-border administration: Citizens can switch between administrative systems by meeting contact persons from the respective national specialized administrations in neighboring offices. Individual case-related problems can be analyzed cooperatively in this way and, in most cases, also successfully solved between the respective experts on site.

[4] It is noteworthy that this approach has been implemented long before the EU-level finally recognized the issue and launched SOLVIT (https://ec.europa.eu/solvit/index_en.htm). In addition, the Infobest-approach also covers policy-areas which are not covered by EU-law but still remain within national competence such as public tax-law.
[5] https://www.infobest.eu

The Infobest offices make a considerable contribution to the transparency of cross-border administrative matters through the information and advice they offer and, in particular, through their bilingual and intercultural mediation function. National specialized administrations, where an individual case from a neighboring country with its specific competence requirements can very easily get lost (most administrations arrange their individual cases according to the initial letters of the respective surnames of their customers, but not according to the required cross-border or international competences of the respective case handlers) are relieved by the fact that corresponding customers are informed and advised in advance and corresponding administrative forms are thus filled out correctly and corresponding documents are submitted completely.

However, the digitization of public administration poses a major challenge for this well-established solution approach. More and more administrations are handling their service functions exclusively digitally as part of e-government. Public areas are being scaled back or completely replaced in terms of quantity (organization of opening hours) and/or quality (qualification of staff at the counter) as part of the current modernization approaches. The fact that cross-border administrative relationships are generally not defined on the basis of transparent business processes that are coordinated between all the specialized administrations involved in a cross-border situation makes cross-border processing structurally more difficult. Although citizens can find digital service offerings in the respective specialized administrations that allow them to process administrative processes flexibly in terms of time and space within the respective national framework, the corresponding interfaces and/or access to the administrations responsible in the neighboring country and/or digital service offerings and/or administrative forms do not exist in most cases. This leads to new problem situations not anticipated by the respective digital solutions and thus to the de facto blocking of service processes.

In the context of digitization, Infobest offices will have to develop a new, even more important service function in a cross-border context: in the future, the initial consultation will no longer be able to refer only to the factual level, but will also have to include corresponding digital interface functions. As part of a pilot project funded by the German Federal Ministry of the Interior (Regional Open Government Lab), Kehl University of Applied Sciences, together with Infobest Kehl/Strasbourg and the corresponding specialized administrations in France and Germany, is currently developing a concept for turning Infobest, which have so far functioned predominantly in analog form, into digital one-stop agencies. In doing so, the existing digitalization approaches on the European level (for example, the establishment of DSI - Digital Service Structures as so-called Building Blocks within the framework of the CEF program of the EU Commission, or the implementation as ISA - Interoperability solution for public administrations [19]) as well as on the national level (for example, universal process OZG of the state of Baden-Württemberg and *www.service-bw.de* or the French approaches to the creation of citizen-oriented decentralized "Maison de Service au publique", www.maisondeserviceaupublic.fr will be functionally linked with each other via business processes oriented to the cross-border life situation concept. The Infobest offices are to be assigned a future-oriented interface function, which in particular also includes an important social and intercultural mediation function and thus continues to contribute, but at a new level, to the transparency of cross-border administrative relations in the age of administrative digitalization. An interlink with the Single Digital Gateway-initiative of the European Commission[6] as well as with SOLVIT and the Initiatives of DG Regio following the Border Review-Exercise[7]

[6] https://ec.europa.eu/growth/single-market/single-digital-gateway_en
[7] https://ec.europa.eu/regional_policy/de/policy/cooperation/european-territorial/cross-border/review/

will be developed in the perspective of strengthening the bottom-up awareness for the identification of the many remaining obstacles, still hindering citizens rights[8] in Europe.

2.2. OG dimension Participation: Cross-border citizen participation in the Upper Rhine region

The topic of participation in cross-border cooperation has gained special political significance in the Upper Rhine region since the founding of the trinational metropolitan region Upper Rhine (TMO) in the mid-2000s[9]. The starting point was the consideration, analogous to the metropolitan and regional governance processes developing in many member states [3], to overcome the functional logic of cross-border cooperation, which until then had been predominantly focused on political-administrative rationality, through an intersectoral networking process. Governance in the Upper Rhine today consists of four pillars: The political pillar with the official cross-border institutions on the regional and intergovernmental level, the Eurodistricts on the inter-municipal level as well as the Upper Rhine city network; the scientific pillar, in which 170 institutions from science and research are networked cross-border across university types; the economic pillar, in which the Chambers of Industry and Commerce as well as the Chambers of Crafts have come together cooperatively; and finally the civil society pillar, within which a networking of social actors of the three countries is promoted. Within the individual pillars, strategic guidelines were developed in a participatory manner, which were networked in 2010 to form a TMO 2020 strategy for the entire region. In 2018/2019, the TMO Strategy 2030 was updated in a collaborative process between all relevant stakeholders and adopted by the representatives of the 4 pillars on November 2019.

From the outset, the topic of citizen participation was strategically significant, but very challenging in concrete implementation. This was partly due to the fact that the relevant terminology and concepts are culturally very different in the three countries and are also put into practice in very different ways. The role that civil society plays or should play in public and political processes is also strongly influenced by the different political cultures of the three neighboring countries [24]. Nevertheless, it was initially possible to organize three cross-border citizens' forums in Strasbourg, Karlsruhe and Basel in 2010 and 2011, in which more than 500 representatives of civil society took part. The main topics discussed there were better networking of citizens through the elimination of language barriers, more comprehensive information through the media and improved cross-border public transport connections. Expectations were also formulated for politicians to intensify citizen participation in the future and to improve cooperation between administrations. In the context of a so-called three-country congress, which was dedicated to the topic of civil society in the Upper Rhine on June 27, 2012, corresponding objectives for the civil society pillar were formulated.

In the years that followed, however, it became apparent that the rather top-down organized participation process ultimately yielded few concrete results. On the one hand, it was found that institutional representatives of civil society tended to participate in the citizens' forums. Secondly, the topics discussed were often far too broad and comprehensive to actually be within the competence of local and regional politicians to act and solve problems. The topic of citizen participation was therefore increasingly shifted to the level of the inter-municipal Euro-districts, as it was possible to develop greater proximity to citizens from there. At the level of the TMO, the

[8] Cf. DIRECTIVE 2004/38/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 on the right of citizens of the Union and their family members to move and reside freely within the territory of the Member States amending Regulation (EEC) No 1612/68 and repealing Directives 64/221/EEC, 68/360/EEC, 72/194/EEC, 73/148/EEC, 75/34/EEC, 75/35/EEC, 90/364/EEC, 90/365/EEC and 93/96/EEC.

[9] www.rmtmo.eu

topic was again taken up and focused in the Strategy 2030. The goal of the TMO in the future is to promote cross-border voluntary work outside and in associations as well as meetings and events by and for the next generation in the Upper Rhine with offers that are as low-threshold as possible. In addition, interdisciplinary projects are to be developed and implemented in dialogue between science, politics and citizens (reallabs).

Despite these efforts, many observers assume that the identification of the citizens with the cross-border living space is, as in other border regions of Europe, also comparatively low in the Upper Rhine (cf. [25], [26]). Even though cross-border consumer and leisure behavior has intensified in the last 30 years, the vast majority of the Upper Rhine population still identifies with the respective sub-regional center of life in Germany, France or Switzerland.

In this context, however, the COVID-19 pandemic can also be seen as a serious turning point in the Upper Rhine region. Due to the abrupt and, above all, uncoordinated border closures between the national governments of Germany, France and Switzerland as of March 17, 2020, cross-border cooperation was abruptly put into a state of closure and "non-cooperation". This traumatic experience for many border actors and border residents of the sudden reappearance of a closed border, permeable only to a few people, combined with sometimes very different, but in any case uncoordinated, measures of shutting down public life, dramatically illustrated what achievements had ultimately been achieved through consistent cross-border cooperation in the past. The fact that cross-border affairs as well as a cross-border way of life are ultimately not a normality but the results of long-term cooperation processes was acknowledged on the individual as well as on the institutional and, above all, on the media level.

Against this background, the state government of Baden-Württemberg organized a digital citizens' dialog in the trinational Eurodistrict Basel on October 12, 2020, dedicated to the topic of "Corona and living together in the trinational border region of Basel" [27]. The methodology of this citizens' dialogue was fundamentally different from previous approaches. On the one hand, the topic was specifically targeted at an area where citizens could actually be expected to be affected accordingly. Secondly, 60 randomly selected citizens from the three countries were integrated into the citizens' dialog via digital formats - this ensured that the interests of civil society functionaries could not be addressed, but rather the actual lifeworld views of the inhabitants of the border region. Thirdly, the process of the Citizens' Dialogue was initially geared to collecting a survey of the participants' mood and their initial participation. The participants were specifically asked whether and how they personally felt about the closing of the border and public life. As many as 40% of the participants stated that the considerable restriction of the possibilities to cross the border has been experienced as very drastic. Through this and in the further discussions and work in small groups, an awareness of the importance of openness in the cross-border living space was created to a special degree. Fourth, the citizens' dialogue was characterized by working in small groups specifically on the question of what expectations would be placed on politics in the event of a second lock-down. The following diagram provides an overview of the core results of these demands. The fact that, not least as a result of this citizens' dialog, the regional players in a joint regional interest group and, in particular, the Baden-Württemberg state government campaigned for at least the state borders to remain open during the second lock-down can be seen as a real success of this format of digital citizen participation.

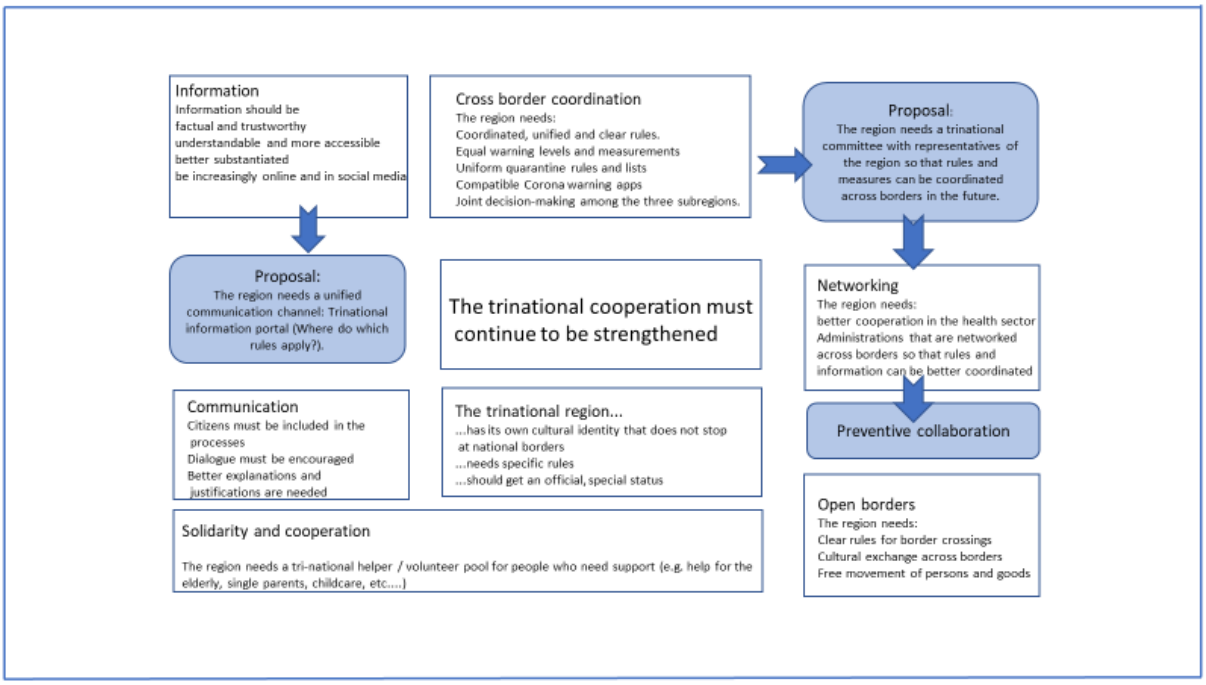

Figure 1: Results of the group work of the citizens' dialogue at Eurodistrict Basle
Source: [27], p. 7 – translation by the author.

2.3. OG Dimension Collaboration: The INTERREG Program

If, as a third example, we look at the central funding instrument INTERREG and ask about the potentials and limits of its contribution to the realization of the principles of open governance, it seems useful to distinguish between two levels: on the one hand, the program level as such, and on the other hand, the level of the projects concretely supported by this funding program. On both levels, in turn, the dimensions of structure and functionality appear to be of interest in this context. These level-specific dimensions will be examined in more detail in the following using the example of the INTERREG program Upper Rhine[10].

The INTERREG program Upper Rhine already existed in the form of the then autonomous experimental program area Pamina as one of the first Europe-wide 14 pilot projects and can thus be considered representative for the genesis and development of the INTERREG approach as a whole since 1989[4],[28], [41]. From a structural point of view, the INTERREG program is characterized by the fact that the systemic openness described above is concretized in the fact that various program partners of the participating member states jointly support and also co-finance the program. The example of the Upper Rhine shows here a cross-level institutional cross-border partnership of the spatially responsible administrative bodies: on the French side, the Région Grand Est, the Départements Bas-Rhin and Haut-Rhin as well as the French State are involved; on the German side, the Federal Ministry for Economic Affairs and Energy, the State of Baden-Württemberg (Ministry of State as well as the two regional councils) and the regional associations Hochrhein-Bodensee, Mittlerer- and Südlicher Oberrhein as well as the State of Rhineland-Palatinate (State Chancellery, Ministry of Economics, Transport, Agriculture and Viniculture, Struktur und Genehmigungsdirektion Süd) and the Rhine-Neckar Association; on the Swiss side,

[10] This section is based on practical insights the author has gained via participative observation over a period of 20 years, holding different functions within the INTRREG Upper-Rhine programme (evaluator, project-applicant, project-manager). For similar evidence from other birder-regions see [28]; [30] and [29].

the Regio Basiliensis as coordinating body, as well as the cantons of Basel-Stadt, Basel-Land, Aargau, Solothurn and Jura. This program-related partner mix, however, only represents the cross-sector collaboration idea intended in the sense of Open Government in a rudimentary way. This is only found at the level of the so-called monitoring committee, in which other institutional actors from the program area are also represented - albeit exclusively in an advisory capacity. On this level, there is a representative of the European Commission as well as other state institutions relevant for spatial development (Commissariat général à l'égalité des territoires (CGET) on the French side and the State Secretariat for Economic Affairs SECO on the Swiss side), the economic and social committee of the Grand Est region (CESER - Conseil Economique, Social et Environnemental Régional Grand Est), as well as the central cross-border institutions German-French-Swiss Upper Rhine Conference (representatives of the state administrations on the Upper Rhine), Upper Rhine Council (Trinational Parliamentary Assembly), Trinational Metropolitan Region Upper Rhine (representatives of the pillars politics, economy, science and civil society), the four inter-communal Eurodistricts (Pamina, Strasbourg/Ortenau, Freiburg(Centre et Sud Alsace as well as the Trinational Eurodistrict Basel) and the citizens' advice network Infobest.

Looking at this spectrum of actors, one can definitely say that the governance structure of the INTERREG Upper Rhine Program not only includes a systemic openness but also a structural, cross-level openness in the sense of regional governance. However, from the perspective of open government in an intersectoral collaborative assessment, the absence of direct representatives of chambers of industry and commerce, chambers of crafts, trade unions as well as representatives of civil society organizations or the network of cities is striking. On the one hand, this may be due to the basic approach of representativeness (representation via the TMO or CESER); on the other hand, it may ultimately also be explained by the simple question of the manageability of a committee size.

Moreover, collaborative openness is especially designed on the functional level of the program. Thus, the action model of INTERREG in the border regions of Europe has led to a very specific design of both program development and implementation. In addition to the partnership principle, the principle of planning/multi-annuality should be mentioned in particular. This has led to the establishment of differentiated program planning procedures in many border regions. In particular, a broad stakeholder consultation has been developed in the Upper Rhine region for several program periods. The planning bases in other border regions, which are partly still exclusively based on SWOT analyses and which are mostly prepared by external consultants, are increasingly complemented by professional participative elements in the Upper Rhine. This can be outlined by the example of the currently ongoing consultation on the INTERREG VI program: an ad-hoc group2020+ had initially identified with the managing authority the thematic funding areas that tend to be the most important and prepared the corresponding specifications of the European Commission for thematic concentration. More than 900 stakeholders from different levels and sectors were contacted on this basis and asked to complete a specially developed online questionnaire. The 149 contributions received with concrete evaluations and suggestions on the individual topics could be assigned to 95 different institutions: Authorities and local authorities (38), associations and federations (22), colleges, universities and public research institutions (18), other public institutions (8), private companies (5), foundations (3) and chambers (1). In addition, there were contributions from 11 cross-border institutions and one private individual. From a conceptual point of view, the contributions received were evaluated by the INTERREG working group on the basis of two central criteria: 1. number of comments received for the individual specific objectives (quantitative prioritization) and 2. significance of the expert comments for the strategic evaluation of the relevance of the specific objectives (qualitative

prioritization). In a second consultation phase, the so-called intervention logic (connection between strategic objectives, specific objectives and concrete fields of action, from which externally developed projects can then be funded) is now being elaborated on this basis, also collaboratively.

On the other hand, evaluations of various INTERREG programs, including those in the Upper Rhine region, also show that there are limits to collaborative openness in the subsequent implementation [15]. For many years, the INTERREG programs of the past were characterized by a strong bottom-up principle, but the selectivity on the basis of transparent criteria was not always given both in the generation of projects and in the selection of projects by the working group and the monitoring committee. The complexity of the partner structure on the one hand and the great challenge of horizontal synchronization, not least of different administrative cultures and system logics, lead in practice to the fact that the formal decision-making processes are characterized by a considerable informality in the sense of making informal preliminary decisions (so-called non-decision-making) [16]. What on the one hand is the prerequisite of good cross-border cooperation, namely that trusting informal network structures between institutional and personnel actors prepare formal decisions of cross-border bodies in an informed manner, is repeatedly criticized by external applicants with regard to the practice of the INTERREG program. This criticism is increasingly met, not least also in the Upper Rhine region, by the fact that project development should no longer be exclusively bottom-up but increasingly also top-down in hybrid form, i.e. in the form of project calls with transparent objectives and selection criteria. One example in this context is the so-called Science Offensive, which between 2007 and 2020 stimulated research, innovation and technology transfer by establishing new cross-border partnerships between science and research institutions in 3 strategic development fields in the spatial vicinity of the tri-national Upper Rhine, using 11 million euros of funding.

On the level of projects funded by the INTERREG program, the structural level shows a very high thematic openness. Since the INTERREG program was established, 835 projects have been funded in the Upper Rhine, covering a total of twelve thematic fields: from research, science and technology transfer, to economic development, education/training and bilingualism, employment and the labor market, nature conservation, biodiversity and environmental protection, mobility and transport, public services and cooperation between administrations, cooperation between citizens, health, tourism, cultural heritage and sports, risk prevention and risk management. Thus, hardly any area of public tasks is ultimately not backed by a specific INTERREG project, which suggests that the program has had a considerable broad impact, which in turn suggests a great openness in cooperation. Within these 835 projects, 322 small projects have been realized, which aim at bringing citizens and associations into a cross-border cooperation context in a low-threshold way. Individual projects have also led to considerable intersectoral networking in the respective policy fields covered, such as the tri-national project TRISAN[11], which has brought all relevant health actors in the Upper Rhine into a collaborative working context, or the tri-national project ATMO-Vision[12], which has networked 20 actors from different sectors and levels in the field of preventive air pollution control.

The collaborative orientation on the structural level (topics and actors) is opposed by limitations on the functional level. For example, the INTERREG program's approval criteria, which are very restrictive compared to national programs, preclude the direct participation of private sector actors as project sponsors. Actors from the social sector, on the other hand, see themselves hindered in the

[11] www.trisan.org
[12] http://www.atmo-grandest.eu

development of cross-border projects by the so-called reimbursement principle, since a project promoter must be able to pre-finance a project largely from its own funds in case of doubt - which meets with considerable obstacles, especially among actors from civil society. From a functional point of view, these criteria imply a privileging of public actors or - in the case of the business community - of institutional representatives. In the practical handling of INTERREG projects, a significantly increased reporting effort compared to national funding programs is criticized. Not only the proof-of-use procedure but especially the documents to be submitted in the context of project approval represent a demotivating hurdle that should not be underestimated in its complexity. In addition, project sponsors bear a considerable risk due to the reimbursement principle: if, for example, the originally planned thematic or structural approach changes during project implementation, if individual project partners leave the working context, or if new challenges arise in implementation that were not known at the time of application, this leads to a change in the budget. Expenditures that have already been made in advance, for example as personnel or ongoing rental costs (so-called overhead costs), can thus very quickly remain with the project executing agency without retroactive subsidization by the program. The functional conception of an INTERREG project is based on the assumption that the project, as it was applied for, will be implemented 1:1. Especially in an intercultural and intersystemic context, this approach ignores insights that can be read in any manual on classical project management: It is the exception rather than the rule that a project is realized as planned precisely because of its secondary organizational character and, as a rule, precisely because of its innovative collaborative context. Learning loops, which are naturally anchored as innovation dimensions in good project management, can thus only be realized to a very limited extent. In combination with the documentation obligation, which many project participants perceive as bureaucracy, there is a danger that the central funding instrument for cross-border cooperation will lose its attractiveness in the future and that collaboration in the sense of open government and administrative action will decrease due to the extraordinarily high administrative transaction costs.

As the analysis presented makes clear, INTERREG has both potentials and obstacles with regard to the realization of the Open Government principle of collaboration on the program as well as on the project level. Three levels of innovation can be derived in this context:

One approach developed in many discussion contexts for the realization of open government is the provision of open data. In the cross-border context, this could promote the existing approaches of consultation and participation in the sense that it enables stronger evidence-based program development. The alignment of program objectives with actual cross-border added values as well as their measurability can be seen as important foundations for the further development of transparency, participation and collaboration, especially in the cross-border context. Open data can also promote openness in the debates and programmatic definitions and thus contribute to transparency both in the cross-border potential analysis and in the subsequent project selection.

A second approach from the general Open Government debate can lead to the recommendation of a perspective overcoming of the so far rather restrictive design and handling of funding criteria in the INTERREG program. The rather small-scale, input-oriented program and project management should lead in favor of a more flexible, result-oriented handling of funding criteria in the cross-border context. Many national funding programs work, for example, with the instrument of simplified proof of use or with de minimis rules. Trust and transparency can be the basis for expanding the spectrum of eligible actor constellations in order to promote even more cross-sector collaboration in the sense of open regional governance. One of the basic ideas of open government refers precisely to the special innovation that can arise from a non-hierarchical collaboration of the

administration with actors from other functional systems. However, this presupposes that even in a funding program for cross-border cooperation, target groups are treated appreciatively as potential-oriented partners and not as simple applicants.

A third approach, which is primarily effective at the project level, could be to take the findings of modern project management more into account at the level of INTERREG. Many approaches of Open Government implement agile methods of public management. This means taking into account the fact that projects usually deal with innovative and complex issues, which are characterized by a high degree of momentum, and whose quality gain often consists precisely in adapting not only the content but also the structure and roles of the project participants flexibly and as needed during the course of the project (Cf. [32]; [33]; [34] and [31]): Exclusively linear, "mechanistic" project planning, as it is currently demanded especially with regard to the preparation of a binding financing and realization plan when applying for an INTERREG project, ultimately does not do justice to the complexity of cross-border projects at the interface of intersystemic and intercultural challenges. In contrast, agile methods [35] should not only allow learning and innovation loops, but should also be actively demanded as a target criterion already at the application stage. The attractiveness of INTERREG projects can be increased, for example, through flat-rate funding. In this way, a contribution to the dynamization of cross-border cooperation can be made.

3. Conclusion

The above analysis shows that CBC is a promising field of the implementation of OG principles. It has been shown, that those principles are - at least for the case of the Upper-Rhine region - partially already implemented. On the other hand the field of cross-border cooperation also still provides much potential in going further into this direction from the point of transnational policy-making.

Against the background of the examples, however, it is suggested that Open Government should not be seen as a normative model for the creation of a participatory transnational administration, but rather as a method by which the greatest possible transnational openness can be developed within given nation-state structures and procedures with regards to the objectives of cross-border cooperation.

Accordingly, the expected impact should also be viewed in a differentiated manner, which may contrast the normative thinking of quite a number of related publications (Cf. [8], [36] and [37]). From a practical application point of view, open government is concretized in the context of cross-border cooperation on three levels. First of all, it can help to promote material innovations at the *micro level,* i.e. in the area of tasks and policy fields, projects, employees, target groups and instruments, to increase acceptance and legitimacy, to strengthen motivation and commitment, but also to increase commitment and identification with the goals and tasks of cross-border cooperation. Effectiveness and efficiency gains can be expected as further impact contributions at this level.

At a second level of aggregation, the organizational *meso level,* open government can contribute to an optimization of cross-border procedures, structures, decisions and internal and external interactions. Processes of strategy formation, but also of transnational further development of given administrative cultures, holistic approaches to organizational development, and systemic innovations, for example in the area of the development of new forms of work or personnel development oriented toward transnational and intercultural openness, can lead here to new and innovative patterns of action for cross-border cooperation under the auspices of open government.

Finally, on a third level of aggregation, the *macro level*, open government can contribute to orienting a border region as a whole on the basis of principles of openness. Here, positive impact expectations can be achieved with regard to an improvement of the input - output legitimation of cross-border policy approaches as well as the normative justification of the transnational public space and of public action in a cross-border perspective (Cf. [38] and [5]).

The three levels of impact are vertically interconnected. The self-image of open government certainly encompasses all three levels and, especially in the cross-border context, it is by no means to be limited exclusively to the macro level. Many innovation potentials for cross-border practice can also be seen at the micro and meso levels. In this respect, the implementation of open government in cross-border cooperation in its rather pragmatic understanding is likely to differ centrally from normative approaches, as they are postulated in particular in the international and national debate.

On the other hand, the case studies suggest, that more work needs to be done in order to adapt the rather general OG principles to the specific inter-institutional and inter-cultural context of cross-border policy-making [24]. In doing so, including Open Government principles into the Territorial Cooperation approach of the European Commission could help to close the still existing gap between concepts and approaches of administrative digitalization and participation developed and implemented mostly at MS-level so far, without taking into account the increasing cross-border dynamics of people, goods, capital and services in a transnational proximity perspective. In addition, this may also contribute to better interlinking the many EU-wide policy approaches designed at the European level with both the realities and potentialities of European border-regions. Cross-border territories could thus become horizontal interfaces and implementation-areas of European citizens-oriented policy-approaches such as the single digital gateway or SOLVIT. Also integrating the case of cross-border inter-institutional challenges as analytical category in the Commissions system of ex ante Impact Assessment could be a promising approach in this regard in order to better anticipate possible impacts of future European policy-approaches. This may help both recognizing the role theses territories are de facto playing in the context of European integration, strengthening their practical contribution with regard to the realization of a horizontal dimension of the European Administrative Space[16[1]] and promoting a better implementation of fundamental European Citizens rights - which are ultimately at the core centre of Open Government principles.

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OPEN DATA IN GERMAN MUNICIPALITIES – BETWEEN ADDED VALUE AND LEGIT CONCERNS?

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Abstract
The corona pandemic has shown that open data can have an added value for cities in dealing with the global pandemic. In May 2020, we conducted a municipal survey in which officials responsible for data coordination and publication in cities with more than 10,000 inhabitants stated that open data could have an advantage in combating the corona pandemic, for example by informing its citizens and providing local open data to a wider public. Despite these positive assessments, the provision and use of open data in Germany still varies greatly in German municipalities. Against this background, the paper highlights the different perspectives of cities and municipalities on the topic of open data, including: (1) assessments of the opportunities and risks of open data in the municipality, (2) references to the political factors that have favoured or hindered the provision of open data, and (3) desired support for municipalities to conceptualize and implement their own open data strategy. Our research aims to provide suggestions for and perspectives on why the municipal level in Germany finds it so difficult to implement innovative approaches to data management as part of their digitization efforts.

1. Introduction

Open data is an essential building block in the digitisation of public administration. To make official data available to the public, however, administrative processes often must be realigned. The opportunity for corresponding reforms lies, for example, in breaking down existing data silos and enabling more participation and transparency in administration and politics by opening up data stocks. At the same time, against the backdrop of changing social, technological, and economic conditions, the importance of open data is becoming increasingly apparent. It can act as an important driver of innovation and technological developments, both in public administration and in companies.

Supported by the Open Government Partnership Initiative (OGP), launched in 2011 under Barack Obama, open data provided by public administrations has become an increasingly important building block for the digitalisation and modernisation of public administration. Already 78 countries participate in the global initiative and are thus committed to creating more transparency and political participation [1]. Open data is data that can be used, reused and distributed without restrictions [2]. In order to be reused and shared, open data must meet specific criteria. The Open Knowledge Foundation (OKF) therefore defines open data as data that comes with an open licence (the further processing and modification of the data must not be restricted), is freely accessible (e.g. as a download free of charge) and in an open format (readable by machines) [3].

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In the past ten years, open data has gained momentum, in particular through political and legal resolutions for the creation of frameworks for the publication, provision and use of open data at the European level. The national implementation of the European Directive on Open Data and Public Sector Information (PSI) by mid-2021, the E-Government Act (EGovG) at the federal level in Germany (and in particular § 12a on open data) as well as regional transparency laws have recently put the topic of open data more firmly on the agenda of internet politics while also raising its visibility.

Legal frameworks that provide both data providers and users with a secure foundation for working with open data are essential for disseminating and adopting open data practices. However, from the user's perspective, there are also concrete requirements for the way open data is made available, such as making the data easy to use, a high level of benefit resulting from the use of the data, and quick retrieval of searched data sets [4; 5]. For data providers such as municipalities, on the other hand, other factors are crucial, such as the organisational adaptation and implementation of open data and open government principles, as well as the implementation of technical measures that enable the use of open data by the broadest possible user community [6; 7].

The provision and use of open data in municipalities varies greatly from region to region in Germany. While some municipalities are already proactively providing open data in some federal states, there has been no provision to date in many municipalities. Only about 90 of the 10,795 municipalities in Germany currently operate open data portals [8]. There is also an uneven distribution between larger and smaller cities. The municipalities with own open data portals include 43 per cent of the large cities surveyed, but only five districts and only 30 smaller municipalities.

2. Methodology

The survey is a joint project of the Bertelsmann Stiftung and the German Institute of Urban Affairs (Difu) and was carried out with the German Association of Cities' support. It aims to map the nationwide provision of Open data in municipalities comprehensively. The survey targeted municipalities with more than 10,000 inhabitants. A total of 1,145 cities and municipalities were contacted by post and invited to participate in the survey. While a full survey was carried out for municipalities with more than 20,000 inhabitants, contacting the group of municipalities with 10,000 to 19,999 inhabitants comprised a sample of 50 per cent. Addresses of the administrations contacted were obtained from the publicly accessible address directory of the Statistische Ämter des Bundes und der Länder.

The questionnaire was developed in tandem with the open data community and tested with three municipal representatives. It includes 19 questions that could be completed in about 15 minutes. The survey period lasted five weeks in April and May 2020, which coincided with a phase in which many employees of the municipal administrations were already working from home due to Covid-19. The response rate to the survey was 19 per cent (212 responses). Compared to other city surveys, one particular benefit of this survey is that small cities and municipalities were included. The response rate in this size category is lower (in percentage terms) than in the other size categories, but it is still large enough to represent this group. Survey data is accessible as open data and can be retrieved from the website of the Bertelsmann Stiftung.

3. Open data in German municipalities

For most municipalities, open administrative data is a relatively new field of activity. This development is reflected in the fact that one-third of the respondents state that they have only dealt with the topic on an ad hoc basis so far. Only three out of ten respondents have already dealt intensively with open data issues. In municipal administrations, data is generated in many places and cleaned, processed and adapted for communication and/or official statistics, for example when it comes to annual budget planning or the collection, evaluation and presentation of topic-specific databases, such as on education, integration, sustainability, or care. The processing of (open and non-open) data is thus part of municipalities' everyday tasks [9]. More than half of the municipal employees surveyed are familiar with these processes and frequently or very frequently process data themselves.

Open data offers added value for many different stakeholders, who may have very different social or business interests in open administrative data. These include citizens, local and non-profit organisations and regional businesses, programmers and developers, journalists and academics [10]. One group of people that is often not directly mentioned are the administrative employees themselves. As open data unlocks the opportunity to link specialised departments in the administration more efficiently and break down existing data silos. The use of open data formats also makes it possible to quickly convert data into the required end formats for specific purposes such as creating reports and presentations.

3.1. Chances, risks, and added value

Overall, the respondents consider open data to be a positive driver in municipal administrations. Almost half of the respondents personally associate the opening of municipal data with opportunities rather than risks; only 9 per cent see more risks. Especially respondents from cities with more than 100,000 inhabitants contribute to this positive overall assessment. Here, three quarters see more opportunities than risks, while in medium-sized and small cities the figure is around 40 per cent. However, the overall assessment within their administration reveals that the surveyed administrative employees are more optimistic than the administration’s assessment as a whole.

A study published in 2016 by the Konrad Adenauer Foundation estimates the economic value creation potential of open data in Germany at up to 43 billion euros per year [11]. A more recent study by the European Data Portal, the European data portal for open administrative data, estimates the Europe-wide market share of products and services enabled or improved by open data at 200 to 334 billion euros by 2025, with an annual growth rate of up to 10 per cent [12].

More than 80 per cent of respondents perceived the direct added value of open data primarily for citizens in our survey, as open data contributes to improving information needs. In principle, open data can also increase identification with the municipality by making the use of funds transparent through open budget data and other indicators, which could strengthen citizens’ trust in the municipality’s perceived performance. Still, according to the respondents, open data does not automatically lead to citizens identifying more strongly with their municipality (see Table 6). On the other hand, around two-thirds of the municipalities surveyed expect citizen participation to improve through open data. Municipalities are also regarded as benefitting from open data through the development of new applications and business models, although mentioned less frequently. More important from the point of view of municipal workers is the benefit from a simplified

exchange between departments and municipal companies, new impulses for changing the organisational culture, and increased transparency.

	fully agree	rather agree	rather disagree	do not agree at all	do not know
What added value do you generally attribute to open administrative data?					
Improved information for citizens	39	42	13	2	4
Simplified exchange between offices and between offices and municipal companies (reduction of "data silos")	37	41	17	1	4
Impulses for a change in administrative culture	27	42	19	5	8
Increased transparency of municipal development processes	23	52	19	3	4
Reduced workload for municipal employees	20	38	27	11	4
Improved exchange with businesses and civil society	19	52	20	3	6
Improved participation of citizens	18	46	26	4	6
Development of new applications and business models (for the benefit of our municipality)	16	37	26	7	13
Increased attractiveness of the municipality as a business location	13	43	31	7	7
Strengthened identification of citizens with their municipality	9	32	41	13	6

Table 6: Added value of open data (values in per cent)

Especially in times of crisis, the municipalities surveyed attribute a substantial value to data. Half of the respondents currently see an advantage in open data in the fight against the Covid-19. 33 per cent are undecided, and only 17 per cent see no direct added value in using open data for this purpose. For tackling the Covid-19, respondents believe that open data's added value lies primarily in providing up-to-date information on the threat situation (such as the rate of infection). Almost half of the respondents named this aspect as the most important added value.

3.2. The status quo of the provision of open data at the municipal level

Open data can be made available in various ways. Municipalities do not always have to operate their own open data portal. Some municipalities have commissioned a regional IT service provider to prepare, operate and maintain the participating municipalities' open data. Open data can also be made available and curated via state data portals such as Open.NRW, the open data portal of the state government of North Rhine-Westphalia (NRW).

The status of the provision of open data varies in municipalities varies greatly. About a third of the municipalities surveyed already provide open data (see Table 7). A further 23 per cent do not yet provide open data but have taken measures such as political decisions or organisational measures to make their databases publicly available. However, 36 per cent of respondents point out that their municipality does not yet provide open data and has not yet pursued any measures in this direction. How a municipality handles its data depends strongly on the size of the city. Most of the surveyed large cities with more than 100,000 inhabitants (94 per cent) have already opened up their data or taken corresponding measures. However, in small and medium-sized cities, the proportion of municipalities providing open data or planning to do that in the future is significantly lower. Smaller municipalities with populations of up to 20,000 hardly provide any open data. Still, 26 per cent of these municipalities have taken measures to provide open data in the future.

	population 10.000-<20.000	population 20.000-<50.000	population 50.000-<100.000	population 100.000 and more	total
How would you describe the current state of open data provision in your municipality?					
Already provide open data	15	24	32	71	35
No open data yet, but measures taken	26	24	21	22	23
No open data so far	56	46	37	4	36
Do not know	3	7	11	2	6

Table 7: State of open data provision by size-class (values in per cent)

The conception, coordination, and implementation of measures to build a data infrastructure, identify potentials, and the actual provision of open data is based in different departments within municipal administrations. Who leads the efforts to provide open data? A coordinator for data or data publication was only appointed in every sixth municipality. In fact, about 80 per cent of the large medium-sized cities have not yet appointed a coordinator for the topic of data and data publication at all. Larger cities, however, have been quicker. Around 40 per cent have appointed coordinators or officers for data, compared to between 5 and 13 per cent in small and medium-sized cities. Open data is based in the IT department in about a quarter of the municipalities surveyed and in the statistics department or with the person responsible for digitalisation in about one-fifth respectively.

More than half of the municipalities exchange information with other municipalities on how to work with data or have begun to define processes, structures, and responsibilities (see Table 8). Data handling is now anchored at the strategic level in about 40 per cent of all municipalities. Though they have rarely received support from the state, the federal government, or the European Union (EU). Just every eighth municipality applies for funding to build up a data infrastructure.

	yes	no	do not know
What measures for building a data infrastructure are already being pursued in your municipality?			
Exchange with other municipalities on the handling of data.	58	36	5
Processes, structures and responsibilities for handling data are defined.	53	36	12
The handling of data is the subject of municipal strategy and mission statement processes.	41	46	13
Implementation of pilot projects on open data/open government issues.	26	66	8
Systematic inventory of the data stock (e.g., creation of a data catalog).	25	68	6
Monitoring of data needs on the user side (e.g., citizens, civil society, business, etc.).	16	74	11
Appointment of a coordinator for data or data publications (e.g. "open data officer").	16	79	6
Actively network with data users (e.g., Open Knowledge Labs), academia, or businesses.	14	80	6
Acquisition of funding (e.g. for the development of a data infrastructure).	13	72	14
How is potential for providing open data sets identified in your municipality?			
We look at what open data other municipalities have already published (e.g., in data portals or sample catalogues) to get ideas.	74	21	6
Our departments publish open data proactively and at their own discretion.	54	41	6
An internal open data officer actively seeks potential for making open data available.	36	57	7
When making open data available, we are guided by the needs of our target groups (e.g., through community events or surveys).	35	48	17
We actively train our employees on the topic of open data to find potential for providing open data.	7	90	3

Table 8: Measures to build a data infrastructure and ways to identify potentials for providing open data (in per cent)

A systematic catalogue of internal administrative data is necessary for fostering a more comprehensive practice of data publication (see Table 3)[14]. Two-thirds of respondents state that no systematic inventory of data holdings has yet been carried out in their municipality. From the user's perspective, one factor is crucial: the simplicity of handling or re-using the open data [13]. The provision of data should therefore be intuitive for both the administration and the user. Just about one in six municipalities say they have already identified what data needs exist on the user side. Only a few municipalities have included the perspective of potential data users, such as civil society, companies, and the administration itself. And only one in seven municipalities is actively involved in networking with data users. Nevertheless, around a quarter of the municipalities have initiated projects on open data or open government issues. Small towns are the least active in networking with users, acquiring funding, and carrying out pilot projects.

Municipalities favour different approaches for identifying the potential of open data. Three-quarters of municipalities already providing open data study other municipalities for inspiration, for example by using the sample data catalogue (see **Table 8**) [14]. Departments publish open data proactively in more than half of the surveyed municipalities. In about a third of municipalities, an open data officer actively searches for potential data. Only in a few cases are local government employees actively trained in curating open data.

3.3. Drivers, challenges, and need for support

Building a data infrastructure is a complex task and affects public administrations' organisational culture as a whole. A fundamental change in organisational culture must be initiated to overcome associated organisational and practical hurdles for working with data. For example, the standardisation of processes for storing open data is an essential milestone for an administration and, at the same time, represents one of the most significant challenges in its implementation.

Regardless of a city's size, municipalities cite the lack of an internal data management system and the standardisation of practices as their primary concerns (see **Table 9**). This applies to almost 80 per cent of the municipalities surveyed. Challenges to internal data management are significant and spread across all size classes. More than seven out of ten municipalities disclose that both the necessary resources and employees' expertise in dealing with data are lacking. The low degree of digitisation of administrative processes also makes the acquisition and transfer of data difficult in seven out of ten municipalities. This aspect is of particular significance in small towns with fewer than 20,000 inhabitants.

	fully agree	rather agree	rather disagree	do not agree at all	do not know
What challenges do you face in your municipality with regard to the acquisition and internal sharing of data?					
Lack of resources	33	38	20	6	3
Few standardized processes for storing and processing data	30	48	14	5	3
Lack of expertise among employees in handling data	23	48	21	3	5
Low degree of digitization of administrative processes	19	53	20	4	3
Lack of direct exchange within the organization across departments	18	48	26	5	3
Data protection concerns	16	34	37	8	5
Lack of knowledge about where which data is collected and stored	13	51	25	8	3
Inadequate IT infrastructure	9	27	41	19	4
What aspects were important on the way to the current state of provision and use of open data in your municipality?					
Relevant legal and regulatory requirements at federal and state level (transparency/information laws, etc.)	36	30	23	7	4
Access to or establishment of corresponding technical infrastructures	26	46	11	10	8
Relevant decision-making at the municipal level	23	32	20	14	11
Establishment of concrete data governance structures in own administration (e.g., establishment of an organizational unit with corresponding responsibilities)	12	22	26	25	14
Demands/needs on the part of civil society and/or companies.	9	39	30	15	7
Provision of open data in other (neighboring) municipalities	5	33	31	23	8

Table 9: Challenges and drivers of open data (values in per cent)

While challenges to provide and share open data internally are mainly organisational and practical, such as low standardisation, lack of direct exchange, or simply a lack of resources, the question about the aspects that drive the adoption of open data in municipalities paints a different picture. Almost three-quarters of the municipalities already engaging in the provision of open data indicate establishing a technical infrastructure was very important for the initial provision of open data.

Furthermore, 66 per cent refer to legal and regulatory requirements at the federal and state level, such as state-specific transparency laws. Only slightly more than half of them see relevant decision-making at the municipal level as an important aspect of open data provision. Growing demand for open administrative data is another crucial aspect for nearly half of the municipalities.

Municipalities without measures to provide open data cite various reasons why they have not yet made open data available with the most common being a lack of human resources (over 80 per cent, see **Table 10**). Three-quarters justify this with the fact that the provision of data as open data is not part of their legal mandate. Municipalities already providing open data cite legal and regulatory requirements at the federal or state level as one of the most important supportive factor. This result underlines the important function of a clear and compulsory legal framework for the provision of open data. 60 per cent name potential additional costs as one reason why they have so far refrained from offering open data. Additionally, almost 60 per cent of respondents indicate a lack of competence in dealing with open data in local government as a reason for not making open data available. It is, however, also clear that neither the lack of acceptance among the citizens nor a negative decision by the city or municipal council are perceived reasons for not sharing more open data.

	fully agree	**rather agree**	**rather disagree**	**do not agree at all**	**do not know**
What support would you like to see in the design and implementation of Open Data in your municipality?					
Practical handouts, such as guides	51	39	7	1	2
A supra-regional data portal where we can post our data without having to build our own open data portal	46	27	12	12	4
Financial support for the provision of open data	42	39	10	5	4
Stronger inter-municipal cooperation in the area of open data	38	44	12	3	3
A better overview of which data sets are published as open data by other municipalities	37	39	16	6	2
Data protection advice and support	35	37	20	5	4
Technical support for the provision of open data	32	40	17	7	4
What were the arguments that led to the decision not to provide open data in your municipality?					
Lack of human resources	43	38	6	1	12
Lack of legal mandate	29	45	14	1	10
Fear of data misuse	29	30	25	1	14
Data protection concerns	23	30	30	1	14
Additional costs due to data provision and processing	19	41	19	3	18
Lack of competencies in local government	19	43	20	1	16
Concern about commercial use by third parties	18	34	28	6	15
Unclear added value for the municipality	13	54	14	3	16
Lack of acceptance in the urban society/population	3	10	29	9	49
Rejecting resolution of the city or municipal council	1	6	17	54	22

Table 10: Support for open data and reasons for not (yet) providing open data (values in per cent)

Although the support of the administrative leadership seems to be relevant for the fundamental decision to provide open data, it is not decisive for its concrete implementation, it is rather the shortage of human and financial resources. Legal aspects seem to either create security and provide a framework for the provision of open data or have the exact opposite effect.

Most municipalities would like support for the task of designing and implementing open data (see**Table 10**). Nine out of ten say that they would benefit from practical handouts and guides. The most frequently mentioned reason for not making open data available is the lack of trained staff. Therefore, almost three-quarters are in favour of a supra-regional data portal where they can post and manage their open data. Especially when staffing and funding are scarce, this support service could be a compelling argument for providing open data.

3.4. Policy changes and the legal framework

For implementing open data in municipalities, political developments and the resulting legal regulations are of vital importance. Almost all municipal employees surveyed consider the political efforts to make open data more widely available as being the right decision. A more nuanced picture emerges when comments of respondents are taken into account. For example, one comment states that, "municipalities need more safeguards from the (often unfounded) allegations 'this violates data protection' and the like by the legislator". As one possible solution, the commentator suggests enforceable and uniform data protection guidelines: "GDPR [EU General Data Protection Regulation]-compliant guidelines for the release of data [must be] uniformly regulated."

In a recent position paper, the Deutsche Städtetag rightly describes the framework conditions for municipalities to provide open data as "very complex". There is a need for clarification and improvement in the application of existing legal provisions and the licences required for publication: clear regulations to enable open data to be published as official works in the public domain, for example, by adapting Section 5 of the Copyright Act (UrhG); abandonment of the misleading Datenlizenz Deutschland, which adds to legal uncertainty; clarification that Section 87a of the Copyright Act does not apply to administrative open data or databases created on behalf of public authorities. Still, respondents see the greatest need for action on a policy-making level: they must ensure that the necessary course is set for the provision of open data at the federal and state levels. Only then can a corresponding process for opening respective databases be initiated and implemented at the municipal level: "The initiative for making the data available must be driven by the municipalities. Mere legal regulations do not strengthen acceptance and implementation".

Despite the high level of approval for the provision of open data, municipalities show a high level of uncertainty in implementing open data processes due to incomplete or missing specifications and laws. In their opinion, the implementation of the European Directive on Open Data and the re-use of Public Sector Information (PSI), which must be transposed into national law by July 2021, will be crucial for the future development of open data in municipalities. The PSI directive is intended to promote the re-use of data, accelerate European innovations and developments in artificial intelligence (AI), and contribute to the development of new business models while also stimulating the publication of real-time data [15]. An online survey conducted as part of the public consultation on the federal government's data strategy recently revealed a growing, societal interest in open geospatial, environmental and transport data, and data from parliament, government, authorities and courts [16].

4. Conclusions and recommendations

The municipalities surveyed do see opportunities in the provision of open data. However, when municipalities' ideas of designing and implementing the necessary processes for providing open data take shape, the challenges associated with taking these steps become apparent. Our results indicate that the digitisation of public administration in Germany – at least regarding the provision

of open data – is still in its infancy and will remain a significant challenge in the future. Open data can be of added value for municipalities in many respects, first and foremost in improving citizens' information needs and stimulating the exchange between departments and municipal enterprises. Four recommendations for action are derived from this study for cultivating more open data in municipalities:

1. **Create a clear legal basis for the provision of open data:** It is advisable that the national legal and administrative standards for the provision and use of open data are designed with municipalities as data owners in mind. Existing legal uncertainties should be reduced. What is needed are clear regulations and guidelines. For innovation to flourish, potential external open data users should be given the opportunity to demand this data from data owners in a binding manner. At the same time, the data sovereignty of municipalities must be ensured.
2. **Support financially weak and smaller municipalities in implementing open data:** It is crucial to ensure that all municipalities, even those under very tight budgetary constraints, have the resources to advance their digital transformation. The Corona pandemics consequences comprise the risk that municipalities will further reduce their investments and postpone digitalisation efforts.
3. **Open data requires a modern and professional organisational culture:** The implementation of open data must be taken seriously and supported by the city and administrative leaders. The standardisation of processes for storing open data is a vital milestone in providing open data in an organisation and it often represents one of the most significant challenges.
4. **Communicate the added value of open data for municipalities:** Public services that benefit from digitisation and open data within are good starting points for widely communicating the value of open data. Communication could focus on the added value that can be "seen" and "felt" by citizens.

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REGULATION OF THE USE OF ADMINISTRATIVE DATA IN HUNGARY

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Abstract
Although the public administration's monopoly position in data management has become less dominant along with the changes in the data-driven economy's utilization patterns, a prominent role has remained. Beyond the fact that public administration has to collect and manage specific data due to legal obligations, the utilization possibilities are broader. The amount and structure of data collected allow service-oriented support of the economy and society.

Historical development influences the actual areas of data management. Continuous learning is to observe the data analysis methods and the regulatory system in line with the needs of practical applications, the regulatory and supervisory organizational environment, or the technological background.

Along with following the guidelines and rules of the European Union in developing the legal background of public data management, exploiting the local opportunities must have a high emphasis. This is a broad topic, including the effectiveness and efficiency of data management processes within the affected organizations. Historical and territorial lessons learned can promote achieving these expectations.

The paper gives an overview of the historical development of data management and its organizational support in Hungary. A critical evaluation of the recent regulation establishes finding the essential focal points of future development.

1. Introduction

There are four critical issues identified in regulating the use and utilization of data in the public sector, including professional content, data protection, technical-IT specificity, and information protection. Due to social, economic, and technological developments, they are expanded with different content elements over time. The government identifies the problem to be solved, makes a decision, creates a strategy, provides conditions, and then assigns a system of rules and institutions to the solution.

The development of the Hungarian regulation and institutional system reflects European tendencies, adjusting to the local peculiarities. This paper gives an overview of data use and utilization history, emphasizing the current regulation and institutional system.

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Figure 1 summarizes administrative data use and the organizational framework of its management and supervision in Hungary.

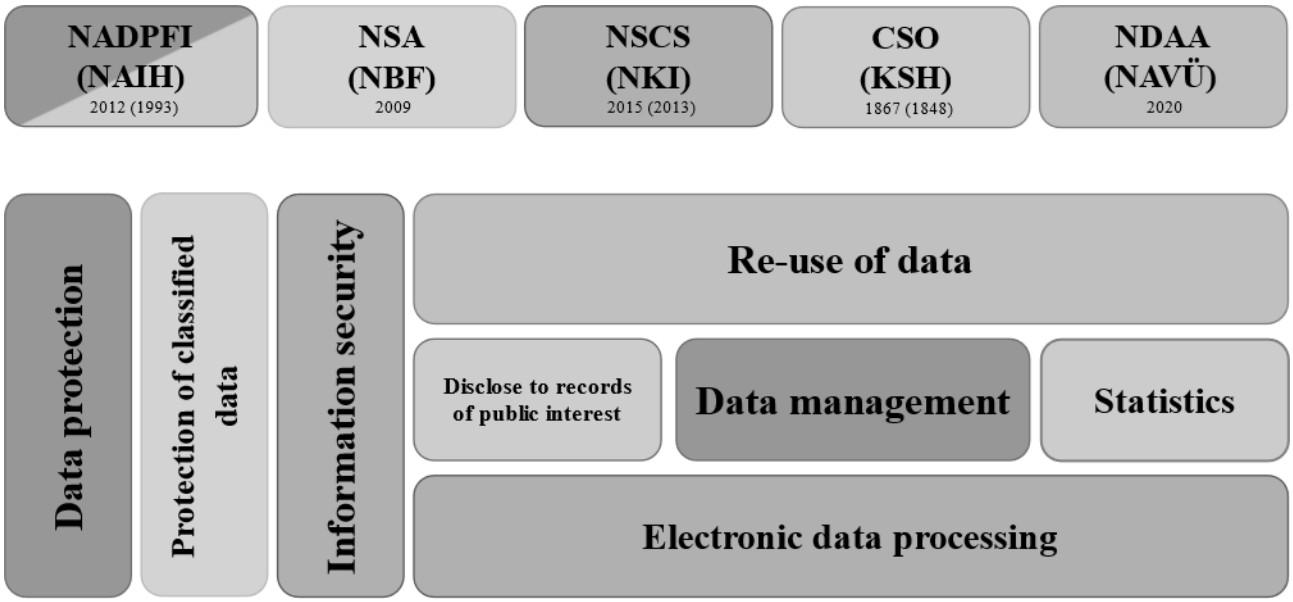

Figure 1: Areas of administrative data use and the organizational framework of its management and supervision in Hungary

The classic form of data utilization by the public sector has been in place for thousands of years, e.g., ancient Babylon or Egypt established a data-based tax system. The goal was to perform public tasks more appropriately. According to the data processing means "any operation or set of operations which is performed on personal data or sets of personal data, whether or not by automated means, such as collection, recording, organization, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction" [40].

The professional standards for data management by the public sector have been and are contained in the sectoral legislation, setting out the scope of the data to be processed and the procedural rules. This scope must be adjusted depending on the actual and local social and governmental expectations.

2. Legislation of statistics

A specific form of data utilization by the public sector is statistical data management. Data recordings in the ancient and medieval, and early modern ages typically served taxations or military purposes. After the 17th and 18th centuries, the new achievements of economics have created the need for accurate data that are able to provide justification for economic theories. Along with, data processing and statistical analysis methods have been appreciated.

The first statistical organizations within public administration were established in the first half of the 19th century in Europe (France, 1834 and United Kingdom, 1836). These organizations collected mainly population data and others for assuring the operation of the public administration.

The institutionalization of the collection of economic statistics from the 1930s onwards can be traced to the middle of the 20th century, according to new economic policies of the world economic

crisis and subsequent reconstruction after World War II. World institutions and organizations like the UN, OECD, or the International Monetary Fund were established in the 20th century, and regional collaborations (EU and its history) boosted up social and economic statistics [24].
Statistics in Hungary in the 19th century covered the separated data collection of some ministries. However, the processes were not effective. The results of the costly and non-professional solutions usually remained unpublished [28].

A central service (called National Statistical Office) was established in 1848 within the organization of the Ministry of the Interior. The goal of the Office was to show the foundations of the planned legislative proposals and to present the impacts. In 1871 the Office became an independent office under the name of the National Royal Hungarian Statistical Office, and since 1897 it has been named the Central Statistical Office (CSO). He published the first Hungarian Statistical Yearbook in 1872, published every year ever since (except in 1891 and 1892) [37].
Legal regulation was soon released:

- The First Statistics Act in 1874 ordered: "the registration of the public status and the public interest relations of the countries of the Hungarian crown, which change from year to year" [47].
- The Second Statistics Act on statistics further specified the purposes of statistics, but, as it included individuals as data subjects, it already contained a data protection restriction: it did not allow the collection of data on the total income or assets of individuals or their non-public items or family, social and moral life [49].
- The Third Statistics Act placed the Office under the supervision of the Prime Minister [45], which puts the role of statistics in developing the social and economic policy at the highest level. In parallel with the Third Statistical Act, another legislative act shows the efforts on the mechanization of tasks. The explanatory memorandum to Article XXV of 1930, which ordered the census, indicated that the census had been carried out every ten years in Hungary as in most cultivated countries since 1880. From 1930 on, new methods and "statistical machines" support the process. They wanted to use an improved version of the Hollerith punch card machine developed by James Powers to publish the results as soon as possible [26] [37].
- Under the planned economy approach after World War II, the Fourth Statistical Act in 1952 established that statistics were a means of monitoring and systematically managing economic, social, and cultural development; reports on the implementation of economic plans but did not include data protection provisions [43].
- The Fifth Statistical Act was adopted in 1973. This act included data protection provisions again. The regulation emphasized that that personal statistics on the personal, family, and other circumstances of an individual may only be used for statistical purposes and that personal statistics on a state, cooperative, social, or other organization may be published or communicated only under conditions laid down by the Council of Ministers. The legislation also provided a practical regulation. Based on this, the data collection, processing, communication, and storage activities within the unified system of state-level statistics (central, sectoral, and territorial) must be carried out according to the same principles [42].
- The Sixth Statistical Act in 1993 has renewed the system. The statistical data collections, except for those required by legal regulations, have been included in the National Statistical Data Collection Program (OSAP) compiled by the Central Statistical Office (CSO), reviewed by the professional advisory body of the President of the CSO (called National Statistical Council) and approved by the government [46]. This act was valid for 23 years, and during

that time, it was modified 27 times. The main reason for the changes is adjusting to the expectations of the European Statistical System (ESS) [30].

Currently, the Seventh Statistics Act promulgated in 2016 is in force, according to which the CSO is a professionally independent, central budgetary organization. The regulation of the statistical data collection and processing goes beyond the responsibility of the CSO. Organizations performing official statistical activities, or publishing statistics as part of their public tasks, must comply with the Code of Practice for National Statistics and the European Statistical Regulation from an organizational and operational perspective. Compliance is established by the Chairman of the CSO in an accreditation procedure [13]. These measures allow a more comprehensive approach to statistical data than ever before.

The Act also states that data produced for official statistics (excluding personal data) are public. Personal data may only be disclosed in cases specified by law. Disclosure is the responsibility of the relevant bodies [13].

3. Some critical issues of data management

3.1. Disclose to records of public interest

Disclose to records of public interest according to the operation of the state and government, as a special way of using public sector data, is a condition and means of enforcing and enforcing the right to free expression of opinion. The decision 32/1992. (V. 29.) of the Constitutional Court stated that access to information of public interest enables the control of the legitimacy and efficiency of elected representative bodies, the executive power, and the administration; and stimulates their democratic functioning [17].

There is an independent institution called the Hungarian National Authority for Data Protection and Freedom of Information (NAIH) established by Article VI of The Fundamental Law of Hungary. NAIH has the authority to enforce access to the records of public interest. The LXIII Act of 1992 on the Protection of Personal Data and the Publicity of Data of Public Interest has set unprecedented standards for the disclosure to records of public interest data and the protection of personal data in Europe [32]. By the Act, the public bodies are required to facilitate the accurate and prompt provision of information to the public on matters falling within their remit by regularly publishing or otherwise making available data relating to their activities. The method of electronic publication of this data has been prescribed since 2005 by law [44].

Recently, the CXII Act of 2011 on the right to informational self-determination and the freedom of information prescribes the regulation about disclosure to public interest records. Following the appreciation of digitization, it includes new elements are added. According to the Act, records of public interest should be made available on a website:

- in digital form,
- with access to anyone without identification or other restrictions,
- in detail without loss or distortion,
- free of charge for inspection, download, printing, extraction, and network transmission.

The scope of data to be published is determined by publication lists available at www.kozadattar.hu [18]. Anyone can submit a data request orally, in a written form, or electronically. The deadline for

fulfilling the request is 15 days by default. By implication, the rules for lawful and expedient use are contained in separate legislation.

Freedom of information is a fundamental right but can be limited by law. The restriction may be justified in the public interest under the CXII Act of 2011, including the interests of defense, national security, law enforcement, environment or nature protection, central financial and foreign exchange policy, foreign relations, relations with international organizations, judicial or administrative proceedings. The protection of private interests justifies, e.g., restriction regarding intellectual property rights. According to access to data of public interest, there is separate legislation formed [12]. It regulates the details of management, protection, and access of classified information based on the necessary and proportionate limitations. The National Security Authority (NBF), which has been operating within the Special Service for National Security since 2010, has been responsible for the protection of classified information.

3.2. Data protection

The growing amount of data collected and stored by the public sector and the development of technology to manage the growing volume of data more efficiently led to the emergence of data protection law in the last third of the 20th century.
The national data protection legislation, the LXIII Act of 1992 on the Protection of Personal Data and Publicity of Data of Public Interest, already mentioned in connection with data of public interest, was enacted in 1992, the preparation of which began before the change of regime in the early1980s. It was planned and an “informatics law” or “information” law, with the contribution of the IT specialization of the CSO [27].

The LXIII Act of 1992 regulated the processing of personal data based on the first binding international data protection instrument, the Convention for the Protection of Individuals concerning Automatic Processing of Personal Data, published by the Council of Europe in 1981. It was found applicable by the EU in 2000 for providing adequate protection of data transfer between Hungary and other EU member states [15]. Before Hungary acceded to the EU in 2004, the first legal harmonization amendment of the Hungarian data protection law took place. Since the LXII Act of 1992 preceded the EU regulation [21], of course, it could not take its provisions into account.

The CXII Act of 2011 replaced the LXIII Act of 1992. It established the Hungarian National Authority for Data Protection and Freedom of Information (NAIH). It is to note that an ombudsman (data protection commissioner) played the role of institution between 1993 and 2011. On 26 June 2018, a relevant modification of the Act was accepted. As a member state of the European Union, Hungary has adjusted its data protection regulation to the General Data Protection Regulation (GDPR) and to the Criminal Data Protection Directive [40] [20] [49]. The adjustment of the sectoral regulation was performed in 2019. While preparing for the GDPR was realized in two years, the preparation of data controllers for the application of the regulations was not smooth. There was an increase in the number of motions for resolutions requesting information that confirms the uncertainty in law enforcement [36]. Managing responsibility for data issues was known within public administration, so GDPR only required some refinements in the regulations. New in that age reported that mainly individual entrepreneurs and SMEs were affected by the significant challenges. The reasons include lack of information, delayed responses of the offices as well as the excessive reactions of the press and consultants [41].

3.3. Technical and electronic data processing

Since 2004, the Hungarian data protection legislation has distinguished technical/electronic data processing (performing technical operations on data) from data management.
In 2010, the concept of national data assets was introduced. On the other hand, the range and limitations of persons and organizations trusted to the tasks related to the creation, operation, and maintenance of electronic records belonging to national data assets are legally defined In some sensitive areas, the act defines that electronic data processor, which may be either the data controller itself or an exclusive state-owned entity [14]. Tamás Fellegi, the Minister of Development, mentioned “about seventy” companies at that time those have a contract with the government [38]. According to the press, the new concept was launched for safer, more efficient, and cheaper data management.

The Zoltán Magyary Public Administration Development Program (version MP 11.0) in 2011 emphasized the role of the CLVII Act of 2010 as a tool for how to address the causes of the public administration crisis. Centralized authority on data management leads to operational and financial benefits as well. Avoiding accounting debates and other conflicts with a third-party organization could have made it impossible to perform public tasks [35].

Electronic data processing regulation was one of the first stages in the development of the central service provider model.

In accordance with the centralization strategy of the government, the National Info-communication Service Provider (NISZ Zrt.) has been established as the centralized IT and electronic communications service provider to support the IT activities of the public administration organization system. Application operation and application development services (IdomSoft Informatikai Zrt.) and the operation of a unified digital radio telecommunication system (Pro-M Professzionális Mobilrádió Zrt.) are also centralized [5] [7].

While previously data management meant the independent activity of different bodies, institutions, and organizations, due to the spread of e-government, in addition to organizational-level data management, the dimension of data management by the public administration system also appeared (based on the principles of one-time data request and interoperability). Legislation on the electronic transmission of data between public administrations and its technical implementation was adopted in 2007 [6] [11]. From 2015, the regulation raised the transfer of data or documents between cooperating bodies to the level of e-government service [10].

3.4. Information security

The application of the increasingly advanced IT technologies in the creation, collection, storage, processing, use, and generally the management of data and information raises new challenges. Electronic information security became a key issue and a new scientific area both on corporate and governmental levels. Information security has grown into an industry, and its spread continues. Beyond the direct involvement in data protection, the emerging social and business conflicts forced the regulation in the field. Since 2013, the administrative information protection activity has been comprehensively regulated by law for all electronic administrative information systems [29].

According to the regulations, public administration organizations are obliged to establish and operate an information security management system. The adequacy of the measures is monitored by

the National Cyber-Security Center (NKI), also operating within the framework of the Special Service for National Security. NKI is the Hungarian partner of the European Network and Information Security Agency (ENISA). The legal regulations are not without precedent. The LX Act of 2009 on electronic public services and its implementing regulations already set out the safety and quality management standards for the operators and other collaborators of the electronic public service system [31].

The regulation applies the guides of the information security and related management standards offering closed, full, continuous, and risk-based protection that meets the principles and requirements of confidentiality, integrity, and availability [4]. It is to highlight that the government has created regulations for information security beyond the public administration. Among others, the financial sector is well regulated. Fulfillment of the requirements by the financial service provider, the Central Bank of Hungary has the authority to control the certification bodies and the audit processes.

4. Re-use of data

The legal actions of the government follow the changes in the society and try to prevent unfavorable impacts of different threats. The appreciation of electronic data management has opened new battlefields. However, IT offers broader and faster use of information; some problems must be considered. Beyond access to data, the mass of data becomes critical. Storing the giant data set and managing redundancies of the data may lead to safety and efficiency problems. Moreover, the mass of information places a heavy burden on all data providers. A transparent solution saves time and money.

Re-use of information is key to success in the future development of data management. Preventive regulation, including public and other data providers' duties and rights, may promote a better understanding in developing the IT systems. Besides, the formation of awareness must be at high emphasis. However, the process has been launched, the continuous development of the society and IT requires new and new responses.

Legislation on the recycling of public data in 2012 made up for the previous shortfall; this is when the European Union's Public Service Information (PSI) Directive from 2003 was implemented [19] [33]. The former Hungarian opinion stated that the unrestricted and free access to and dissemination of public interest data as well as the obligation to publish covered the requirements set out in the PSI Directive, no special regulation was justified. The new approach separated dissemination and re-use of data:

- Dissemination provides access to the information and fights against hiding the information.
- Regulation of re-use is intended to ensure the processing and use of large amounts of public sector data [25].

In 2015, the regulation ordered a survey of the re-using sectoral practices of public data and the integration of public data provision suitable in sectoral strategies. Furthermore, preparing a White Paper on data policy and establishing a national public data portal were prescribed [1]. Another regulation prescribed the establishment of a public data cadaster with a comprehensive survey of public data assets as well as the preparation of a proposal on the possibilities of recycling non-personal data based on the forthcoming White Paper on data policy [3].

Government activity related to the utilization of data assets intensified again in 2018. Covered by the Digital Prosperity Program (DJP), the Artificial Intelligence Coalition (MIK) operates as a forum of more than 300 members from international and local companies, universities, scientific and public organizations. MIK prepared the Artificial Intelligence Strategy of Hungary in 2020 [2] [34]. The National Data Asset Agency (NAVÜ, established in 2020) plays a role in framing the data economy, including the legal and engineering conditions and the survey of the data set. Academic knowledge on finding the best practices is involved. The change in governmental approach can be described by the note of the executive of NAVÜ, András Levente Gál, who stated that "the Hungarian legal system handles data well, and data assets as goods are less… Legally, data assets must be defined as private law goods, and a subject must be found who deals with them within the public administration. The NAVÜ does this… The fuel for solutions based on artificial intelligence is clean, accessible, well-utilized data, all of which are data assets, and we need to ensure this, for example, in order to implement the domestic AI strategy" [22] [23]. The Parliament received a bill on national data assets From the Hungarian Government in February 2021. This bill preserved the main concept of the former legislation and laid down rules for the key service provider performing technical and technical tasks as well as the operation of the institutions. Cooperation of the agency (National Data Asset Agency, NAÜ) and the council (National Data Assets Council, NAT) based on this regulation, the European data strategy from 2020, and the organizational elements of the draft regulation on European data governance is clear, but the impacts will be assessed during and after the finalization of the regulations [9] [16] [39].

5. Summary

Based on the historical review of the development of the regulation of data management, it can be seen that the regulatory need for data use and data utilization and the legal regulation fulfilling it was always present and developed. The process included the enhancement of the control tools and institutions. The increasing mass and the complexity of data to manage, parallel with information technology development, require rethinking the policies and strategies. Sectoral and sporadic solutions are appropriate as initial stages of finding the best practices, but a centralized approach must come forth.

Nowadays, the "use" of data and the systems that process and store them is inseparable, so the legal regulation of data management and information protection is present in parallel and is continuously evolving. Nevertheless, the information protection regulation is more detailed and elaborate, as in this case, the legislator can build on the decades of professional experience of information security management systems. The legal regulation of data re-use, as the most recent professional topic, has already been established, the detailed professional content is still to be translated into legal form; the Data Assets Act is being amended. The goal can be a comprehensive and flexible system that is ready to adapt to future changes.

The areas and historical stages of administrative data utilization presented in this study are part of the European development of data utilization and closely related data protection, sometimes anticipating, basically following European developments, but always in line with social and economic needs and the EU policy documents and legislative acts.

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eGovernment and the Pandemic II

HOW OPEN SOURCE TOOLS COULD HELP REMOTE LEARNING DURING THE FIRST LOCKDOWN IN HUNGARY? – CASE STUDY OF UNIVERSITY OF PUBLIC SERVICE

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Abstract
This paper analyses how these open source tools could help remote learning at the University of Public Service during the spring semester in 2020 and how their usage rise significantly compared with the previous period.

Covid-19 has had serious consequences in all aspects of people's everyday life – including higher education. Forced emergency responses made a significant impact on the digital transformation of higher education. In Hungary, the University of Public Service switched from attendance education to remote learning within ten days.

Using case study methodology, this paper analyses how open source software usage changed at the first lockdown. The transformation period was between 12-22 March 2020, and online education started on 23 March 2020. The end of the examined period is the end of the 2020 autumn semester. The examined institute is the University of Public Service. This research focuses only open source tools, including the already utilized accessed Moodle course management system.

This paper is highlighting the relevance of the usage of open source software in the given timeframe. The "public money – public code" principle is also emphasized as one which could be an especially key issue in the University of Public Service as this institute prepares students to work as public servants in the future.

1. Introduction

The novel coronavirus (SARS-CoV-2) pandemic has had serious consequences in every aspect of people's life – including solving how to run higher education online. Even though some tools had already been used to share course material or even encourage interactivity, distance learning was not that popular within Hungary. There was no significant demand for it before, but with the quick closure of the institutes, universities had to find rapid solutions. Without opportunities for public procurement to purchase software, usage remained with already used or open source options.
The institute used in this case study – the University of Public Service in Hungary – lecturers and students had to switch from attendance education to remote learning within ten days in March 2020. The change appeared fast and in many aspects: students had to leave their dormitories and move home, find a proper environment there, set up a good enough IT base, change their mindset – so did the teachers. The latter had to change the way of teaching, get used to teaching in a yet unusual and

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– in many cases – uncomfortable situation. Obviously, it needed a lot of administrative support, either.

This paper's central question focuses on which online platform could best fit the circumstances, so do requirements of rational usage of public money at a state university – with particular highlight to open source concept – and how these opportunities could evolve with time. This paper also assumes that the usage of analyzed platforms increased spectacularly, and the covid-19 pandemic boosted higher education to meet modern technology opportunities.

2. Methodology

The scope is the University of Public Service in Hungary. This research focuses only on the open source tools. The analysis highlights the findings related to the already utilized accessed Moodle course management system, as other public platforms (like Big Blue Button) did not spread widely. Therefore data of usage analyzed came from Moodle E-learning platform.

This paper's main research question is: (1) how the usage of open source teaching platforms changed at the University of Public Service due to the novel coronavirus (SARS-CoV-2) pandemic in 2020?

To analyze it, we need to understand the theoretical background of why to prefer open source options, which public platforms have been used since the pandemic started and how the university itself has tackled to go remote on short notice. To understand how the chosen institute could switch to distance learning in ten days, we need to analyze university regulations and recommendations by the rector and the chosen University's Operational Corps.

The choice of research strategy was based on considering three conditions: "(a) the type of research question posed, (b) the extent of control an investigator has over actual behavioral events, and (c) the degree of focus on contemporary." [1, p5.] Following this guideline, the authors chose case study methodology to use as to how "question is being asked about a contemporary set of events, over which investigator has little or no control." [1, p9.]

3. Literature review

3.1. Covid-19 related higher education recommendations

The meaning of blended learning has changed since its first appearance in 1999, and all understand it based on their need. The core idea is the combination of classroom and online learning or face-to-face (oral, non-verbal) and written education, where teachers' roles can vary. Based on a definition tree diagram in case teacher and students are at the same time "co-present", and there are content and/or communication technically mediated blended learning occurs. [2]

Online and blended learning had already had growing popularity and strategic priority at colleges and universities in 2019, but decisive and determinant steps have not been forced before the covid-19 lockdown. As a consequence – although not every experience is positive and not everyone is happy about going online – quality growth and "many faculty and students now better understand and appreciate the value of asynchronous (D2L, Canvas, Blackboard, Moodle) learning management systems and synchronous tools for collaborative group work (Zoom, FaceTime, Hangouts)." [3, pp310-311]

Development, investment, and training seem to appear as a recognized crucial point both in human resources and technology infrastructure. [3] Simultaneously, "capacity building and competencies of both teachers and students to facilitate their remote teaching and learning experiences" [4, p8] must be prioritized. The focus has to be put on skills development, such as using online platforms and tools and designing "an effective online course" [4, p8] – as some even say, design for teaching is the main point, not the technology. [3]

At a time of crisis, adaptation can be quicker, as we experienced in the last year. Strategies and solutions had to be developed quickly, and correction mechanisms had to appear based on experiences gained. A recommended way is "[i]ntegration of formal and informal learning settings, along with Open Education and Open Science" with the cooperation and shared knowledge within the university community. "Resources can be Open, Universal and-or Free (OUF), and they have to be correctly tagged and used, to this matter." [4, p8]

3.2. Open source - public money, public code

Based on the Open Source Initiative, open source denoting software for which the original source code is made freely available that anyone can inspect, modify, and enhance and redistribute. [5] The European Union has an open source license, "The European Union Public Licence (EUPL)" yet since 2009, but its usage not mandatory. Its purpose is "to encourage public administrations to embrace the free and open source model." [6]

The "Public Money - Public Code" is a campaign by Free Software Foundation Europe. Their main aim is to encourage the politicians to "Implement legislation requiring that publicly financed software developed for the public sector be made publicly available under a Free and Open Source Software license." 203 organizations and 30151 individuals already support this call for action by signing the open letter to use taxpayers' money wisely in this aspect. [7]

4. Tools

4.1. Moodle

Moodle is the world's most popular open source learning management system, supporting both blended learning and 100% online courses and available in more than 120 local languages. It "has been adapted for use across education, business, non-profit, government, and community contexts" and "designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments." [8] It can be extended by plugins and customized in any way and tailored to individual needs. About its usage statistics, see Figure 1.

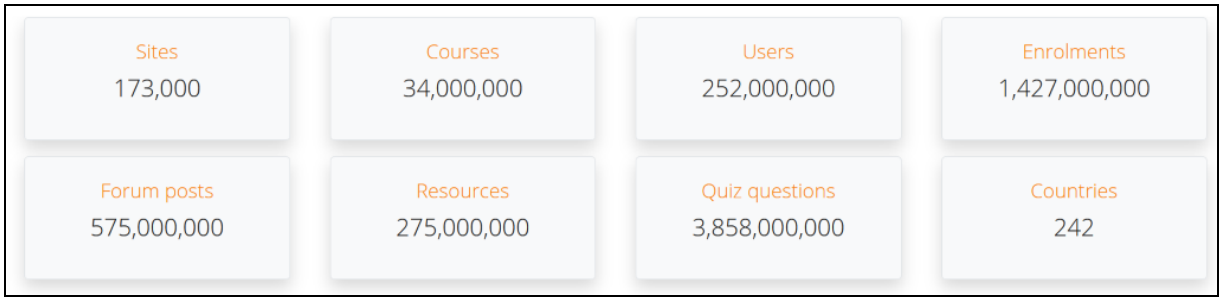

Figure 1: Moodle global statistics [9]

4.2. Big Blue Button

Big Blue Button (BBB) is an open source web conferencing system designed for online learning. BBB is an HTML5-based web application that runs within a web browser and does not require installing any software, unlike many commercial web conferencing systems. There is no mobile app to download or install, but BBB can run within a mobile browser.

BBB integrates seamlessly with Moodle using plugin. An incoming release is planned to Integrate the BBB plugin into Moodle. [11] It is designed for collaboration and engagement, focusing on virtual office hours/tutoring, flipped classroom, student collaboration, and fully online classes. Its features include real-time sharing of audio, video, presentation, and screen – along with collaboration tools such as interactive chat (public and private), multi-user whiteboard, shared notes, polling, and breakout rooms. BBB can record one's sessions for later playback. [10] One of its advantage for teaching that participants can get the right to present their screen without getting other extra rights (for example recording). Therefore currently it is one of the most advanced tools for online teaching.

Despite its advantages, it does not reach the popularity of MS Teams at university level in Hungary.

5. Covid-19 provisions: University of Public Service

The Government Decree 40/2020. (III. 11.) on the declaration of state of emergency [12] – as a consequence of novel coronavirus (SARS-CoV-2) pandemic outbreak – affected the operation of the given university. The rector declared the period between 12-22 March as an educational break to prepare for distance learning from 23 March 2020. Till 3 July 2020 semester was competed with online learning, which meant pre-recorded lectures and online submitted assignments via Moodle or email. Video lectures were available at the Ludovika Webinar [13]. Big Blue Button face-to-face interaction software could be available but has not been used, although it could complete the open source learning tool requirements if they would like to organize blended learning. Its advantage would have been on one hand that in this period only on-premise solutions were allowed at the university, on the other hand, Big Blue Button has already had functionalities specialized for teaching what MS Teams is just currently developing.

The autumn semester 2020 started as attendance education, but based on Government Decree 484/2020 [14], the rector declared at 11 November 2020 online education again [15], stared at 16 November 2020. It appeared as blended learning: Moodle and MS Teams were, the two branches of online learning and face-to-face interaction, decided to be used. Although blended learning provides a more effective learning experience, MS Teams does not fit open source tools' requirements. Moodle still fits the public money – public code idea.

At the same time - within Moodle – an internal training system has been set for teachers to learn how to use and design better online teaching.

6. Research findings: usage of open-source tools at the chosen university

The University of Public Service is a state university with four faculties located in Budapest and Baja. The number of students in the spring semester 2020 was N=5479, while in the autumn semester N=5908. At the same period number of teachers was N=731 and N=853.

The number of usages of Big Blue Button was not noteworthy; therefore, we cannot make a comprehensive data-based analysis. In 2020 Big Blue Button was used in 93 courses altogether.

To measure the usage of Moodle, the resources were set as a baseline. This case resource is an item that a teacher can use to support learning, such as a file or link uploaded together with assignments or tests (see resource usage frequency in Table 1.). The starting date was the first week of 2020 (2020 week1 =0). Figure 2 shows data starting in 2020 as data from 2019 remained close to the amount we can see till 2020 week 9. The date of the exam period can differ in different faculties, the Figure 2 indicates the most common period. Learning assets are resources that are used to deliver information through a learning management system or portal for training and development.

Analyzing data, two peaks appear: 9 March 2020 (week 11) and 2 November 2020 (week 45). Week 11 was synchrony with the declaration of state of danger and closing universities, but peak at week 45 was two weeks before online education started again in the second semester and one week before the rector announced it. It might have based on two facts: on the one hand, usage of Moodle does not fall since the first lockdown, on the other hand, the number of Covid-19 cases rising in the country could make the suspicion for a second closure.

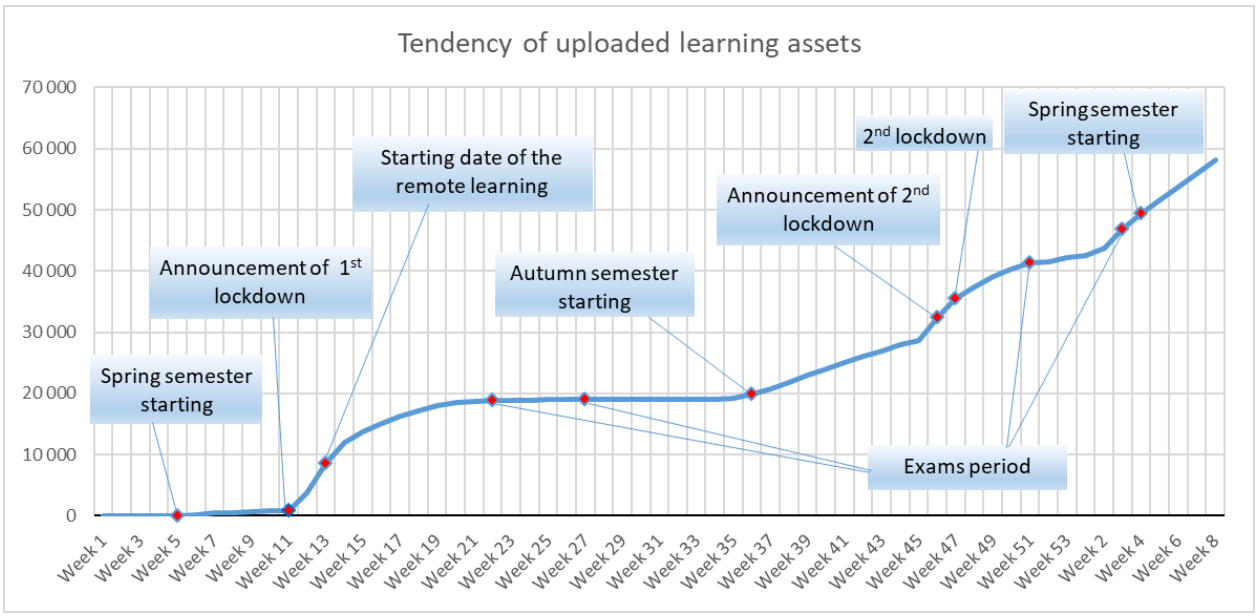

Figure 2: Number of uploaded resources (files, links) between 2020-2021.

Interesting to highlight from Figure 2 that although the autumn semester started with classroom education usage of Moodle still increased. It can indicate educators understood the potential of using this tool as an added value for their teaching (blended learning).

Figure 3 shows the peaks even more spectacular. That figure indicates the number of logins and unique logins to the University of Public Service Moodle system between 31 January 2018 and 31 January 2021. Since the beginning of the pandemic, the drop happened during the summer holiday.

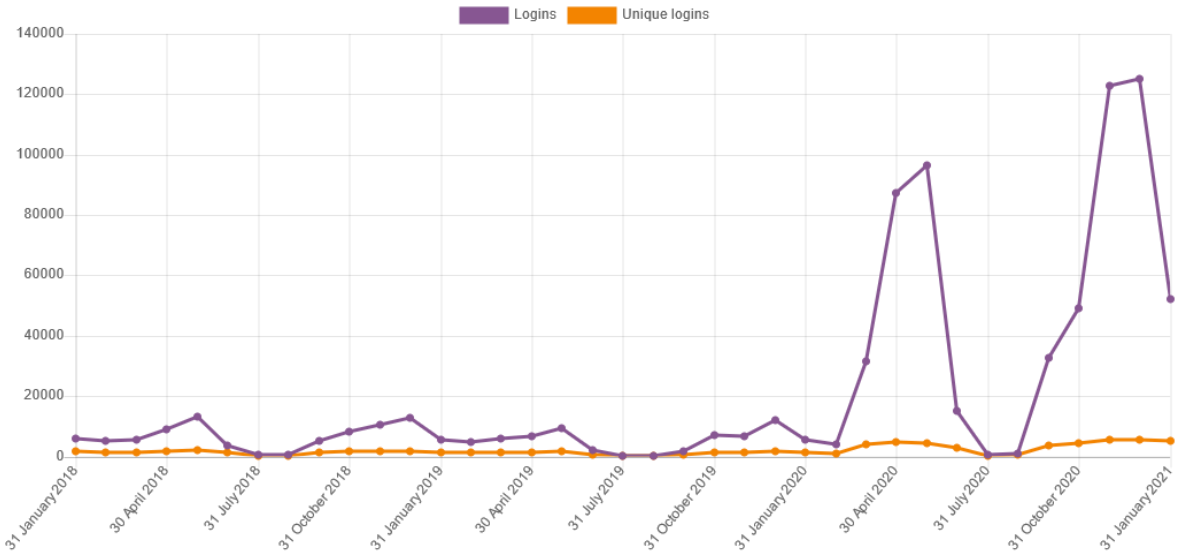

Figure 3: Moodle login data between 2018-2021.

To analyze in more detail, Table 1 and Figure 5 presents how many courses used any of the listed resources in the given semesters. An assignment could be both small tests, quizzes during the semester, or exams. Worth mentioning that at the end of the 2020 spring semester exams could be completed only with assignments, but at that time many educators asked for it via email.

	Resource	2019/20/2 (2020 spring semester)	2020/21/1 (2020 autumn semester)	Total
1.	File	1 300	1 567	2 867
2.	Label	65	1 839	1 904
3.	Assignment	566	537	1 103
4.	Quiz	283	665	948
5.	URL	378	411	789
6.	Folder	205	215	420
7.	Forum	131	54	185
8.	Page	89	75	164
9.	Big Blue Button	24	69	93
10.	Chat	57	29	86

Table 1: Ten most commonly used learning assets

As one could expect most popular option was file sharing within Moodle's basic features. Label resource rose up in the second examined semester as there has been an option that Moodle users with Microsoft 365 accounts can create Teams meetings within Moodle with an installed plugin. It means that starting of blended learning caused the rise (Figure 4). [16] Numbers also highlight that Forum and Chat were not popular among educators.

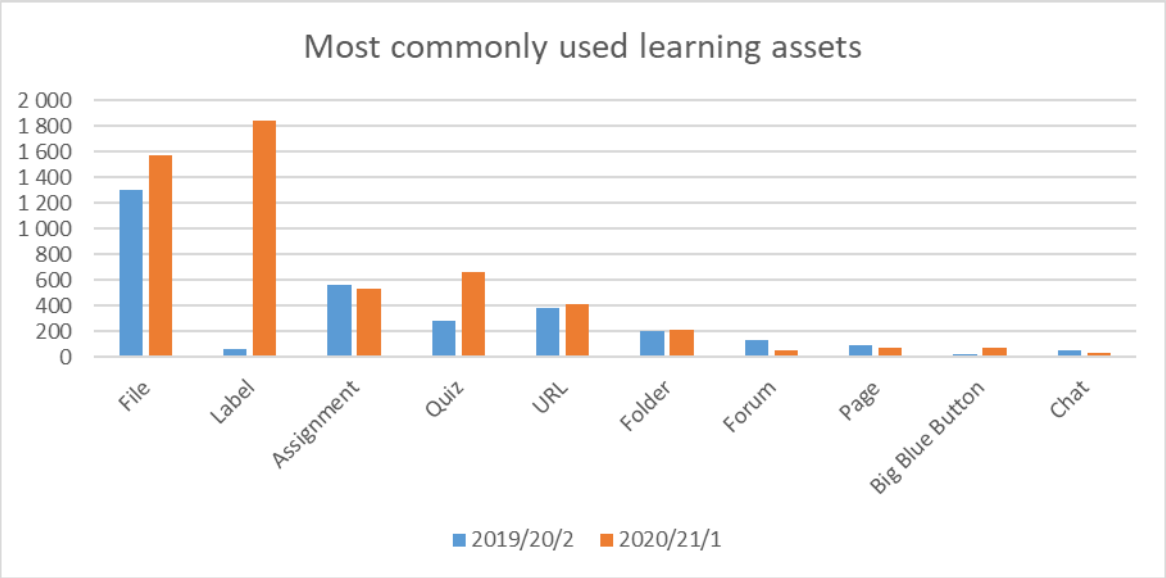

Figure 4: Most commonly used learning assets in Moodle

7. Conclusions

As universities in Hungary had to turn to online education because of the Covid-19 pandemic on short notice, they had to turn to feasible solutions. The time frame was not enough for public procurement, so they had to turn to already used tools and/or start to use open source solutions.

The University of Public Service has had Moodle open source tool already had used at the institute, but it could not reach its real potential till the crises. For blended learning, a face-to-face tool was needed to be added, but instead of open source Big Blue Button, MS Teams appeared as a solution since the autumn semester. With doing so, open source and public money – public code recommendations had been realized partially.

The big question is how will higher education look like after the pandemic? What strategy to plan with? [cf. 3] Authors hope that Moodle system's wise usage will remain at the university as a tool of blended learning – even when the second branch of it can be a real face-to-face lecture.

This paper's limitations are that it could not analyze students' and lecturers' perceptions about online education, so do their opinion about using different online tools and their preferences about it. It cannot focus on the IT "infrastructure" of actors. It must have excluded other challenges and various circumstances that could affect online learning as well, such as digital inclusion or administration challenges. Further research should be done to investigate them.

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COVID-19 AND DIGITAL RIGHTS IN ROMANIA, MOLDOVA AND UKRAINE

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Abstract
The Covid-19 pandemic has caused tensions between protecting public health and upholding fundamental rights and freedoms, resulting in high-pressure on digital rights. Extending existing human rights and freedoms to cyberspace has more than ever come to the fore.

In some cases, authorities succeeded in guaranteeing the enjoyment of fundamental rights and freedoms online. But they fell short in many others, in particular, regarding the right to education, due process rights, the right to privacy. More, some authorities used the pandemic to crack down on digital rights. This is especially true about the freedom of expression.

Analysing the digital rights crisis in Romania, Moldova, and Ukraine, reveals different approaches in each country to the above-mentioned cases. In order to get over the crisis, such complexity urges extensive legal, political and social transformations. Hence, this brief identifies the necessary transformations and provides guidance to undergo them, highlighting among the most significant: adopting a rights-based approach, countering the digital divide, increasing transparency over the internet, enhancing data security and protection.

1. Introduction

In dealing with Romania, Moldova, and Ukraine's digital rights in the age of the Covid-19 pandemic, this brief aims to tackle some fundamental questions in greater depth. Would Covid-19 pandemic crisis boost towards digitization, or a return to the previous state of arts is expected after vaccination? If the former is affirmative, what are the challenges and how to overcome shortcomings? Would the pandemic's impact be sufficient to raise awareness that digital rights are individual rights? What could be done to defend individual rights online?

In order to answer these questions, the structure of this paper is divided into three parts. The first part defines the concept of digital rights in light of technological evolution, international recognition, and relationship with individual rights. The second part analyses the digital ways and means that were adopted to solve the challenges caused by the crisis regarding the right to education, due process rights, the freedom of expression and the right to privacy. Finally, the last part presents solutions and recommendations to overcome challenges and shortcomings.

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2. Features of digital rights

2.1. Defining digital rights

What do we mean when we talk about digital rights? Digital rights mean different things to different people. There is a degree of confusion about it. A quick search online yields a variety of definitions, but most of them are about the relationship of humans with devices and networks. Many of these focus on the issue of copyright, freedom of expression and the right to access. Such a narrow framework is due to the evolution of digital technologies.

Twenty-thirty years ago digital rights meant something different than its today meaning. With the start in the 90s of the World Wide Web available for everyone, the internet was firstly used for text and file sharing. Such utilization had inevitably touched issues regarding copyright information, resulting in associating digital rights with the protection of copyright online. The outcome of this identification got the name of digital rights management (DRM) [22].

Since the 2000s, this perception of digital rights has evolved towards including various facets of the freedom of expression, due to the development of online social platforms and mobile devices with access to them. Even if "digital rights" today is still anchored mainly to freedom of expression, this is only a transition process. The tendency of shifting towards covering the whole group of individual rights and freedoms is getting more evident and the process seems imminent. The Covid-19 pandemic crisis contributed a lot in this sense.

2.2. Digital rights are human rights

In the last decade, an increasing number of human rights organisations, lawyers and activists have been invoking that digital rights are the same offline individual rights but applicable indistinctively online, in the digital sphere or in the internet era [32]. This interpretation has been agreed by consensus and promoted mostly by the UN Human Rights Council, asserting in several resolutions that "same rights that people have offline must also be protected online" [49] [50].

Even if the said resolutions expressly point that the above-mentioned affirmation is true in particular to freedom of expression, one might erroneously think that the applicability of the offline human rights in the online sphere regards only the said freedom. Instead, such focus should be read from the perspective of the UN's awareness of the transition process towards recognition of all human rights online, of which freedom of expression is one of the cornerstone pioneers. The UN message suggests instead that rather than seeking to define new rights for the online space, we should focus on extending existing human rights to cyberspace. There is no need to invent new human rights, but rather finding solutions to adapt the existing toolbox to the digital world [16].

2.3. Facets of human rights in the digital sphere

At this point, one might wonder, if digital rights are individual rights, why use a different term? Such terminology is pursuing the scope of drawing attention to particular issues, that is, the threats of individual rights in the digital sphere. Such framing has a higher potential of capturing attention to the said issues [18] [19].

Another aspect that needs clarification is the wide-spread indifferently use of terms human rights and fundamental rights throughout the various debates regarding aspects of technology implications

[36]. Despite overlapping between these two notions, they mean different things in terms of protection and enforceability. Human rights are those rights that belong to every human being and are protected by virtue of international law through covenants and conventions. While fundamental rights are the rights granted in the Constitutions of the States, as such, are the primary source of recognition and protection when dealing with someone's rights. In order to avoid confusion, this brief will use the "neutral" term of individual rights, unless the former would be more appropriate in a specific context.

Finally, another important query that comes to the fore is the degree of application of individual rights in the digital sphere. Since digital rights are the offline rights but in the online sphere, are they subject to the same features that apply to offline rights? In other words, are they universal, inalienable, indivisible, interdependent and interrelated as are human rights? Or, do they distinct like fundamental rights between absolute rights and rights subject to limitations, rights that oblige to action or inaction, rights that are exercised individually or collectively, etc.?

At a glance, the Covid-19 crisis highlighted that offline rights need adaptation to the digital sphere since they are not automatically transposing to the digital sphere. This brief aims to identify such shortcomings and provide for the necessary recommendations in the case of Romania, Moldova and Ukraine. In order to do so, it will engage the term digital rights at the scope of capturing attention to the individual rights' issues in the digital sphere and suggest making no difference of protection between individual rights offline and online. More, it points out the governments' duty to adopt positive actions to guarantee and protect digital rights, albeit admitting meanwhile for their limitation. Last but not least, it presents the increased digital rights' tendency in losing ties with specific individual rights towards enclosing them all. In other words, the pandemic pushed for distancing digital rights from the dominium of the freedom of expression towards the human rights intrinsic concepts of universality, inalienability, indivisibility, interdependence and interrelation.

3. Digital rights in the age of Covid-19

3.1. Crisis pushed towards digital

The COVID-19 pandemic has underscored the vital role of digital technologies in our lives. Digital has been crucial in managing the crisis and ensuring the many parts of our life that were brought to a halt, including individual rights. However, the rapid adoption of digital technologies can neglect the adherence to individual rights and the related principles of transparency and accountability. Indeed, digital fell short in the countries with weak digital foundations, exacerbating gaps and inequalities which amount to violations of individual rights.

3.2. The right to education

Education was among the first affected by the pandemic, thus, one of the first to test digitalization. Under international and national law of case-study countries, education shall be free and compulsory, at least in the elementary and fundamental stages. And safeguarding the right to education is a public responsibility relying on the Sates. This means that along with safeguarding the fundamental rights to life and health, the States are obliged to guarantee also the right to education. The former does not abrogate the latter, but only modify the ways in which it is ensured.

Such a state of affairs made the application of digital technologies a critical lifeline for the learning process. Remote learning via digital means has rapidly become the only way of guaranteeing safe

education. However, as the practice had shown, it wasn't without obstacles and difficulties. Rapid digital adoption has ensured the continuation of learning, "but has also created new barriers and unintended consequences" [34], such as, widening an existing digital divide, compromising the right to privacy and data protection, undermining parents' right to autonomy in choosing the type of education for their children, psychological effects due to less socialization, lack of nutrition, absence of suitable learning home spaces, request of more education skills from parents, physical and psychological violence, etc.

In Romania, school closure was very problematic from the rights perspective. It was a sudden decision that caught off guard the education process. The first two months have been the most taught period. The sudden decision of school closure, in a context of encouraging online education but in the absence of any centralized overview of the situation [40], have induced school administrations, teachers, and children to fast searching for ways and means of connecting. This due diligence resulted in the use of a variety of ad-hoc tools for on-line classes, mostly messenger apps, which put at-risk children's personal data.

But this wasn't the case for almost a third of all children and nearly a half of the teachers, as they had no access to online education. A survey of the NGO Save the Children showed that 43% of the teachers and 28 % of all children do not possess material resources for online education, with this percentage being 10 % higher in rural areas [44]. Also, 28% of all children do not possess adequate skills for online learning, with this percentage being 5% higher in rural areas. Most of these children come from socioeconomically disadvantaged families. However, the government reacted promptly and actively and allocated the necessary funding for supplying with tablets children from socio-economically disadvantaged backgrounds to ensure their participation in remote learning [39]. Also, various online platforms for facilitating online learning have been elaborated since then. Nevertheless, this hasn't totally countered inequalities due to the gap of digital literacy that needs a long-term policy.

Also in Moldova, the closure of schools was one of the first decisions taken during the state of emergency. Although Moldova had established before the pandemic an online platform for online classes (studii.md), it hasn't been much used after school closure [53]. By July 2020, over 70 public schools with 77,000 users utilised the platform, which means 5% of all schools and 23% of all children in Moldova [31]. Also, even though other platforms facilitating online learning have been elaborated during the first period of the pandemic, messenger apps and videotelephony software have been way more popular.

As of June 2020, 5% of all children and 10% of all teachers hadn't access to ICT technology, with a rate of 11% in rural areas. Of those children that had instead access to ICT technologies, nearly 86% have internet connectivity in urban areas and 75% in rural areas. Among them, the access to the internet is considerably lower in families with a lower level of education (64.7%) than families with higher education level (94%).

Ukraine adopted a more flexible mode of operations. It encouraged remote learning but left to the school boards the final decision in respect of the software for remote learning [51]. Unlike Romania and Moldova, Ukraine adopted a more passive approach regarding the software. The Ministry of Education has recommended using the online digital platform but without further indication in this direction [48], which resulted in a higher threat for children since in most of the cases they have used random freeware. Also, unlike the other case-study countries which have relied primarily on

ad-hoc platforms with digital books and lesson recordings, in Ukraine many of core subjects have been broadcasted through TV channels and YouTube.

Aside from these differences, Ukraine also faces challenges of guaranteeing equal access to education. Rural and socioeconomically disadvantaged children being the most affected. Up to 19% of all children have no or limited access to a computer. Of those that instead have access to a computer, 85% that live in the urban area have also a stable internet connection, while in the rural areas less than 60% [25]. Also, many of the teachers and rural and socioeconomically disadvantaged children are usually affected by the absence of digital literacy [46].

The right to education is universal, which means that it belongs to every person, but the pandemic has shown the fragility of this declaration. Although is one of the social rights *par excellence*, which means that authorities have the duty to guarantee its enjoyment by positive actions, it hasn't been guaranteed to thousands of children.

Making digital the default means of learning delivery had consequences on all of the children, but on some of them more than the others. Turning education digital had exposed and exacerbated once more inequalities. The above-mentioned examples show that online education has highlighted inequalities between the rural and the urban, socioeconomically disadvantaged and advantaged, families with secondary education and families with higher education[2]. Whilst the main reasons for such inequalities are the lack of digital literacy and the absence of access to ICT technology and the internet [14]. Guaranteeing access to education in these conditions is a big challenge, nevertheless, Romania showed it is possible.

Besides these concerns, the threats to personal data of children have gone unnoticed by authorities. In all the countries, at least in the beginning, free products have been used for classrooms online. But some of these come at the cost of children's rights and dignity, due to the threats of exploitation of their personal data [34]. Last but not least, the digitalisation of education has undermined parents' right to the kind of education that shall be given to their children, who couldn't choose learning without any digital means or low tech teaching for their children [52].

Switching to online education has shown that digital literacy and access to ICT technology and internet connection is a prerequisite of the right to education, thus, the states have to meet their obligations and provide for them in order of guaranteeing the right to education. Otherwise, the states could be accused of violating not only the right to education but also the right to equality and non-discrimination. In doing so, caution should be exercised regarding personal data and parent's right to autonomy.

3.3. Due process rights

Along with education, the judicial system has been seriously affected by the pandemic. Like many other sectors, the pandemic had diminished the functioning of the judiciary via physical contact, compensating for the negative impact through boosting digitalization. Digitalization turned indispensable to ensuring due process rights.

During Romania's state of emergency, most of the Courts have restricted their program to the public. Many cases had been paused and postponed and communications with the Court turned

[2] This is also true with respect to children with disabilities and Roma, albeit not mentioned in the examples.

almost exclusively in electronic format [5]. The Courts were updating regularly on their website the upcoming hearings and trials, indicating that petitions could be submitted by regular post and email. More, the circulation of procedural documents through e-mail was presumed and didn't require the agreement of the parties. The judicial bodies could request via phone, as needed, the electronic addresses to communicate the said documents [43]. In a similar way, the right to be heard of the persons deprived of their liberty also was presumed and has been ensured via videoconference.
An exception to the above-mentioned rules were the cases of extreme urgency, which couldn't be paused. But even then, when possible, the Courts could decide to conduct the hearings through videoconference and communicate the procedural documents through telefax, e-mail, or other means which ensure sending the text of the act and the confirmation of its receipt [47].

Also, prosecutors started to use remote communication, as they were receiving receipts of notifications, requests and memos by correspondence, electronic means of communication, or post. However, the absence of means for videoconference has prevented remote hearings. Thus, these have been done face to face in extreme cases, while postponed in the other [5].
While convicted persons have seen suspended their right to receive visits, goods, or permits to leave temporarily the penitentiary [12]. These restrictions have been compensated by the right to videoconferences and an increased number and duration of phone conversations.

Even after the state of emergency had been lifted, the Ministry of Justice recommended using videoconferencing and teleworking at most [42]. Also, the communication of procedural documents through electronic means; like e-mail, WhatsApp and others. This last decision is questionable at best, as it doesn't take into account the absence of ICT technology, internet connection, or digital literacy. More, it allows such communication through freeware, which represent a high risk to personal data.

In Moldova, videoconferencing enabled delivering justice during the pandemic. From the early days, the Courts have been encouraged to schedule hearings through the videoconference and to communicate the procedural acts or other related documents electronically" [7]. Although, Moldovan Courts have started using videoconferencing system even before the pandemic. Since 2019, videoconferencing has been used in criminal cases related to early release from custody and complaints regarding prison conditions, connecting in this way remotely inmates in penitentiaries to participate in court hearings. More, the Courts were using the videoconferencing system also for training and meetings.

The pandemic has boosted this tendency towards other issues and cases as well, like extending the period of arrest. From March 17, 2020, immediately after the state of emergency was declared, to the end of October 2020, the Courts used videoconferencing for over 6.800 remote hearings[3]. A significant number if compared to the total of almost 11.200 remote hearings that have been conducted since the very implementation of the system in November 2018 [37]. The rapid increase of hearings through videoconferencing during the pandemic shows that the system turned very useful. In a similar vein, besides doubling the duration and number of telephone calls, videoconferences on software previously accepted by the penitentiary institutions have been allowed to convicted persons for online meetings with their families [28]. Extending the system to other types of legal procedures is a potential next step for the Moldavian justice system.

[3] Until October 23, 2020.

Besides videoconferencing, the Courts were allowed to communicate the procedural documents through fax, e-mail, or other means which could ensure sending the text of the act and the confirmation of its receipt. But e-mail was used more than other means by most prosecutors and judges. The circulation of procedural documents by e-mail was presumed and didn't require the agreement of the parties [28]. In case of the absence of e-mail address in the case file, it was asked via phone call. Also, in order to avoid human contact, the Courts recommended to the parties sending all the materials by e-mail or by ordinary post [2].
Notwithstanding the pandemic, authorities continued reforming justice. The integrated file management program (PIGD 5.0) has been updated to a new version and implemented for testing in more Courts [17]. It consists mainly of allowing submitting and sending summonses electronically, facilitating the coordination of hearings and the inclusion of documents in the system, offering to the parties better access to all procedural actions performed by the Court.

The lockdown measures negatively impacted Ukraine's judicial system, which appeared unprepared to respond to existing challenges [51]. Unlike Romania and Moldova, Ukraine adopted a decentralized approach. During the initial period of quarantine, which was declared on March 12, the highest judicial bodies and institutions issued recommendations towards using the remote communications facilities; in particular, videoconferencing the hearings, circulation of documents in digital form, teleworking [21][4].

At the end of March, the Parliament adopted amendments towards simplifying the procedure for participation in Court hearings by videoconference [23]. According to these, during the quarantine regime and by using own technical means, the parties could ask the judge for remote court hearings via videoconference. The confirmation of the identity of users to the said hearings to be made via electronic signature. Alternative means have been indicated in case of impossibility to provide the electronic signature. The said amendments have been later completed with further specifications regarding criminal cases, indicating the possibility of using videoconferencing for pretrial and trial hearings. The latter could be held by the judge's decision or on a party's request, while the former only with the defendant's consent [24]. However, it was left up to Courts to decide upon the rules, criteria, procedure, and procurement of necessary technology [46].

Following the abovementioned amendments, the State Judicial Administration issued a Regulation on videoconferencing and launched a system of videoconferencing for the participation of parties in proceedings (EasyCon). This can be launched on any computer or smartphone and allows the exchange of documents. However, it limits access to citizens without digital signature. Later on, the Regulation have been updated towards allowing people without a digital signature to participate in hearings and the Courts to use any software that complies with a set of specific technical requirements.

[4] The Chairman of the Council of Judges recommended to the Courts of informing citizens about the possibility of videoconferencing the hearings and about receiving the statements on reviewing through remote communications facilities. Also, he advised citizens to submit documents in electronic form and by remote means. The State Judicial Administration and the Council of Judges have advised courts to switch to e-filing systems and e-mails for submissions and procedural documents. The Supreme Council of Justice has advised all Courts for the period of quarantine to hold hearings via videoconferencing where possible and to receive documents in digital form. The High Council of Justice recommended to the Courts, where possible, to conduct hearings in real-time via the Internet, to process correspondence electronically, to provide the Courts' staff with the possibility to perform their duties remotely. The Higher Anti-Corruption Court advised citizens to submit all necessary documents by email or by post. Dniprovskyi District Court of Kyiv city recommended providing all necessary documents to the Court in electronic form, and to get acquainted with the case materials after quarantine or remotely, if so technically available.

Nevertheless, these innovations had little effect on ensuring justice and protect due process rights. This is first of all due to the legislative framework, since videoconferencing has been stated as an alternative way to participate in hearings only during the quarantine regime, that could be asked by the parties, with the final decision belonging to the judge, and in consideration of technical possibility [20]. The risk of bad connection is carried out by the party that had asked for videoconferencing. While the judge decides over the possibility of identification with other documents than the electronic signature, which can easily turn into restricting de facto the right of access to justice.

Besides this, Courts were unwilling and unprepared to use digital means, mainly due to the lack of standardised videoconferencing equipment and internet security measures for hearings and e-filing. Courts have been using a plethora of third-party videoconferencing platforms, with only one of these deemed sufficiently secure (Webex Meetings) [45]. Indeed, monitoring of the Human Rights Ombudsman's office has revealed that in Kyiv, due to the lack of equipment and coordination, only 6.5% of all pretrial detention hearings were held via videoconferencing. Better in Odessa, where over 17% of hearings were held online, although in at least one case a hearing had to be postponed because of connectivity issues [46].

3.4. Freedom of expression.

Digital communication had been a critical factor allowing the free flow of information about the pandemic, including false information. Unfortunately, many governments have abused of their power of censuring false information via sanctioning selectively information that they deemed fake [54]. Moreover, the excuse of protecting the information ecosystem from misinformation was used to deny the fundamental right of access to information. Although freedom of expression and the right to information could be limited, such a decision should be taken only in extreme cases and proportionally to the pursued aim. This is true even during a public health crisis when the free flow of reliable information is critical to containing the pandemic, governments should avoid restricting free speech through prior restrictions, closing media outlets, or blocking access to online communications. Such actions "call for the most careful scrutiny and are justified only in the most exceptional circumstances" [9].

From the beginning of the pandemic in Romania, information was one of the major concerns of the government. The Government created a separate section on its web page dedicated to coronavirus with information about the new regulations. Also, it had been continuously running information campaigns on TV and social media, while public institutions were actively re-distributing them on their web pages and in social media. In addition, a dedicated free phone line (telverde) was introduced for information and support [12].

However, other decisions were less popular. One such decision was the double term in which public institutions could answer the access to information requests. According to civil society, some public institutions invoked the term extension to suspend the access to information entirely [6]. Another unpopular decision is the criminalization of fake news, since it allows authorities to order interrupting the transmission or the storage of the content concerning online media accused of spreading false information about the COVID-19 outbreak [47]. This power was used against a website for publishing disinformation [41].

Since the beginning of the pandemic, Moldova adopted several decisions regarding the freedom of expression and the right to information that are questionable at best [1]. The first was the extension

of the period for government agencies to respond to freedom of information requests from 15 to 45 days [28]. Another more controversial was the request of authorities, quickly revoked due to harsh criticism, to audiovisual media to present only the official position of authorities in coverage of the pandemic and prohibiting journalists from expressing their personal opinions in reflecting the topics concerning the COVID-19 pandemic [29]. The third such decision regards the order of Information and Security Service to block access to more than 50 websites for "promoting fake news about coronavirus evolution and protection and prevention measures" [10]. This heightening concerns regarding the extension of censorship measures as blocking was without any warning or public explanation and the fake news published on these websites weren't related to coronavirus [30].

Besides above-mentioned cases, the authorities fell short of their obligation to effectively inform the public. For example, while the government created, like in Romania, a separate section on its web page dedicated to coronavirus where it posted information about the new regulations, it made little effort to translate their complex legal language into simple and understandable guidance, making it difficult for a non-specialist audience to understand and follow them [27]. Many of the decisions concern the organization of transport to bring citizens into the country, making a separate list with such decisions would facilitate navigating and accessing the other more relevant decisions.

Ukrainian authorities also attempted to limit access to public information during the pandemic, but the harsh criticism led the government to withdraw. Nevertheless, some public institutions refused access due to the pandemic. Unlike Romania and Moldova, Ukraine was very active regarding the flow of information, both positively and negatively. About the latter, Ukraine used existing legislation to curb what it deemed fake news related to coronavirus, resulting in cyber-police taking down social media posts and blocking 10.000 web-links and the Security Service blocking 2,500 web-communities and identifying nearly 400 web-agitators [46].

However, Ukraine took also positive steps towards effectively informing the public. It has created a user-friendly and easily understandable for non-specialist audiences website dedicated to Coronavirus[5], but which unfortunately ignores minority languages as it's available only in Ukrainian and English languages [52][6]. Also, a Telegram channel with more than 600.000 subscribers and almost 200.000 views of daily updates[7], daily press briefings which are available also on YouTube[8], a free phone line, mobile loudspeakers [38].

All the countries took concrete actions regarding the information space in the pandemic. Some of them had a positive effect in preventing the spread of Coronavirus, but others are questionable at best. Besides the suspension of access to information, serious concerns raise the extension of censorship online under the excuse of combating fake news. This is especially true in the case of Moldova and Ukraine. Instead of combating false information, authorities must consider taking affirmative measures towards bolstering the information ecosystem through consistent and transparent actions.

[5] https://covid19.gov.ua/
[6] "Some groups did not have any access to COVID-19 online information because they lacked access to Internet or had language or accessibility barriers", "67% of rural women do not have access to Internet at home".
[7] Коронавірус_інфо, https://t.me/COVID19_Ukraine
[8] https://www.youtube.com/channel/UCYlTFedAEZiqE6r9eY0PZ1A/videos

3.5. Right to privacy and data protection.

Bio-surveillance and Covid-1984 are just two examples of alluding to the governments' extraordinary surveillance powers to contain the spread of the virus[9]. According to public health experts, monitoring and tracking are significant steps of epidemic surveillance. Nevertheless, such surveillance raises concerns regarding the impact on an individual's right to privacy. The governments' use of modern technology to police Covid-19 lockdowns is a real risk of causing irreversible harm to personal data.

There haven't been registered any serious infringements of privacy or data protection rights via digital technology during the pandemic in our case-study countries. In Moldova, there was a little collection of personal data in a non-electronic form. While the only surveillance regarded the people in self-isolation and it was enacted via physical monitoring by police officers.

Few concerns were raised about privacy and data protection in Romania. In an isolated case, these were raised in relation to the publication on Facebook by a public official of data allowing the identification of patients [12]. While another such issue was the temperature screening at the entrance in closed public spaces, but the Data Protection Authority clarified that such screening without taking records is not data processing [13]. The most concerning was the authorities' attempt to develop a contact-tracing application. The civil society raised concerns about the lack of transparency and potential for abuse of geo-tracking people in quarantine as no judicial authorisation was required for it [3]. In contrast to many other states, Romania abandoned plans to develop such an application [13].

Some exceptions regarding personal data have been adopted for the period of quarantine in Ukraine. At the scope of preventing the spread of Coronavirus, it authorized some agencies to process personal data without the consent of the person [35]. More importantly, however, is the mobile contact-tracing application (Дій вдома - Act at Home), designed to control the observance of obligatory self-isolation during the quarantine [26]. Persons entering Ukraine may choose between hospitalization to specialized observatories or 14 days self-isolation with the use of the application. If the latter is picked up, the person has to answer random requests by sending geo-tagged selfies. If no such answer is received within 15 minutes since the request, the app sends a notification to the police. Unfortunately, the app. suits only smartphones with Ukrainian phone numbers, which means, one is forced to hospitalization or to provide a negative result of testing for COVID-19 if doesn't have a Ukrainian phone number or its device is unsuitable with the application. Aside from tracking, the main issue with the application regards the collection and storage of data. Many human rights activists are concerned that the data could be used for purposes other than preventing the spread of Coronavirus. Also, that the data wouldn't be effectively deleted in 30 days after the end of the quarantine regime as stated in law [8]. Several incidents of leaked sensitive personal data from the application into the public domain highlighted indeed the app.'s fails in relation to privacy and data protection [46].

[9] Covid-1984 is an allusion to George Orwell's dystopian social science fiction novel in order to point to the infringements to the right to privacy during the Covid-19 pandemic.

4. Conclusions and Recommendations.

4.1. Challenges as opportunities for a rights-based approach.

The Covid-19 pandemic crisis has been challenging. However, it also offers an opportunity to revisit strategic approaches on the use of digital towards improving the delivery of public value [33]. Such an improvement is possible by making individual rights the bedrock of digital transformation [11]. Since digital tools and data are inevitably integrating into our lives, individual rights should constitute the central normative framework for the policies related to digital technologies [19]. Digital is an opportunity to do the right thing, as protecting individual rights online is necessary for our growth and prosperity.

4.2. Counter digital divide via the right to access.

The digital divide appears to be the main issue that has been underscored by the pandemic. There are three main gaps between those able to benefit from the digital and those who are not; absence of internet connection, lack of an adequate device, poor digital literacy.

Even if a stable broadband internet connection is available for a large part of the population in all the case-study countries, where it lacks was sufficient to prevent the exercise of individual rights for a significant part of the population. Internet access is often connected to classic rights as their digital projection [36]. But the crisis has changed this perception by showing the deep impact of absent access on political space and socio-economical rights. The right to internet access is not anymore just an appendix of the freedom of expression broadly conceived but is a self-right. Indeed, the crisis has shown that the right to internet access possesses the human rights' features of universality, indivisibility, interdependence and interrelation, as it was indispensable for the full enjoyment of human rights [15]. There was no point of rights if one hadn't access and vice versa. As such, the crisis confirmed the UN's last decade policy of stating internet access as a human right. Also, the tendency of many countries that have codified it in their legislation. For example, Greece, Ecuador, Portugal, Mexico, and more recently Georgia and Sudan have codified access to the internet as a fundamental right at the constitutional level, although seems that in all the cases it has emancipated from the scope of protection of the freedom of expression. Other countries have codified it at the sub-constitutional level; like Finland, Estonia, Spain [36][10]. While in France and Costa Rica it was asserted by the constitutional judges [4].

But the pandemic has shown that the proliferation and flourishing of advocacy towards asserting the right to access the internet becomes more meaningless if lack of digital literacy or the absence of adequate devices. Along with internet access, access to adequate devices and to the knowledge of using them is extremely important for the enjoyment of individual rights. Romania's example of purchasing hundreds of thousands of tablets to solve the problem with access to adequate devices is a perfect example showing that it is possible. More problematic is digital literacy. Digital literacy shall be a key component of education and everyone shall be educated about digital technologies. Governments shall consider organising and offering assistance to citizens in using digital devices, networks and services. Reforms towards digitalization raise many questions and queries, especially for citizens that are less familiar with informational technologies. Therefore, governments could

[10] Finland law states internet as a universal service and oblige telecommunications companies to provide a minimum standard internet speed. While Estonia indicates it as universal public service which must be available to all users.

consider creating ad hoc informational centres and holding apposite classes that would instruct and assist citizens during the transition to digitalization.

Overall, access is the number one problem. Therefore, it urges significant legal and social reforms like the codification in national Constitutions. Codifying the right of access to the internet, devices, and knowledge as a social right, which implies active intervention from public authorities to guaranteeing it to everybody[11], would be a significant step towards ensuring the enjoyment of individual rights in the digital sphere. Moreover, it would be consistent with the UN 2030 agenda for sustainable development's call of leave no-one behind, which aims to enhance the human rights of all, without discrimination on any grounds.

4.3. Multi-stakeholder approach for transparency and data protection.

Transparency and privacy are other pieces of the aforementioned puzzle. The pandemic has highlighted the significant role of access to digital technologies and how vital is to maintain an open and secure approach to it. Digitalization can advance human rights, but can also support abusive and unlawful restrictions on individual rights. The misuse of digital technologies carries a real risk of increased illegal access, monitoring, control, repression [11].

Digital technologies have the potential to contain and remedy the pandemic. At the same time, this potential should not be left unchecked and unbalanced [9]. Indeed, the harmful impact on privacy due to the rapid adoption of digital technologies in the context of the pandemic could be avoided via more transparency and accountability.

A reliable solution to this shortcoming could be adopting a multi-stakeholder approach, that will include civil society, the media community, businesses, governments, and citizens. Technologies and policies should be developed and adopted in an open way so that the other members could verify them. Such an open and cooperative could solve the problem of trust concerning the use and storage of data obtained via Ukrainian contact-tracing application; and an independent regulator could be one of its pragmatic outcomes. The governments should consider creating an independent supervisory authority chaired by civil society and independent media representatives to monitor the observance of individual rights and ensure that the digitalization reform process is human-centred.

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INSUFFICIENT CONDITIONS FOR DISTANCE LEARNING IN GERMANY EXACERBATE EDUCATIONAL INEQUITY

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Abstract
Every three years, the OECD conducts the so-called PISA studies (Programme for International Student Assessment), the largest international studies of school performance. These studies test whether participating pupils can apply their acquired knowledge and link information in a meaningful way - key competencies for being successful in the information society of the 21st century. Some 600,000 pupils from 79 countries and regions participated in the latest 2018 PISA test. In the first test, conducted in 2000, Germany's pupils performed poorly, but now they achieve above-average results. But of concern to german education policymakers is the substantial achievement gap between pupils from favorable socioeconomic backgrounds and those from unfavorable social backgrounds in Germany. Although there has been progress since the first study in 2000, there have been setbacks in recent years. Further setbacks could follow. Due to the Corona crisis, schools had to be closed for several weeks. At short notice and without preparation distance learning was prescribed. However, Germany is not sufficiently prepared for this. In an international comparison, the technical equipment in schools, a prerequisite for sustainable "digital" learning success for pupils, is not particularly good. Pupils' conditions at home, especially among disadvantaged pupils, are also often not conducive to successful distance learning. They are less well equipped with PCs and laptops, have less access to the Internet, receive significantly less support from their parents, and their housing conditions are much more cramped. This raises fears that social selectivity could increase.

1. Pisa studies

Since 2000, the Organisation for Economic Cooperation and Development (OECD) has commissioned the so-called PISA studies (Programme for International Student Assessment) every three years. The aim is to record basic competencies on reading, mathematics and science of fifteen-year-olds towards the end of compulsory schooling in order to make statements about how well prepared young people are for successful participation in modern society. One of the three fields alternately form the focus. In addition, questionnaires will provide information about the characteristics of the respective school, the attitudes and activities of the young people and the situation at home. Difficulty and competence score scales are subsequently scaled so that the competence scores have a mean of approximately 500 and a standard deviation of 100 in the OECD countries. 37 OECD countries and 42 so-called OECD partner countries took part in the 2018 PISA study. Around 600,000 students took part worldwide. In Germany, 5,500 students at around 220 German schools of all types were tested. Teachers and parents were also surveyed. [9]

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2. Pisa shock 2000

In the first PISA test in 2000, in which 32 nations took part, Germany ranked only 21st. The German pupils performed worse than the OECD average in all competence areas. Of particular concern to many education policymakers, however, was the close correlation between social background and academic success in Germany. In no other industrialized nation do children and young people with an immigrant background or from working-class families have such a low chance of getting a good school degree. The shock was profound. Germany's education politicians began to investigate the causes, numerous proposals were discussed and some reform measures were taken. In many places, reformers focused on the expansion of all-day schools, early language support and, finally, the (partial) abolition of the tripartite school system. In the following years, improvements in performance were evident. German pupils achieved results above the OECD average, including the Pisa study in 2018.

3. PISA-Study 2018

3.1. Reading

The 2018 Pisa study focused on the competence area of reading. At 498 points, the mean value of reading skills in Germany was significantly above the OECD mean of 487. In 2000, however, the mean score of young people in Germany was still significantly below the mean value of the OECD countries. In all countries that participated in the 2018 PISA study, girls achieved significantly higher mean scores in reading literacy than boys; in Germany, boys scored 486 points and girls 512 points. In addition to looking at the mean values, the disparity of reading skills is of particular importance for educational policy. This is measured in form of standard deviation and provides information about how large the differences in competency of the pupils are within the individual countries. The standard deviation of reading literacy in Germany is 106 points, which is significantly larger than the spread across all OECD countries (99 points). This means that there are considerable differences between pupils with very good reading abilities und pupils with poor abilities within Germany. At 20.7%, Germany has a very high proportion of pupils with very poor literacy skills. Compared to the last PISA study in 2015, the proportion has even increased, especially in non-grammar school types. In further in-depth analyses, the differences between school types were examined. A distinction is made between grammar schools (Gymnasien) and non-grammar school types (secondary school, school with several courses of study, integrated comprehensive school and secondary school: in German: Hauptschule, Schule mit mehreren Bildungsgängen, Integrierte Gesamtschule and Realschule).[2] It is not surprising that within the non-grammar school types, there is a wider spread of reading competence (93) than within grammar

[2] In Germany, education is a matter of the federal states. Each federal state has its own school types and names. First of all, the pupils go to elementary school (Grundschule), which lasts four years in most federal states. This is traditionally followed by the three-tier school system in: Hauptschule, Realschule and Gymnasium. A Hauptschule ("general school") is a secondary school in Germany, which offers Lower Secondary Education (Level 2) according to the International Standard Classification of Education. A Gymnasium is a type of school with a strong emphasis on academic learning, and providing advanced secondary education, comparable to British grammar schools. The third type in the German secondary school system, the Realschule, is ranked between Hauptschule (lowest) and Gymnasium (highest). In recent years there have been numerous reform efforts (partly due to the PISA shock). There are more and more community schools (Gemeinschaftsschulen, Gesamtschule). Community school stands for different forms of longer learning "together". The basic principle is the flexible cooperation of different types of schools up to the complete consolidation into one type of school with the aim of a longer common school time. The aim is to achieve better permeability in the education system and more effective integration of migrant children.

schools (76). It is worrying that 29% of young people at non-grammar schools are on the lowest proficiency levels (I and II). They only have very limited reading skills. [11]

Ranking position	Country	Mean (points)	Standard deviation (points)
1.	Estonia	523	93
2.	Canada	520	100
3.	Finland	520	100
15.	Germany	498	106
16.	Slovenia	495	94
20.	Czech Republic	490	97
	OECD-Mean	487	99
22.	Austria	484	99
26.	Hungary	476	98
32.	Slovakia	458	100

Table 1: Mean values, standard deviations: Reading literacy of selected OECD countries
Indicated are the top three countries and the countries from which the most conferees come from.
Source: [2] p. 59.

An interesting finding with regard to digitalisation can be seen in a direct comparison of the understanding of texts when they are presented to readers either in printed form or in digital form on a screen. Delgado, Vargas, Ackerman and Salmerón (2018) prove a superiority in reading comprehension for the printed medium, especially for factual texts. One reason for this discrepancy could be that reading on the screen suggests a rather superficial processing mode, the information presented is processed less deeply. [4]

3.2. Mathematics

In mathematics, German pupils achieve an average score of 500 points. This means that German pupils are also significantly above the OECD average of 489 points in this field of competence. As in previous studies, there are significant gender differences in the mathematical competencies. In mathematics, in contrast to reading, male pupils achieve better results than female pupils. With a standard deviation of 95 points, Germany also has a significantly higher dispersion in this area of competence than the OECD average (91). The high dispersion reveals big differences in the mathematical competence of low-performing and high-performing pupils. [11]

Ranking position	Country	Mean (points)	Standard deviation (points)
1.	Japan	527	86
2.	South Korea	526	100
3.	Estonia	523	82
9.	Slovenia	509	89
15.	Germany	500	95
17.	Czech Republic	499	93
18.	Austria	499	93
	OECD-Mean	489	91
26.	Slovakia	486	100
30.	Hungary	481	91

Table 2: Mean values, standard deviations: Mathematic literacy of selected OECD countries
Indicated are the top three countries and the countries from which the most conferees come from.
Source: [4] p. 196.

3.3. Natural Science

The pupils in Germany scored 503 points in natural science. In this field of competence, too, they are above the OECD average of 489 points. However, here too - as in the other two competency fields - a wide disparity can be observed. A fifth of the young people do not reach competence level II. In the non-grammar school types, scientific literacy has even decreased significantly compared to the previous PISA study in 2015. The performance of girls and boys hardly differs. Here too, the standard deviation provides information on the heterogeneity of the distribution of competencies in a country. The widest differences within the OECD countries are in Israel (111), followed by the Netherlands (104), Germany (103), New Zealand (102) and Australia (101). In all these countries, the dispersion is significantly above the OECD mean (94). The promotion of young people with weak competencies in Germany remains a challenge. Obviously, the German education system does not succeed in providing equal support for low- and high-achieving young people. A relatively large proportion of young people achieve only inadequate results. These young people are not sufficiently educated for their future path, especially in the workplace and in society in general. Education systems such as Estonia or Japan show that successful broad-based funding in the sense of natural sciences can be more successful for everyone that does not neglect even highly competent young people. [11]

Ranking position	Country	Mean (points)	Standard deviation (points)
1.	Estonia	530	88
2.	Japan	529	92
3.	Finland	522	96
8.	Slovenia	507	88
11.	Germany	503	103
16.	Czech Republic	497	94
23.	Austria	490	96
	OECD-Mean	489	94
27.	Hungary	481	94
32.	Slovakia	464	96

Table 3: Mean values, standard deviations: science literacy of selected OECD countries
Indicated are the top three countries and the countries from which the most conferees come from.
Source: [5] p. 224.

3.4. Still high correlation between educational success and social background

The results of the 2018 PISA study once again show that the correlation between social origin and education is particularly strong in Germany, compared with other OECD countries, although the gap is no longer quite as large as it was in 2000. Even if the gap decreased, compared to the year 2000, it has actually increased somewhat again compared with the test of 2015. Compared with other European countries, the performance differences between young people without an immigrant background and young people with an immigrant background in particular is relatively big.

The study also examined what proportions of fifteen-year-olds with and without an immigrant background attend a Gymnasium or a non-grammar school. The proportion of fifteen-year-olds without an immigrant background who attend a Gymnasium is 13 percentage points higher than the proportion of their peers with an immigrant background. At non-gymnasium schools, the share of fifteen-year-olds with an immigrant background is 14 percentage points higher than the share of fifteen-year-olds without an immigrant background. [11]

	Grammar school	Non-grammar school types
Without immigration background	43.0 %	52.8 %
With immigration background	29.8 %	66.4 %

Table 4: Percentage of fifteen-year-old pupils with an immigrant background in grammar schools and non-grammar school types. (Total does not equal 100 per cent as some students could not be "assigned")

Not only the school system, but also the German higher education system is characterized by strong social selectivity. This is also shown by the results of the so called “Bildungstrichter”. Out of 100 children from non-academic families, only 27 begin studying. If the parents have a university degree, on the other hand, it is 79 out of 100 - so the chance for academic children is around three times higher. These data show a very strong correlation between educational success and social background. For pupils with a migration background, social origin plays an important role. [5]

Overall, children from socially weaker and less educated families in Germany have significantly worse chances of success at school and universities than children with highly educated parents. This is also confirmed by the figures of the Federal Statistical Office and raises the issue of educational justice in Germany. 61% of children under 15 years whose parents themselves have a high level of education attended a Gymnasium in 2015. Only 18% of the children of highly educated families went to a Realschule or Gemeinschaftsschule. Only a very small proportion of 3% attended the Hauptschule. Parents with an intermediate level of education most often send their children to the Realschule (35%), only 30% attend the Gymnasium. Almost as many children (28%) attend a Gemeinschaftsschule. The Hauptschule is rarely chosen (7%). About every fifth child of parents with Hauptschul-degree also attended a Hauptschule in 2015. At the same time, the number of Gesamtschüler in these families increased. Almost every third child (31%) attended a Gesamtschule. Only every seventh child from a family with low education attended a Gymnasium (14%). [15]

	High Education	Middle Education	Low Education
Gymnasium	61	30	14
Realschule	18	35	33
Hauptschule	3	7	22
School with several courses	18	28	33

Table 5: School attendance by educational attainment of parents (2015 in %)

The level of education also correlates very strong with poverty. At 35.9%, the poverty rate of pupils of the Hauptschule in 2012 was more than twice as high as that of all pupils (17.6%). The poverty rate of pupils of the Realschule (17.2%) hardly differed from the overall average, while only 8.6% of pupils attending a Gymnasium were at risk of poverty. The significantly higher poverty rates of pupils with a migrant background compared to those without a migrant background in all types of schools were particularly striking. Across all types of school, children with a migration background (29.4%) were almost three times as likely to be at risk of poverty as those without a migration background (10.7%). [8]

4. Corona und shutdown

In spring 2020, the Corona virus spread rapidly in Europe and also in Germany. To contain the Corona virus, schools were closed for several weeks in all federal states - in spring 2020 (also in winter 2020/2021 and spring 2021). "Overnight", schools were faced with the task of establishing digital forms of teaching. Many schools, also teachers and pupils, were unprepared. The pupils had to learn predominantly at home - in what form exactly, is handled very differently from school to

school. However, these school closures and distance learning could lead to an increase in social selectivity.

4.1. Requirements / equipment

The learning success of school children in distance learning differs depending on the equipment of the schools, the achievement level of the pupils, school motivation, the home equipment, the housing conditions and in the support possibilities by the parents.

4.1.1. Equipment of schools

If distance learning is prescribed, you need a good digital infrastructure. The Corona-related school closures have exposed the weaknesses of the digitalisation of the education system in Germany. In many cases, the basic foundations of digital education, especially modern equipment in schools, were already lacking before the outbreak of the corona pandemic.

International comparisons show that German schools are not well equipped with digital devices. Quantitative indicators such as the number of computers per pupil in schools show that Germany (0.61), is below the OECD average (0.9). This also applies to the number of computers with internet access, the number of interactive whiteboards and the number of computers with internet access for teachers. [11]

Equipment per pupil in grade 9	Germany	OECD-Mean
Number of computers	0.61	0.90
Number of computers with internet connection	0.57	0.88
Number of portable computers	0.17	0.42
Number of interactive whiteboards	0.10	0.14
Number of computers with internet connection for teachers	0.49	0.57

Table 6: Equipment per pupil in grade 9

The digital learning platform “Preply” has published a study in which the current preconditions for successful eLearning and digital education in 30 OECD countries were examined. The study compared the conditions for digital education in Germany with other countries worldwide. For this purpose, data on the status of the digital infrastructure, the digital educational offer and the eLearning market were analysed. In the resulting ranking of the countries, Germany only ranks 13th. Germany's position in the midfield confirms that digitalisation lags behind towards many other countries, especially with regard to broadband speed. Norway offers the best conditions worldwide for successful eLearning, among other things with broadband internet at a speed of 127.2 Mbit/s - almost one and a half times faster than in Germany. [10]

In international comparison, Germany is very far behind in terms of fibre-optic connections. However, fibre optic cable offers an enormous advantage that very high transmission rates and thus very fast internet connections are possible. A fibre-optic connection delivers 10 to 20 times the speed of a copper cable. While Lithuania and Sweden have a very high share of fibre-optic connections in all stationary broadband connections, well over 70%, the OECD average is 28%, Germany only achieves a share of 4%. [12]

Table 7 shows the result of a survey carried out among school principals in 2019 on the availability of high-speed Internet and WiFi in classrooms and subject rooms. Only 36% of all surveyed school principals stated that both - classrooms and specialist rooms - in their school had access to high-

speed internet and WiFi. According to the survey, this form of digital equipment was available in 34% of primary schools and 45% in Gymnasien. [12]

	Yes	No
Overall	36 %	63%
Grundschule	34 %	66%
Haupt-, Real-, Gesamtschule	40%	60%
Gymnasium	45 %	55%

Table 7: Is high-speed internet and Wi-Fi access available in all classrooms and subject rooms at your school?

In a survey conducted by "Westdeutscher Rundfunk" in 2019, school principals as well as pupils aged 14 to 20 in Germany were asked to rate the digital equipment in their schools using school grades. In this evaluation, the worst score for both headmaster and 14 to 20 year-olds was for tablet equipment: on average, pupils gave a 4.6 and headmaster a 4.5. Computer equipment received the best average score from both sides and is rated "satisfactory" with a score of 3 (rounded) in each case. [13]

	Grading by pupils	Grading by head teacher
Tablets	4,5	4,6
WLan	3,6	4,1
Smartboard, interactive boards	4,0	3,5
Computer	2,9	3,2

Table 8: What grade would you give your school when it comes to equipment with tablets, WLAN, smartboards or computers?

Overall, Germany is clearly lagging behind the international leaders, which is also perceived by the school headmasters and teachers. Thus, from the perspective of the school headmasters, a clear, but not positive picture emerges. School leaders in Germany perceive the quality of the internet connection and the computing power of the digital devices as well as the availability of suitable software and an effective online learning platform as significantly worse than school leaders in the OECD average. In terms of the quality of internet connectivity, Germany has almost the lowest scores of all OECD countries.

Deficits are evident not only in technical equipment, but also in pedagogical competence of teachers for the use of digital devices and availability of qualified staff for technical support. For the latter, Germany is - in the perception of school administrators - in the lower third of the OECD countries. This shows a fairly consistent picture: From the point of view of school administrators, schools in Germany have considerable deficits in terms of the number of digital resources, their quality, the ICT (Information and Communication Technology) competence of the pedagogicals and the availability of technical staff compared to other countries.

Even though many of the analyses are (merely) assessments by school administrators or pupils and not an actual stocktaking, the perception of those directly affected is an important indicator of the state of digitalisation in the education sector, which places Germany in the bottom third in international comparisons. This result is in line with the findings of other studies. According to the Bertelsmann Stiftung's Digital Education Monitor study, only 16% of teachers rate the technical equipment for digital learning at their schools as very good, 38% as good. Even fewer teachers are completely satisfied with the support available (only 12%), the WLAN (8%) or further training (5%). In this study, teachers are most critical of the school WLAN. One in five said that there was no WLAN at all at their school. Where there is WLAN, more than half of the teachers rate its

quality rather negative. In total, almost two-thirds of teachers in Germany report that there is no or inadequate Wi-Fi. Teachers also complain about the lack of IT support (58%) and the lack of further training (65%). There is also a need for action in other areas. About half of the experts surveyed complain about the insufficient teacher training on the topic of "digitalisation". There is a lack of comprehensive educational concepts that explicitly include the digital possibilities of learning. The inclusion of digital possibilities in teaching would also change the didactics for teaching. This has not yet received any attention in teacher training, nor how disadvantaged pupils can be adequately helped "digitally". [3]

4.1.2. Equipment at home

Not only the equipment of the schools, but also the environment at home often shows considerable deficits with regard to distance learning. The learning success of individual schoolchildren differs depending on their performance level, motivation, technical equipment and the support they receive from their parents. The quantity, but especially the quality of these factors often is poor for the already disadvantaged pupils.

4.1.2.1 Technical Equipment

Internet access is still far from standard among poorer people. Table 9 shows the proportion of the population in Germany with internet access based on net household income per month in January 2020. 90% of people in households with a household net income of 2,000 euros to 2,999 euros had internet access at the time of the survey. But only 66% of people in households with a net household income of up to 1,999 euros had internet access. The poorer households are thus significantly worse equipped with internet access. This means that especially the poorer ones do not even have the basic requirement for distance learning. [14]

Household income	**Internet access in %**
Up to 1,999 euros	66 %
2,000 – 2,999 euros	90 %
3,000 euros and more	98 %

Table 9: Share of the population in Germany with internet access by household net income per month (January 2020)

The study of DIW also shows that pupils from poor backgrounds are significantly worse equipped for distance learning than pupils from affluent backgrounds. “While less than 2% of high-performing pupils do not have internet access at home, this is true for 6% of lower-performing pupils. Likewise, 13% of the underperforming students do not have a PC or laptop in their household, while the proportion of the higher performing pupils is 11%.” [6] However, it is also important that every pupil owns a laptop or a personal computer. One laptop in a household is not sufficient to participate suitable in distance learning if there live several children in the household. In 2017/18, only 28% of 12-year-olds in Germany had their own PC or laptop, compared to 41% of 14-year-olds. Children who grow up in unfavourable domestic living conditions often have to cope with even worse learning equipment. For example, only 15% of 12-year-olds in households receiving social welfare have their own computer, in families with three or more children only one in four 14-year-olds has their own PC - in single-parent households, however, one in two does. [7]

4.1.2.2. Motivation

With regard to motivation at school, there are significant differences between higher- and lower-performing pupils, which could probably also related to the success of distance learning. The better performing pupils are mostly more motivated to catch up the learning contents. While only 4% of the better-performing pupils do not like going to school, the proportion among the poorer-performing pupils is almost 14%. [6] Distance learning in particular requires a certain amount of self-motivation. It is to be feared that in case of distance learning, the underperforming pupils show rather lower willingness to be motivated to pursue the school material. In school lessons, the teacher can act as a corrective - at distance learning, this is probably more difficult. A lack of technical equipment is likely to reinforce the lower motivation of poorly performing pupils.

4.1.2.3. Different support from parents

Parental support plays an important role in children's learning success, especially in times of school closures. Lower-performing pupils are much more likely to need support with homework. Parents with different educational resources support their children to varying degrees of time and quality. This "educational gap" has tended to increase in recent years and is a central cause of the low educational mobility observed in Germany. Parents with an academic background support their children more often with their schoolwork. [1]

4.1.2.4. Place of learning - cramped living conditions

In the situation with school closures and distance learning, a suitable place of learning at home comes to the fore. Children in poor households are also disadvantaged than children in secure income situations with regard to such a place of learning at home.

On average, in couple families in Baden-Wuerttemberg, each family member has around 30 square meters (sqm) of living space available. Couple families with one or two children have 34 sqm and 30 sqm, respectively, and families with three or more children have 24 sqm. Families with many children thus live in more cramped living conditions. Families with a migration background also live in smaller flats. On average, they have 23 sqm of living space per capita. Family households at risk of poverty have an average living space of 26 sqm per capita. This means that large families, families with a migration background and families at risk of poverty have significantly less space in their homes than the average of all families. (Similar orders of magnitude can be seen in other federal states.)

Life forms	Living space per capita	In cramped living conditions
Couples without children	51,8 sqm	5,9 %
Couples with children	30,1 sqm	45,5 %
With 1 child	33,5 sqm	35,9 %
With 2 children	29,6 sqm	48,2 %
With 3 children	23,9 sqm	70,1 %
Single parents	35,0 sqm	32,6 %
With 1 child	39,4 sqm	23,1 %
With 2 children	31,0 sqm	47,4 %
With 3 children	23,0 sqm	74,7 %
Families with migration background	22,5 sqm	63,8 %
Family households at risk of poverty	25,7 sqm	68,0 %

Table 10: “Confined living conditions”

These basic statements are also confirmed if the proportion of families is considered who live in cramped living conditions compared to the housing situation of all forms of life in Baden-Wuerttemberg. This includes families "who have less than 60% of the median living space" of all living arrangements per capita in the state at their disposal. In particular, couples and single parents with 3 or more children (70% and 75% respectively), families at risk of poverty (68%) and families with a migration background (64%) live - according to this definition - in comparatively cramped conditions.

In addition to living space in square metres, the number of rooms available is another indicator of housing supply. Households are considered "overcrowded" if they do not have the following minimum number of rooms: one room for the household; one room for each couple in the household; one room for each individual aged 18 and over; one room for each two children of the same sex aged 12-17; one room for each child aged 12-17 if the children are of different sexes; one room for each two children under 12. In Germany, the proportion of overcrowded households was 7%. Looking at the overcrowding rate by household type, there are clear differences. In Germany, the overcrowding rate for households with children is 9%, for households without children it is 5%. Households of single parents (23%), households of couples with 3 or more children (13 %) and households at risk of poverty (20%) are particularly frequently affected. These are not good conditions for suitable distance learning. [16]

5. Federal Digital Pact

To promote the equipment of schools for better distance learning, the Federal Government and the federal states have already reacted already before the pandemic outburst. With the “DigitalPakt Schule” (Digital Pact for Schools) in summer 2019, the Federal Government is supporting the federal states and municipalities in investing in digital education infrastructure. The aim of the Digital Pact is the nationwide development of a modern digital education infrastructure in schools. By 2025, all schools are to be equipped with a suitable digital educational infrastructure. The federal government will provide 5 billion euros. However, till June 30, 2020, only 15.7 million of the funds had been called. Germany is lagging behind furthermore and is struggling to advance digitalisation.

The Corona crisis revealed that there was a lot of catching up to do nationwide in terms of digital learning. The Corona crisis now provides a boost in terms of digitalisation efforts. Germany is now trying to make up for the failures of the past years in a very short time. As a result of the school closures caused by the pandemic, in summer/autumn of 2020 it was decided to supplement the DigitalPakt with additional 1.5 billion for IT administration, tools for the creation of digital content and loanable school mobile devices for pupils as well as for teachers.

- 500 million euros for an immediate equipment program so that schools can lend laptops to those pupils who do not have their own devices at home
- 500 million euros to support administrators who are supposed to take care of digital technology
- 500 million euros to equip teachers with laptops

For example, every pupil in the state of Bremen (first in Germany) who urgently needs a laptop or tablet for lessons at home are now provided with devices on loan. It is to be welcomed that funds are being made available for such devices. This can already help a lot, but it does not solve all problems. Germany cannot make up - in a very short time - everything what it has missed in the

past years. Didactic instruction must run parallel to the distribution of the terminal devices, because just because the children have tablets or laptops at their disposal does not mean that they are able to use them adequately for distance learning. In addition to better equipment, additional specialists, guidance, adapted curricula - and time is needed. The Corona crisis has shown that more efforts for more equal opportunities is needed, especially in distance learning - otherwise many pupils are left behind.

6. Conclusion

The Corona pandemic hits the German education system hard. Schools were closed, face-to-face teaching was no longer possible. Very unprepared, the school system had to switch to distance learning. Many schools were not prepared for this. The Corona pandemic exposed very quickly and ruthlessly the schools' inadequate digital equipment. In international comparison, Germany lags behind many other countries. Deficits are not only evident in the technical equipment, but also in the pedagogical competence of teachers for the use of digital devices as well as in the availability of qualified staff for technical support. Experts also criticise the insufficient teacher training of "digitalisation". There is a lack of comprehensive educational concepts. Even before the pandemic, educational opportunities in Germany were very unequally distributed, as the various Pisa tests prove. With distance learning, however, the differences in performance between high-performing and low-performing pupils threaten to increase further. The Corona crisis exposes the very uneven possibilities of digital learning. Distance learning disadvantage children from poorer social backgrounds. They are less likely to have the necessary technical equipment for distance learning. They often do not have their own (internet-enabled) PC and many do not have a quiet place to study. They live in cramped living conditions, where not enough rooms are available. 24% of children receiving social welfare do not have a PC with internet access in their household, 13% do not have a quiet place to study. Almost half of the children live in a flat where there are not enough rooms available. [2] Sufficient support from parents can often not be guaranteed. There is concerned reason that in the case of prolonged school closures for months, lower-performing pupils will lose out during this time. This is a problem that cannot easily be made up without additional, needs-oriented offers in the period after the school closures. Education researchers and economists have long agreed that in the long run, the “price” of closed schools will be paid by the pupils themselves (especially by the disadvantaged pupils), because they will miss essential education. The effects would not only affect individual pupils, but also the entire economy. Politicians have reacted to the shortcomings with the Federal DigitalPact, but far too late and the outflow of funds is shameful. The money is supposed to be used to improve equipment in particular. Good equipment is an important prerequisite, but money alone is not enough. A comprehensive sustainable concept for digitalisation is still not discernible.

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eGovernment II

BUSINESS PERCEPTIONS OF E-GOVERNMENT SERVICES IN HUNGARY

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Abstract
The outbreak of Covid-19 pandemic emphasized the importance of electronic governance. Citizens and business actors, two main groups of electronic public administration service users, can effectively and without any personal contacts handle their official duties with public administration bodies. E-governance improves efficiency, transparency and generates economic growth. Perceptions of end-users about services influence their willingness of use, satisfactions and also determine the chosen channel (personal, online, phone) to administer. In general, the main focus of analyzing satisfaction with e-government services is on citizens and business actors are pushed into the background. This paper analyses the satisfaction of business actors with public administration services. Hungarian small and medium enterprises are responsible for the majority of employment in Hungary. Their competitiveness and improving innovation ability are key to break out of the middle-income trap. According to the international comparisons, Hungary is lagging behind in performance of e-governmental services. Based on the survey with 1270 entries, Hungarian businesses are mainly satisfied with public administration services. Further improvements in the quality of public administration services can be carried out based on the evaluation of businesses' perception.

1. Introduction

The significant volume of public administration developments focuses on the development of e-government. End-users of e-governmental services can be divided in two main categories: citizens and businesses. The preferences of business actors are less frequently discussed; therefore, this paper focuses on them. Majority of Hungarian businesses are small and medium enterprises (SMEs). SMEs play an important role in the Hungarian labour market. The number of SMEs is increasing since 2013. In 2019 more than 800 000 SMEs were active in Hungary, employing majority of employees, more than 3,2 million people.[2] Their competitiveness and productivity not only depend on their own performance but indirectly also on the circumstances of the wider environment (state-business-citizen relationship). The efficient and capable public administration can significantly improve their competitiveness.

This paper focuses on perceptions of selected Hungarian public bodies in international context. Survey can provide better understandings to the quality of the Hungarian public administration. Executed survey among businesses provides supplementary information to the results of international comparison methods. Licensing (giving permissions and certifications), regulatory controlling and data reporting are some of services provided by public administration bodies.

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[2] According to the latest statistics of the Hungarian Central Statistical Office, available: https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qta005.html (downloaded: 30 January 2021)

Frequency of service demands depends on sectoral particularities and legal environment. The most common public administration service is connected to the Hungarian Tax and Custom Authority. Almost every business has regular duties with the Hungarian Tax and Custom Authority. Services of Hungarian Land Office show strong industrial characteristics (main users belong to agriculture). Every business has to register to the Company Registry Courts in Hungary. Perceptions of businesses can provide adequate information about public administration services. Meanwhile, international indicators provide the framework, surveys can provide significant supplemental information revealing the national peculiarities. The devil hides in the details. For evaluating Hungary's performance international context, several regional countries (Estonia, V4 countries, Romania and Bulgaria) and the EU28 average are selected.

2. Literature review

As a response to the outbreak of the Covid-19 global pandemic (stated by the WHO on 11th March 2020) severe lockdowns and restriction were imposed by governments all over the world at high economic and societal cost[1]. In this environment digital solutions and services are getting emphasized attention. Digital solutions can mitigate harmful economic effects of government interventions to control the pandemics and provide positive effects to public health interests [2]. The digital forms of collaboration have increased rapidly as a consequence of the changed environment [3], making it necessary to public administrations to adopt and at the same time define the technological circumstances by introducing laws, providing the necessary infrastructures (5G availability). The usage of digital public services increased significantly in 2020 [4]. Digital transformation accelerated in the health sector[5] (e.g. using video-visits, mobile phone applications), in pandemic prevention and crisis management[6], also in education where children, teachers and parents[7] were all challenged by digital education. E-government services in a broader definition include any form of information and communication technologies used in public administration[8], providing connection among citizens, among businesses and state agencies and also among state agencies. These services can improve transparency, decrease the level of corruption, positively affect economic growth and increase convenience[9]. The cost saving bases on two pillars (1) the citizens and businesses save time and effort to handle their issues personally in one stop shops of the public administration, (2) less one stop shops need to be maintained because of the smaller number of personally handled cases. There is no need to digitalize the paper-based documents anymore and better data collection are available to the central body of public administration on which evidence-based policy decisions can be issued. Connections among government agencies become also more precise and quicker, government effectiveness improves. State capacity matters in the fight against the Covid -19 pandemic, increased government effectiveness is significantly associated with lower death rates[10]. According to the predictions, new technologies would be significantly adopted in the processes of public administration, like cloud computing, big data analysis, text, image and voice processing, encryption and cybersecurity by 2025 [11]. These developments will also reshape connections between end users and governmental bodies. Citizens and businesses are the main end user groups of e-governmental services. Therefore, not only citizens perception [12][13][14], but also business actors' perceptions should be examined closer [15][16][17].

3. Methodology

The survey data, used in this paper, comes from a Business survey[3] (collected in 2020) reaching small and medium enterprises (employing 0-250 people) and examining their satisfaction through the main public administration institutions.

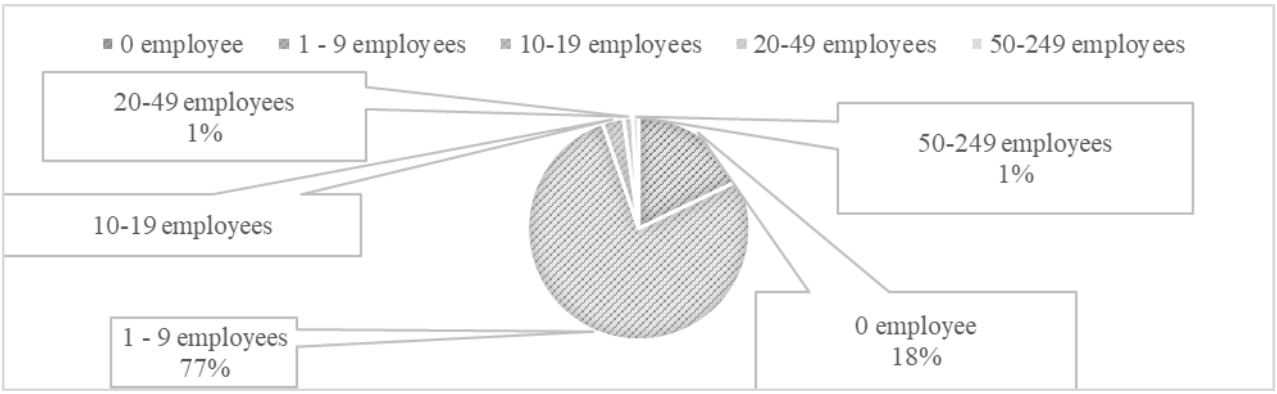

Figure 1: The sectoral distribution of businesses in percentage (prepared by the author from Business survey data)

The sample contains simplified regional, economic sectoral (TEOÁR[4] categories are merged into 9 main groups) and size layers.

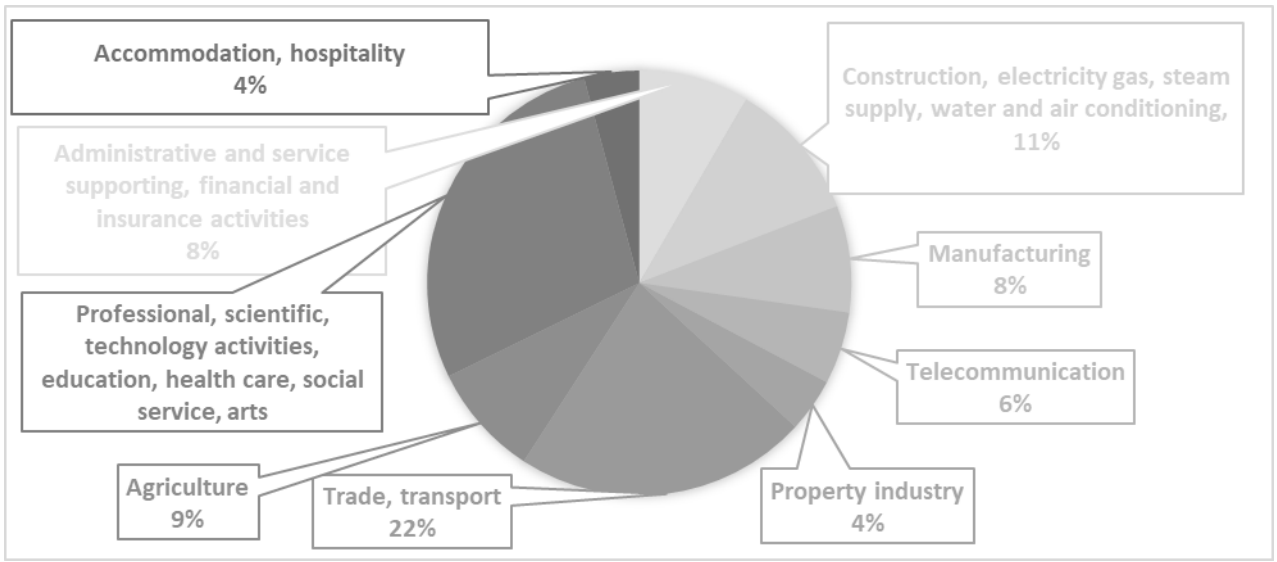

Figure 2: The percentage of companies according to their size in the sample (prepared by the author from Business survey data)

Data collection was executed by computer assisted telephone interviewing (CATI). The mayor form of operating business is limited liability company (57,4%), the ratio of limited partnership is 19%, sole-trader is 17,4% and other form (including foundations and associations) is 6,2%. Data

[3] The Business survey was financed as a part of the project "Public Administration and Civil Service Development OP" (PACSDOP-2.1.2-CCHOP-15-2016-00001): Representative big sample data collection about the businesses' use of public administration services.

[4] The Hungarian activity classification is identical with European, NACE Rev 2. Statistical Classification of Economic Activities in the European Community.

collection was taken place in 2020 after the declaration of Hungarian emergency situation connected to the pandemic Covid-19 (announced on 11 March 2020). Satisfaction of businesses is measured with 5 level scale: very unsatisfied, unsatisfied, satisfied, very satisfied and additional possible answers are not known or not used.

4. Empirical findings

As online form of handling public administration duties is a comparative advantage of businesses, public bodies seek to widen the scope of online available services. Digital public service for businesses indicator of the Digital Economic and Society Index (DESI) measures the available online services for starting a business and for conducting regular business operations through all life events. Hungary's performance in 2019 is 83,7 under the average score (88,5) of the European Union.[5]

4.1. General satisfaction with relevant public bodies

The number of services is continuously rising in Hungary. The relevant institutions of public administration provide the possibility of handling duties in online form. In the last decade, huge amount of money was used to improve the e-governmental services in Hungary, inasmuch electronic channels can provide efficiency and transparency both governmental and private actors. It can improve the control and also provide better databases for further evident-based policies. Business users are satisfied or mostly satisfied with the provided services of public administration organs.

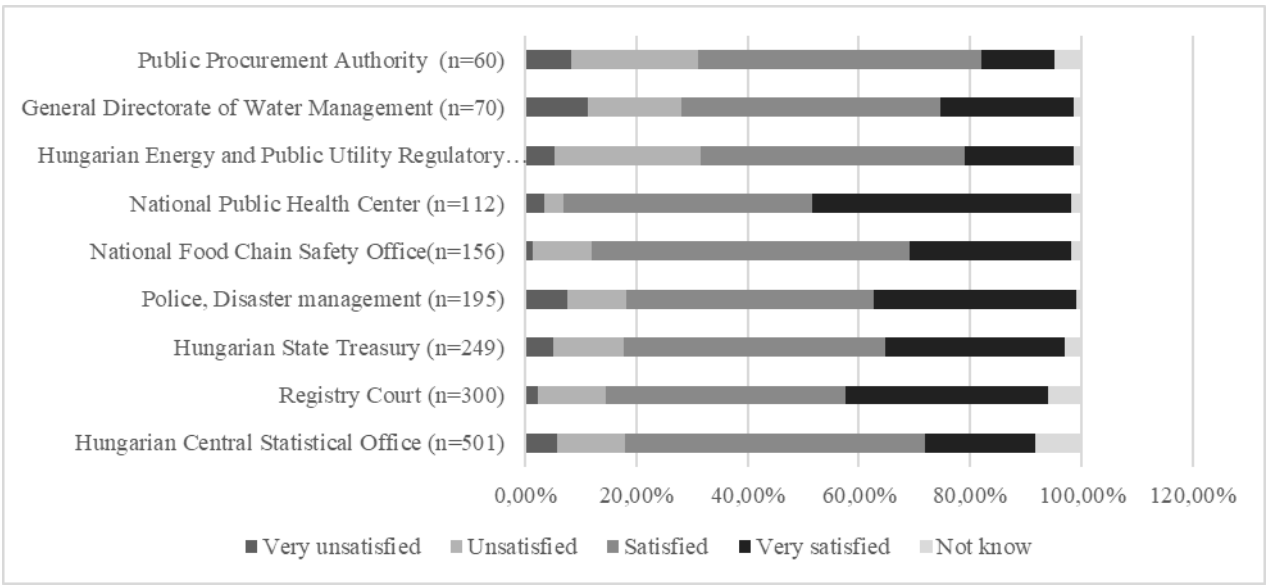

Figure 3: Satisfaction with various public bodies of public administration in handling duties (prepared by the author from Business survey data)

[5] Data available: https://digital-agenda-data.eu/charts/analyse-one-indicator-and-compare-countries#chart={"indicator-group":"egovernment","indicator":"e_gov_ebus","breakdown":"all_egov_le","unit-measure":"egov_score","ref-area":["AT","BE","BG","HR","CY","CZ","DK","EE","EU","FI","FR","DE","EL","HU","IS","IE","IT","LV","LT","LU","MT","NL","NO","PL","PT","RO","SK","SI","ES","SE","UK"]} (Downloaded 27 February 2021)

4.2. General satisfaction with the chambers and the two levels of governmental public administration services

Business actors use services of local and central government. The chambers appear as a mezzo level between the macro level (state sphere) and the microsphere (businesses) [18]. The mezzo (intermediate) level has to lobby and defense the interests of the microsphere at the state sphere. The mezzo level has to transfer adequate information from the microsphere to the state sphere. Chambers also provide services for private actors (e.g. businesses) of the microsphere. Two relevant chambers (Hungarian Chamber of Commerce and Industry and Hungarian Chamber of Agriculture) are strongly connected to the business sector and collect compulsory contribution from businesses. According to the results of the survey, a significant percentage of companies have negative perception about the chambers: 40 % is unsatisfied or very unsatisfied. This can mean that that the chambers cannot fulfil their tasks as service provider institutions or businesses cannot evaluate efficient their lobbying activity.

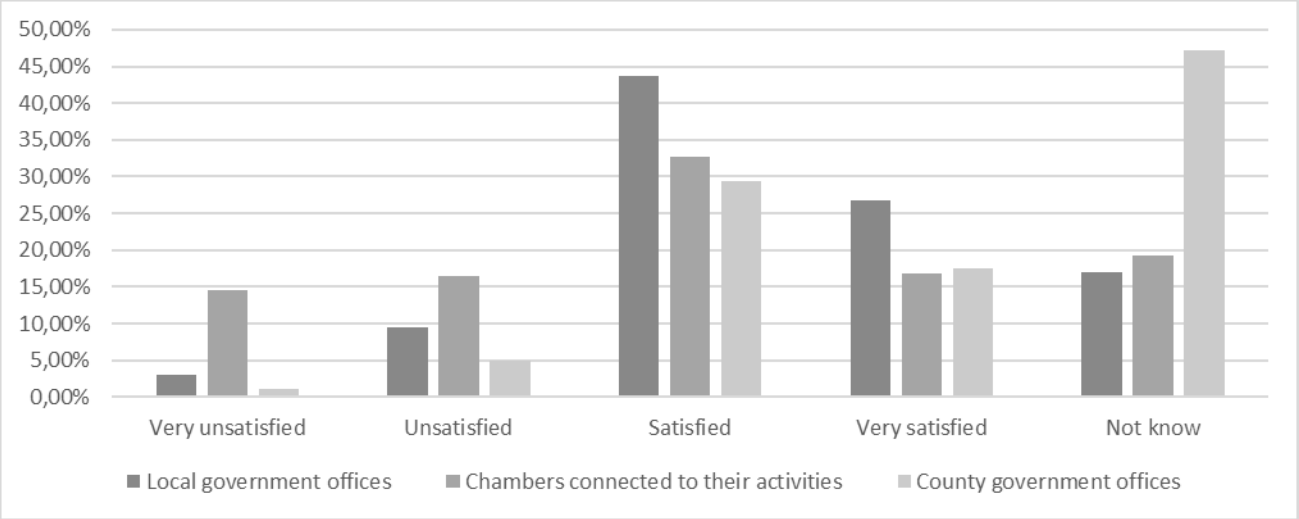

Figure 4: Satisfaction with the levels of governments (prepared by the author from Business survey data)

Satisfaction with local governance is significant. 70,4% of business actors are satisfied or very satisfied with the local government offices. 43,4 % of not know in case of county government offices can originated in the fact that business actors may not draw a strict borderline between the services of county government offices and central public organizations. County government offices are the territorial state administrative organs of central government with more than thousand official competencies and responsibilities.[6] Businesses focus on the duties to be handled and are not interested its origins from which public organ come from. Businesses prefer the personal form of handling their duties in case of local governments, and the online form in case of county government offices in case of requiring permissions or certifications. The later ones are evaluated more modern.

[6] General description: https://www.kormanyhivatal.hu/download/d/bb/04000/Angol%20tájékoztató.pdf#!DocumentBrowse (Accessed 27 February 2021)

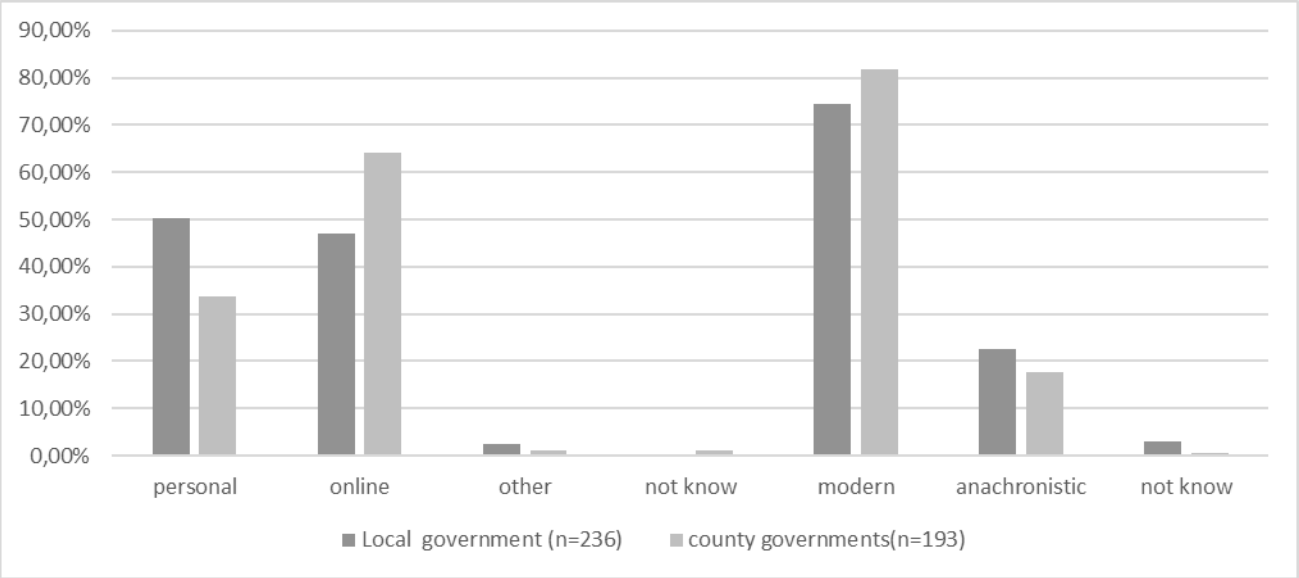

Figure 5: The chosen channel and its modernity evaluation in case of requiring permission and certifications (prepared by the author from Business survey data)

4.3. Satisfaction in specific services in the public administration in the contrast of international rankings

World Bank annually publishes the Report of "Ease of Doing Business" since 2003 ranking the performance of 190 countries on 10 topics. The Doing Business Ranking is widely used as an international benchmarking tool of competitiveness. Three subdimensions (Starting a business, Paying taxes and Registering a property) are chosen to demonstrate Hungary's performance in international comparisons. Data of the latest available report were collected in 2019. As benchmarking countries, Estonia (as a well-performing country), the V4 countries (Poland, Slovak Republic, Czech Republic), Bulgaria and Romania are selected. Hungary introduced a comprehensive development program for the development of public administration services. Revealing the recent tendencies, 2017 is chosen as a base year. Data of the Business survey focuses on the satisfaction of Hungarian businesses with the services of selected public administration bodies in 2020. The Business survey already implies some of the results of the implemented development program.

4.3.1. Starting a business

Every business has to register to the Company Registry Courts in Hungary. Since 1 January 2018, businesses have to use the "Cégkapu" portal as an electronic channel of public administration. ¾ of businesses choose to comply with their administrative duties with the registry court online and only appr. 25 % of the respondents in person. The majority (89,9%) believes that the procedure time is short or acceptable and 58,8 % is satisfied or very satisfied with the electronic channel. The analysis of international ranking about starting a business dimension in the Doing Business Ranking shows that other factors are taking into consideration by the formulation of the subindex like procedure, time, cost and paid in minimum capital. By procedure the number of days counts and not the form of channels. Hungary's rank is the 87th from the 190 countries. Its score shows minor development in the recent years. It can be seen that the business actors are satisfied with the public administration service however in international comparisons, it is only hardly found in the first

quarter of the examined countries. By reducing the procedure time, Hungary could reach a significant improvement in the Doing Business Ranking.

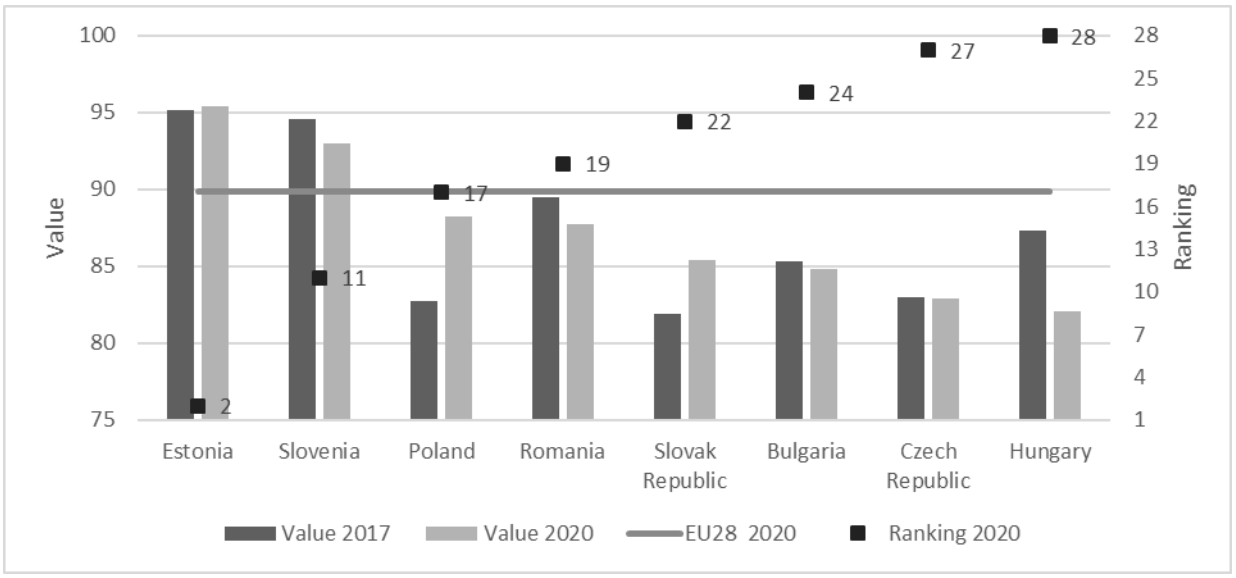

Figure 6. International comparisons of rankings and values in Starting business subdimension of Doing Business (prepared by the author from Doing Business data)

4.3.2. Using tax authority services

All business actors have obligation to request permission and to provide information regularly about their activities to the tax authority. There is a relationship between the tax systems and competitiveness[19]. Next to the tax rates, the tax collection efficiency is also significant part of tax systems. As paying taxes is an element of competitiveness, so it's a subindex of the international Doing Business Index. The score of subindex measures the payments (number per year, the time (hours per year), the total tax and contribution rate (% profit) and the post filing index (time to comply with VAT refund, time to obtain VAT refund, time to comply with a corporate tax correction and time to complete a corporate income tax correction)[7]. Paying taxes subindex of Doing Business Index also collects data not only about the fares but also about the procedure complexity through an example of a local middle-size company. Among the 190 countries, ranged in the Paying taxes subindex, Hungary's rank is the 56th as a result of making paying taxes easier and the internal electronic tax system was developed in the recent years. Hungary's score improved from 79,2 to 80,6 in 2020. According to the Business survey the perception of SMEs about administrative burden of handling tax and contribution paying, measured on a three-level scale (small (19,6%), acceptable (41,8%), excessive (19,9%), (doesn't know (18,7%)) in the survey. However, majority believes that it is acceptable, many companies find it still excessive and a significant percentage did not express their opinion.

[7] Detailed description is available: https://www.doingbusiness.org/en/methodology/paying-taxes (downloaded: 02 February 2021)

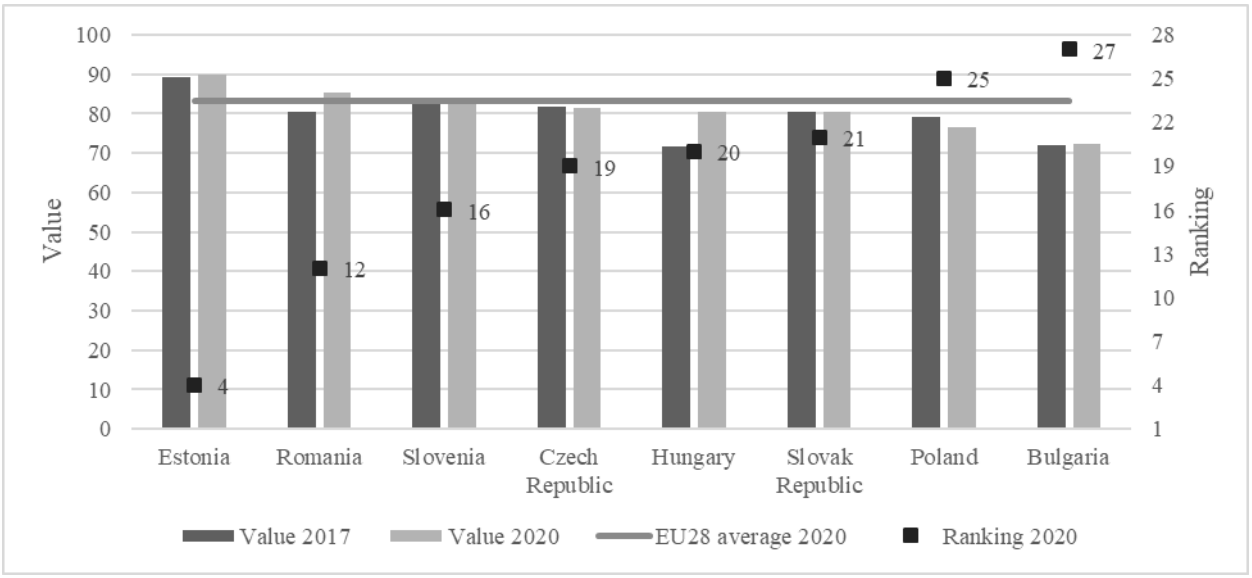

Figure 7: International comparisons of rankings and values in Paying taxes subdimension of Doing Business (prepared by the author from Doing Business data)

4.3.3. Using Hungarian Land Office services

Registering property is also a subdimension of the Doing Business Ranking which takes into consideration the number of procedures, the days, costs and the quality of the land administration index. Hungary's rank in this case was 29th from the 190 countries. In the recent year its score does not change (80,1 score). According to the survey, only one out of five businesses obtained permission or certification from the Hungarian Land Office. Mostly the personal channel was used. Only 56 % finds it modern and the rest finds it anachronistic. Not surprisingly, in the sectoral division, the agricultural businesses (45,9 %) have to use the services of the Land Office. Its services show a strong industrial difference. There is a constant demand for property deeds, land-use documents and the agriculture registration. These documents are necessary for buying or selling lands and for the payment demands of agricultural subsidies.

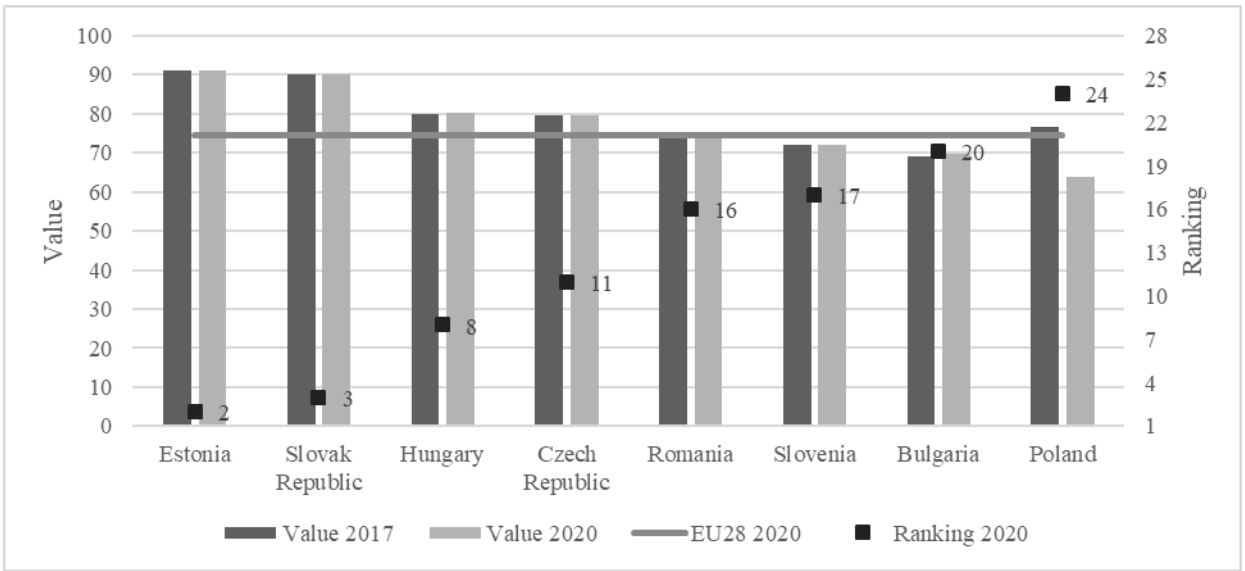

Figure 8. International comparisons of rankings and values in Registering property subdimension of Doing Business (prepared by the author from Doing Business data)

5. Conclusions

The methodology of international rankings can limitedly adapt to national characteristics. Business survey data help to give a more nuanced interpretation to the public administration service indicators of the broadly recognized Doing Business competitiveness ranking. Survey data show that the overall satisfaction with the public administration services is satisfying in Hungary. The most commonly used services are connected to the Hungarian National Tax and Customs Administration. Its online services are permanently improving. Businesses are satisfied with its services however, they find the tax system still complicated and still not competitive in international comparisons. This finding is also supported by the SME's survey carried out by the Hungarian Chamber of Commerce and Industry [20] in May 2020. According to the 18% of respondents, the greatest administration burden in their activities is administering taxes and contributions, and 9% says that the permissions and the bureaucracy. However, according to the satisfaction survey, they mostly find the channels modern and are satisfied with services of public administration institutions. It suggests that public bodies can provide their services properly, in spite of the complex legal environment. Their procedures were significantly developed recently. The online channel became generally available and compulsorily for certain duties. Reforms in the legal environment of public administration could further develop the competitiveness of SMEs. These measures could also improve Hungary's rank in international rankings. We can also announce that the demand for online services has increased even more, and the personal channel declined in the last year as a consequence of the pandemic. The positive experiences with online services can later maintain the demand for them, and could improve the overall efficiency of managing administrative duties. Further research could be carried out to determine the specific causes of satisfaction.

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KTLO & BROWNFIELD: OVERCOMING CHALLENGES WHEN MODERNIZING PROCESS AUTOMATION AND BUSINESS INTELLIGENCE

Alois Paulin[1]

DOI: 10.24989/ocg.v341.17

Abstract
An estimated 50-80% of an organisation's IT budget is said to be spent on "keeping the lights on" (KTLO), with the remaining resources being often constrained to brownfield development in which legacy software systems define the boundaries to modernisation and innovation. Prominent business systems such as e.g., SAP ERP or SAP HANA fail to address all business needs, hence in-house software development remains unavoidable. This paper gives an overview of the development and successful implementation of a scalable in-house data aggregation and data provisioning system built to enable rapid responses to emerging process digitalisation and business intelligence needs. The architectural implications and considerations are discussed.

1. Introduction

With sophisticated information systems developed and deployed over the course of several decades, enterprises find themselves depending on outdated IT infrastructure that still fulfils key business needs. A prominent such example are the U.S. Internal Revenue Service's and U.S. Social Security Administration's COBOL-based stack of software developed in the early decades of e-government (i.e. the 1960s – 1980s) when the COBOL programming language was state-of-the-art choice for business applications (cf. [9], pp. 1-2).

Apart from such large-scale systems, myriads of smaller legacy systems are serving as vital parts of the enterprises' IT landscape that address everyday requirements such as information retrieval, data translation between domains, various process automation requirements, or business intelligence needs such as insights into the performance of business units or staff. Often these smaller systems have been developed internally as some kind of "shadow IT" projects [1, 11], i.e. as systems that provide needed functionality for business but have been developed and deployed without the knowledge and without having been officially sanctioned by the enterprises' central IT departments. Such "shadow IT" projects can assume any level of complexity and professionality ranging from simple macros built by skilled employees to facilitate reporting, up to professional middleware systems designed to fill the gap between what the enterprises' central IT departments provide and what the individual business units need.

The reliance on system-relevant "shadow IT" solutions bears the risk that the enterprise develops a strong dependency on the personal knowledge of the authors of such systems, who are the ones holding advanced know-how on how to modify their systems, how to find and remove bugs and glitches, add features, adapt the systems to changed interfaces, etc. The graveness of these risks becomes apparent when authors of such systems retire, aim for career changes, or leave the

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enterprise. Once the original author of such system leaves, the successor is often better off developing new shadow IT solutions from scratch using modern development approaches, as the predecessor's code will likely be outdated, buggy, undocumented, or simply too complex for the successor to adopt within a reasonable amount of time. The new developer is then set in a *brownfield* context (cf. [3]), i.e., a context in which pre-existing systems determine the boundaries to modernisation and innovation.

2. Research Question and Methodology

This paper aims to contribute to the following research question: *How to design an expandable system capable to address future, at design-time not foreseeable, business needs for digitalisation and data analytics, whereby the implementation of such future functionality would not require a change of the system.*

By addressing this question, the work described in this paper aims to contribute towards a best practice for developers facing the challenge to engineer new systems in a brownfield context. By striving for independence of such systems from their initial developers, the newly developed systems can achieve a lifespan that extends far beyond the affiliation of the developer with the organisation. To this end, following such best practice would contribute to improved business continuance and an improved resilience of the available IT systems to hazards associated with staff fluctuation.

This research challenge is rooted in design science. The design-science research methodology recognizes as a valid contribution to science the design of novel artefacts such as prototype instantiations, the design of novel models or methods, improved instantiations or methodologies, etc. ([2], p.87). As Hevner *et al.* (ibid. pp.79-81) argue, the contribution to science must either be capable to create significant added value in form of a relevant instantiation applied into its destined environment or be a relevant addition to the knowledge base from which follow-up research can draw its rigor.

Following these recommendations on how to approach research in the domain of design science, this paper aims to contribute to the knowledge base by describing a case in which the research question as described was faced. More specifically, this paper describes the author's experiences with replacing purposely built legacy middleware systems with a modern system that has been developed in such a way that it could be expanded and reused at other regional departments of the enterprise without direct dependency on its original author.

The work was set in the context of a multinational corporation's building technology unit whose business was the development, provision, and installation of various building technology systems such as systems for air conditioning, fire safety, access control, adaptive lighting and shading technologies, etc. The customers ranged from smaller organisations such as offices or schools, to larger systems such as hospitals, airports, power plants, or research and manufacturing facilities whose complex demands for specific workspace conditions (clean room, pressurized rooms to control virus or gas hazards) could only be met by advanced building automation solutions.

The planning and installation of the solutions and the maintenance of the installed systems were executed by some 450 technicians organised in several regional branch offices. This technical staff regularly reported on their activities in order for their work time to be assigned on projects, and, in turn, charged to the customers. Various IT solutions were deployed to enable work time tracking,

and subsequent analysis of the reports to conclude about efficiency of work time utilisation, enable work optimisation, and facilitate planning for next business periods. To enable analytics of thus gathered data, business intelligence solutions have been built in the past by meanwhile retired staff, leaving behind systems that could not be maintained or adapted to changed needs any longer due to lost knowledge. Consequently, new systems were developed by a new generation of software engineers.

The remainder of this paper is structured as follows: Section 0 describes the initial (brownfield) situation in terms of the architecture of the legacy systems (section 0), discusses the design considerations for the novel architecture (section 0) and the redesigned final system landscape. Section 0 provides a summary of the paper.

3. Replacement of Legacy Systems by new Architecture

3.1. Brownfield Situation and Legacy Systems

The brownfield system landscape consisted of a regional system for reporting work on projects (the MSSC system), and a local SQL database (the Franz database) with Microsoft Access frontend in which affiliation data for the operative staff was maintained. The MSSC system fed data into the regional SAP ERP system. To obtain data from the MSSC system a local SQL database (the MSSC database) was set up and automated data transfers from the regional MSSC system to the local MSSC database were scheduled. Maintenance of the data in the Franz database was done manually – new hires were reported by e-mail to the administrator, as were any changes to contact data, and terminations of employment relationships.

Both the MSSC database as well as the Franz database and frontend can be considered "shadow IT" solutions. They were built in a response to requirements of middle management when reporting to senior management of the regional organisation, as well as to provide a technical basis to build tools to assist line managers in their role to take care of day-to-day business. A number of business intelligence and business analytics systems were built based on the MSSC and Franz databases, using Microsoft Access as the application framework and frontend of choice. A middleware system was developed (also as "shadow IT") that aggregated data from both databases and exposed it as domain objects through a REST API. This API served as a gateway to the data for a variety of process automation tools that improved efficiency of day-to-day business.

The existence of these "shadow IT" solutions is symptomatic for the inability of organisations to fully address all business needs by large systems such as SAP ERP. More specifically, SAP ERP was not able to serve as an analytics tool due to slow loading of data and the inability to model the domain objects required for complex analyses. Furthermore, SAP ERP has not been designed to orchestrate external systems as required by process automation workflows. To the rescue came homebrews of various shapes and sizes that rapidly and efficiently filled the gaps between what the officially sanctioned systems provided and what day-to-day business required. Over the course of years and decades, in-house developers conceived a shadow IT landscape of systems that could not be maintained any further once their authors retired or continued their careers elsewhere.

3.2. Considerations for new Architecture

Beside SAP ERP, large data repositories such as SAP HANA Data Lake (an in-memory database containing mirrored data from regional SAP ERP systems) were made available by the central IT

unit, as well as the data analytics platform Qlik Sense, a platform that allows developers to interactively analyse and visualise data from systems such as SAP HANA. Both the SAP HANA and the Qlik Sense platform offer impressive capabilities to deal with the available data. SAP HANA allows data to be queried by SQL, modelled into domain objects, and exposed via standard interfaces such as OData. Data loaded in SAP HANA can be processed by scripts written in JavaScript ([10], section 1.3.1). The Qlik Sense platform is able to interact with the SAP HANA system, and likewise enables developers to write scripts in JavaScript.

The SAP HANA DataLake and the Qlik Sense platform were made available at a later stage, when the legacy systems described in section 0 were already firmly established as part of the general brownfield situation. Considerations were made to replace legacy systems by the functionality provided by SAP HANA and Qlik Sense. However, restrictions to accessing data available in SAP HANA in order to process it by "shadow IT" systems required for process automation and data synchronisation with entrenched "shadow IT" systems prevented the effective reduction in the "shadow IT" landscape's complexity.

The challenge to be solved could best be described as follows: To design and develop a system that will enable the mash-up of a growing number of data sources into an internal knowledge network able to provide answers to an unknown number of queries pertinent to constantly evolving business needs. This system should seamlessly fit into the existing brownfield situation whereby existing legacy solutions should, as much as possible, be replaced by new solutions to compensate for the knowledge lost by the engineers that have left.

3.3. Development of new Architecture and Solution

The design and development of the new system was driven by an existing demand to establish a KPI[2] dashboard for senior management that would accurately display the past and ongoing performance of business units. To realise this task, data on the affiliation of staff members with business units, data on their work time and absences, and data on their work reports had to be merged, and finally assessed against set targets. This KPI dashboard was expected to give answers to questions such as how much of the worktime has been sold to clients, how much of the planned vacation has been spent already, how much of the expected yearly target has already been reached, or what the proportions of each type of work category are.

Further ad-hoc demands, such as to provide the staff headcount differences between two reporting periods, or to provide a list of external staff, came in during the design process. These spontaneous demands proved valuable in informing the design process about the type of queries the system would need to handle. The requirement to differentiate between data at different points in time called for a solution that would contain a queryable temporal dimension as opposed to simply reflect the latest state of data. The foreseeable heterogeneity of requests called for a solution that would expose a dynamic JSON[3] API[4] in which the client application would define the data model of the domain objects requested, thus adjusting size and complexity of the response to fit its specific needs.

[2] Key Performance Indicator(s)
[3] JavaScript Object Notation, a format for storing objects as text.
[4] Application Programming Interface

The initial data sources made available were, in addition to the already mentioned MSSC database, daily CSV[5] snapshots from a regional system for reporting daily work time and absences such as vacation, sick leave, etc. (the AZM), and weekly CSV snapshots from a global system containing affiliation and contact data of staff (the SCD). The amount of data thus loaded amounted to approx. 4 GB for each year. This data quantity called for an approach in which all data converted to domain objects and interlinked during a nightly load / refresh routine, then kept as interlinked domain objects in memory during run time for a rapid access to the in-memory data network.

A further requirement that emerged during the development process was the ability to process scripts on the server. This would enable server-side processing of sensitive data before sending the results of the processing to a client application. Complex queries that otherwise would require the server sending large quantities of data to the client application could thus be processed on the server in a resource-saving way.
The resulting system was an in-memory multidimensional data cube in terms of a network of interconnected domain objects with a time dimension for those objects for which temporal data has been provided. This system was named the *DataCentre*. Data in the DataCentre could be accessed through either a dynamic Web API in which the client application defined the model for the data requested (defining the fields of the requested data objects) or through Python scripts that were executed by an Iron Python interpreter on the server.

3.4. Designing for Expandability

The design and development process revealed a strong dynamic in terms of requirements that were continuously added, as well as a strong dynamic in terms of data sources that needed to be integrated to address constantly evolving business needs. The risks of this dynamic have been studied previously in the context of e-Government [7, 8] where inflexible systems were identified as a significant factor in why e-Government fails to deliver on its promise to optimise public governance and to reduce public spending (cf. [5], section 2.3).

To avoid the common pitfall of developing a system that would offer only limited functionality as known at design-time, the system was designed to allow for rapid expandability and adaptability to the context and needs of other regions, organisational units, or even other organisations, to which the system might be deployed in the future. This was achieved by three tiers of artefacts that would be designed for each context individually: (1) Data Loaders, (2) Domain Objects, and (3) Serialisation Definitions.

Figure 1 shows the architecture of the DataCentre system. It shows the modular data loaders, domain objects / regional concepts (types), and the regional type conversion & serialisation layer that defines how the API will serialise domain object type members to the data fields requested via the API. Regional Python scripts and apps process the data stored in the DataCentre to provide meaningful business applications for purposes such as process automation, digitalisation, data analytics, reporting, etc.

[5] Comma Separated Values, a format used to structure data as rows and columns.

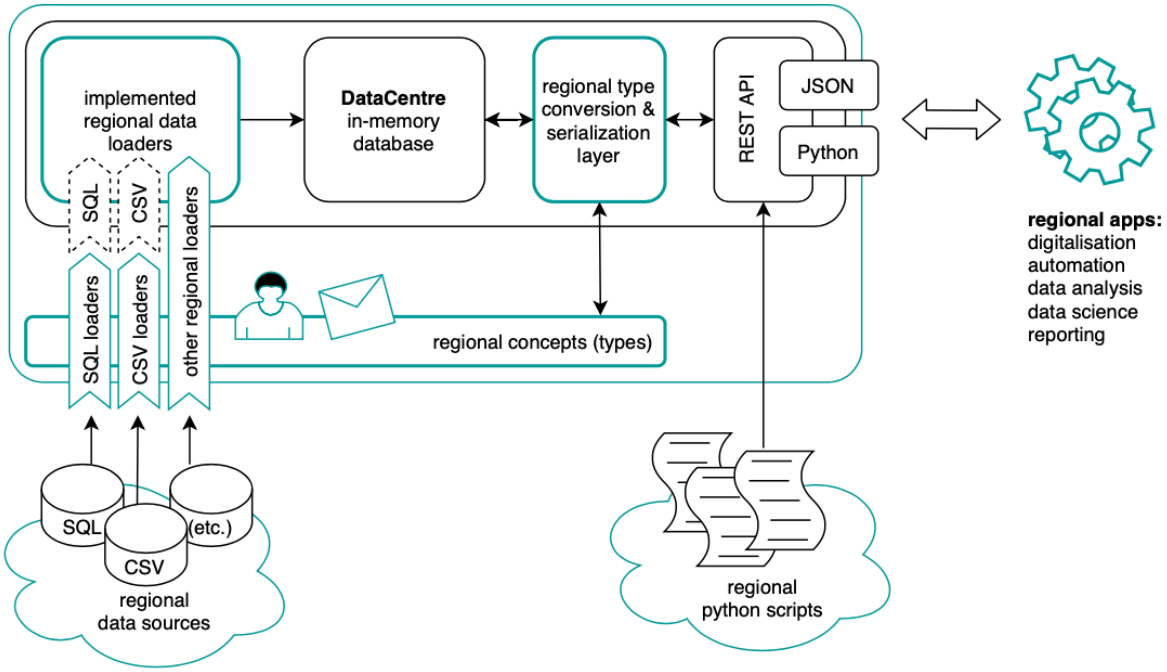

Figure 3: Data Centre system with modular concepts to create regional Data Centre instances

3.4.1. Replaceable Data Loaders

For each data source that is made available to the system, a designated Data Loader class has to be composed that extends from a common base class. The Data Loader class defines the specifics of the data source, such as location (e.g. database server, network file share, web service, etc.), data type / format (relational data obtained via SQL, CSV files, XML files, LDAP, e-Mails), as well as how the read data is converted into domain objects and how thus instantiated domain objects are interlinked with other existing domain objects in the system. The algorithms for refreshing the loaded data source, as well as everything else required for handling the data is to be defined by the data loader class.

The system can have as many data loaders as required to handle all needed and available data sources. New types of data loaders can be developed and plugged into the existing system to address an ever-evolving business need.

3.4.2. Replaceable Domain Objects

Each data loader (see above) loads the data into one or many domain object instances and interlinks the domain objects to create the knowledge network that is hosted by the system. As each environment that the system would be set in might have differing definitions of domain objects, a modular approach to add domain object types to the system has been chosen. Such domain object can be anything required by the particular domain: a person, supplier, employee, a site at which work is done, a project, work report, access credentials, and so on.
The modularity of domain objects guarantees that business need can be flexibly addressed by adding new domain objects or modifying existing ones.

3.4.3. Replaceable Serialisation Definitions

When querying data, the client application provides a set of keywords that define which data or information it is requesting. This set of keywords must be defined for each domain object separately

in form of a serialisation definition that translates between the type members of the domain object and the keywords available to the Web API and Python scripts. Typically, keywords will be directly mapped to type members of the domain object. However, also virtual keywords can be defined, which translate to functions that provide processed data when such virtual keyword is requested.
The modularity of serialisation definitions guarantees that available keywords can be tailored to fit the requirements of the context. This allows that comparable, but not fully equal concepts at different organisational units can be accessed by a shared set of keywords, while keeping the domain objects logically separate. Also, several keywords can be mapped to the same type member of the internal domain object – e.g.: keywords "mail" and "email" might both refer to the same internal representation of an e-mail address.

3.4.4. Applications

The DataCentre enabled the development of an technological ecosystem (cf. [4, 6]) that sourced its data from the DataCentre. The outbound layer of this ecosystem are the applications that access the DataCentre to address the business needs. These applications could be hosted at the server-edge in form of Python scripts, could run as independent applications sourcing data through the JSON API, or utilise a hybrid approach by consuming data pre-processed by Python scripts or tailored-to-fit native extensions to the regional DataCentre instance in form of MVC[6] controllers.

Several applications were built as part of this ecosystem that optimized existing workflows of legacy applications and enabled the development of previously impossible applications. Thus, synchronisation of the local "grey IT" database with personal data, which previously was done manually, was now automated with data from the DataCentre. The KPI dashboard mentioned above, which was the initial driver of demands for this project, was realised as a hybrid application that utilised server-edge processing by natively extending the regional system instance. Numerous other applications connected to the DataSource by means of the JSON API or Python scripts to address business intelligence, data automation, or reporting needs, as well as to use it as a pillar for access control schemes.

4. Summary and Outlook

This paper described some of the challenges that software engineers face when tasked to maintain the functionality of systems built and left behind by their parted predecessors. One of the main such challenges is the lack of documentation available to the new generation, and the incomprehensibility of the source code left behind. A common solution to resolve such legacy is to design and engineer its functionality anew. This way the new generation is able to provide and maintain the functionality for the duration of their affiliation, but once the new generation leaves, the successors face the challenge again. Taking this issue as a point of departure, the research described in this paper aimed to overcome the perpetuation of dependency on individual software engineers by developing a system that would enable succeeding generations to meet future business demands without knowledge of the system’s underlying code.

We described the design and development process of an expandable information system that would act as a knowledge base addressing an ever-evolving business need. The initial need for developing a novel system emerged as existing "shadow IT" solutions in place became unmaintainable due to retirement of the in-house developer who built them over the course of his career.

[6] Model View Controler is a design pattern for composing complex software systems.

The new system was set in a complex "brownfield" landscape, i.e., had to be built so that it remained compatible with existing systems in place. During the design and development process new requirements emerged. These requirements informed the design and development process of an inherent need for utmost flexibility and extensibility of the system. This way, the likelihood that the system would be able to serve beyond just acute requirements of an initial business situation could be increased.

The resulting system was built using a modular architecture which allowed crucial components of the system to be exchanged or expanded over time by developers without a deeper understanding of how the system internally operates. New data sources could be added as plug-ins to the system. More specifically, the algorithms responsible for loading the data, its internal representation as domain objects, and the commands to describe data to be queried via outbound interfaces (a JSON API and a Python interpreter), would be implemented in such a way as to yield a tailored-to-fit solution. Outbound interfaces were provided that allowed consuming systems to themselves describe the composition of data required.

The developed system succeeded in fitting into the existing brownfield landscape. Applications based on the new system were able to replace many of the legacy systems. Legacy systems which earlier had to be maintained manually could now be maintained automatically. Previously unavailable rapid access to the data became possible as the new system successfully joined major data sources into an in-memory knowledge network, allowing for a data collection of several gigabytes in size to be queried within milliseconds.

The approach taken in the case described in this paper has proven as a meaningful solution to overcoming dependency on the knowledge of the original authors of in-house software systems. Accordingly, the described case presents a contribution to the body of knowledge on best practice from which enterprises, public administrations, and any other types of organisations that rely on agile in-house engineering to address their dynamically changing business needs can learn how to engineer systems that are easier to maintain.

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EGOVERNMENT AND DIGITALIZATION IN THE SLOVAK REPUBLIC – CURRENT DEVELOPMENT AND POLITICAL STRATEGIES

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Abstract
Digitalization of public administration's activities, interlinked with smart city concepts and set within the context of the overall digitalization of the society are altogether topics, which have been in the past an integral part of political strategies in the Slovak Republic and which are also currently leading future policy development. Explicit goals towards a better position in the Digital Economy and Society Index in the Government programme objectives, governmental organizational changes, funding of IT expenditures are highlighting a persistent position of eGovernment and digitalisation in h Slovak Republic's policy agenda. The aim of the article is to analyse the current state and development of public administration's digitalization and digitalization of the society in the Slovak Republic, taking into consideration comparative analysis of different international rankings, but also political strategies and decision made at the Slovak Republic's government policy level.

Key words: *eGovernment, Digitalisation, Slovak Republic, Municipalities, Digital Economy and Society Index and eGovernment benchmark*

1. Introduction

The modern topics of digitalization, informatization, and electronization of public administration are interconnected to such extent at present, that it is difficult to clearly identify the boundaries between eGovernment, the digitalization of society, and smart cities. Each segments and topics can be dealt with individually, but currently it is required to interconnect eGovernment with smart concept and overall with digitalization in the communities. eGovernment is seen as the use of ICT in practical government administration activities, whereby smart city builds upon this with the aim to provide better services for the people. [17][24] We have dealt with these explanations also in our previous research [31][32][30]. The basis for understanding the functioning of eGovernment and smart cities is to explain the preconditions of the overall digitalization of the society, which means the introduction of IT and ICT elements into individual spheres, segments, sectors and subjects in society.

All these topics have been "in" lately, and in case of smart cities even a general understanding has been detected, i.e., if cities do not use the term smart in their management and strategy, they are not presenting a modern direction and vibe. From our point of view, there is a clear connection between smart cities and eGovernment. Municipalities and cities that improve their processes and services via ICT and use eGovernment and digitalization, create a precondition for becoming smart

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municipalities that are focused on the sensible and efficient use of data for a better management and on meeting the needs of the citizens [30][32][24]. Some authors see eGovernment as a prerequisite for the implementation of a smart cities approach [17]. They analyze the question, if it is beneficial for different levels of government (state, regional, local) to become smart by using different information communication technologies.

We believe that currently it is not possible to talk about eGovernment, at least at the level of local governments, without mentioning the connection of eGovernment and the concept of smart cities, and not pointing out their interdependence. By doing so we use the main goals of eGovernment as starting points, about which we can say that the governments are implementing eGovernment strategies in order to achieve the following objectives [27]:

- administrative efficiency and interoperability,
- service improvement,
- citizen centricity.

Within the framework of the National Concept of Public Administration Informatization of the Slovak Republic [25], which was adopted in 2016, the eGovernment goals, formulated as objectives of public administration informatization, were set a little more specifically:

- Shift towards services aimed at quality of life improvement,
- Shift towards services aimed at increasing competitiveness,
- Bringing public administration closer to maximum use of data,
- Enabling the modernization and rationalization of public administration by ICT means (continuous improvement of services using modern technologies),
- Optimizing the use of information technologies in public administration thanks to the shared services platform,
- Cybersecurity.

Within the goals of public administration informatization in the Slovak Republic it is also possible to detect the stated general objectives listed by Pereira et al. [27]. The digitalization of the society is the prerequisite for eGovernment, so the aim of our article will be to analyze the state of digitalization and informatization of society and public administration in the Slovak Republic, mainly in the recent period in the contexts of the political strategies of the Slovak government and of a European comparison by considering the achievements in case of the stated goals of eGovernment, i.e., the three objectives. We will use a series of well-known indicators, The Digital Economy and Society Index and the eGovernment Benchmark report, to analyze the state of digitalization and eGovernment.

2. Performance of the Slovak Republic according to the Digital Economy and Society Index and the eGovernment Benchmark report

The position of the Slovak Republic in terms of progress in eGovernment and in the overall digitalization of society has become part of the priorities of the Government of the Slovak Republic for 2020 - 2024. In the Program Statement of the Government of the Slovak Republic for 2020 – 2024 [28], in section „Transformation of Slovakia into an intelligent, innovative and transparent country through meaningful informatization", the placement of the Slovak Republic in the Digital Economy and Society Index is explicitly mentioned, while priorities for the future are set in order to

improve the position of the Slovak Republic in the given index. This suggests that evaluation indices, rankings, and international comparisons are also becoming part of the national political agenda. According to Orbán (2020) [26], while such international assessments mean challenge, and although they capture the situation over a specific period of time, and the indicators also change over time, they can be considered as guidelines or manuals for further development. For a detailed analysis of the current state and development of overall digitalization, and of the state of eGovenrment in the Slovak Republic, we use the Digital Economy and Society Index and the eGovernment Benchmark report. Our goal here will not be to analyze the partial indicators and methodology of the selected rankings in detail, but to focus on the results of the evaluation of the Slovak Republic in comparison with the EU average.

Indicator / Period	DESI	Connectivity	Human Capital	Use of Internet Services	Integration of Digital Technology	Digital Public Services
2020 SK (EU)	45,2 (52,6)	47,5 (50,1)	41,8 (49,3)	53,4 (58,0)	32,6 (41,4)	55,6 (72,0)
2019 SK (EU)	42,9 (49,4)	39,6 (44,7)	44,2 (47,9)	51,3 (55,0)	33,1 (39,8)	50,7 (67,0)
2018 SK (EU)	41,9 (46,5)	37,9 (39,9)	42,9 (47,6)	48,7 (51,8)	35,8 (37,8)	48,0 (61,8)

Table 1: Comparison of DESI and the sub-indicators - Slovakia and EU
Source: [11]

The Digital Economy and Society Index (DESI) evaluates five sub-indicators, namely Connectivity, Human Capital, Use of Internet Services, Integration of Digital Technology, and Digital Public Services. [10] Despite the year-over-year increase in the total score (2018: 41.9; 2019: 42.9; 2020: 45.2), the overall position of the Slovak Republic deteriorated every year in DESI, from position 20 in 2018 to position 21 in 2019 and subsequently to position 22 in 2020. [11]

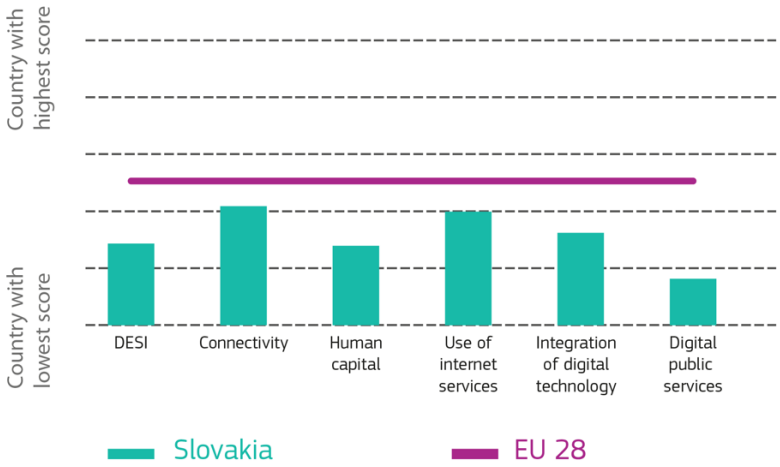


Figure 1: Digital Economy and Society Index – Slovakia 2020
Source: [12]

In each evaluated DESI sub-indicator the Slovak Republic had a score below the EU average, with the largest difference in the *Digital Public Services* sub-indicator. This information also highlights the importance of the fact that despite the improvement of the score of the Slovak Republic, not only in the overall DESI, but also in almost every sub-indicator (except Human Capital), the Slovak Republic has not been able to reach the EU average for a long time. At the same time, in the evaluated period of 2018 - 2020 the difference in the total DESI score between the Slovak Republic

and the EU average continued to increase year by year, from a difference of 4.6 in 2018 to a difference of 7.4 in 2020.

Important in the use of this indicator is also the fact that five DESI partial indicators create a precondition for the introduction, implementation and progress in the electronization of public administration services.

Subsequently, we can use another rating to evaluate the real progress in the field of eGovernment and for this task we have chosen the eGovernment Benchmark report.

The eGovernment Benchmark report evaluates the use of ICT in the public sector annually, and focuses on several sub-areas, such as User centricity, Transparency, Citizen cross-border mobility, Business cross-border mobility and Key enablers. [8]

Period / Indicator	**Biennial averages 2018 + 2019 SK (EU)**	**Biennial averages 2017 + 2018 SK (EU)**	**Biennial averages 2016 + 2017 SK (EU)**
User Centricity	84,6 (86,5)	77,4 (84,8)	75 (82,8)
Transparency	46,6 (65,6)	41,9 (62,3)	37,3 (58,6)
Citizen cross-border mobility	34,8 (50,8)	26,0 (47,5)	26,0 (47,8)
Business cross-border mobility	67,0 (67,0)	62,0 (63,0)	53,5 (61,0)
Key enablers	66,9 (61,4)	57,8 (58,3)	56,5 (53,5)

Table 2.: Comparison of partial indicators by the eGovernment Benchmark report - Slovakia and EU
Source: [9]

Following the patterns presented in DESI, the comparison of the individual sub-indicators within the eGovernment Benchmark report also shows that the Slovak Republic did not reach the EU average at almost any of the sub-indicators. Based on Table 2 the Slovak Republic achieved a score higher than the EU average only in the case of the Key enablers indicator (2018-2019 by 5.5 points higher and 2016-2017 by 3 points higher). The highest difference in the scores, where the Slovak Republic presented the weaker results, was in case of the indicators Transparency and Citizen cross-border mobility within the evaluated period. Even though the Slovak Republic did not manage to reach the EU average, a gradual progress was recorded in case of each sub-indicator. However, the pace of this progress was sufficient only to move slightly closer to the EU average.

Both measures have been used to point out how the Slovak Republic society is digitalized and thus prepared for eGovernment.

3. Current trends in the Slovak Republic in the field of eGovernment and informatization

As we have previously stated [31], the area of eGovernment and informatization of society in the conditions of the Slovak Republic is distributed among several central state administration bodies. In connection with the change of government in the spring of 2020, changes took place in this area, that were mainly related to the transformation of the former Office of the Deputy Prime Minister of the Slovak Republic for Investments and Informatization into the Ministry of Investments, Regional Development and Informatization of the Slovak Republic. Based on the Resolution of the Government of the Slovak Republic No. 282/2020, a proposal to amend Act No. 575/2001 of Law Code on the organization of activities of the Government and organizations of the central state

administration, as amended by subsequent provisions was submitted to the National Council of the Slovak Republic, which aimed to achieve a competence change and to establishment a new ministry. According to the explanatory memorandum of the submitted resolution, the aim was to move the new regional development agenda from the Ministry of Agriculture and Rural Development of the Slovak Republic to the new ministry, in addition to the informatization agenda, while also centralizing and concentrating the regional development agenda and the Eurofunds. [18][16]

According to the Statute of the Ministry of Investments, Regional Development and Informatization of the Slovak Republic [36] approved by the Resolution of the Government of the Slovak Republic No. 417 of 1 July 2020 as amended by the Resolution of the Government of the Slovak Republic No. 613 of 30 September 2020 and in accordance with Act No. 575/2001 of Law Code on the organization of activities of the Government and organizations of the central state administration, as amended by subsequent provisions [1], four main areas of the Ministry's tasks were defined: 1.) management, coordination and supervision over the use of European Union funds; 2.) investments; 3.) regional development; 4.) central management of the informatization of society and single digital market policy-making. Within the field of central management of the informatization of society and single digital market policy-making an effort was made to manage this agenda comprehensively and centrally, with the Ministry focusing in particular on:

- central management of the informatization of society,
- preparing and managing the policy of the single digital market,
- coordinating the policies and measures to mitigate the negative impact of technologies and digitalization on the society, including the fight against misinformation in the online space,
- administration, operation, and development of the Govnet, the Central Public Administration Portal, and other information systems used within the eGovernment of the Slovak Republic,
- coordinating the development of information technologies of the public administration,
- preparing strategies, monitoring the current situation, developing, innovative solutions, cooperation within the institutions of the Slovak Republic and with foreign countries concerning cyber and information security.

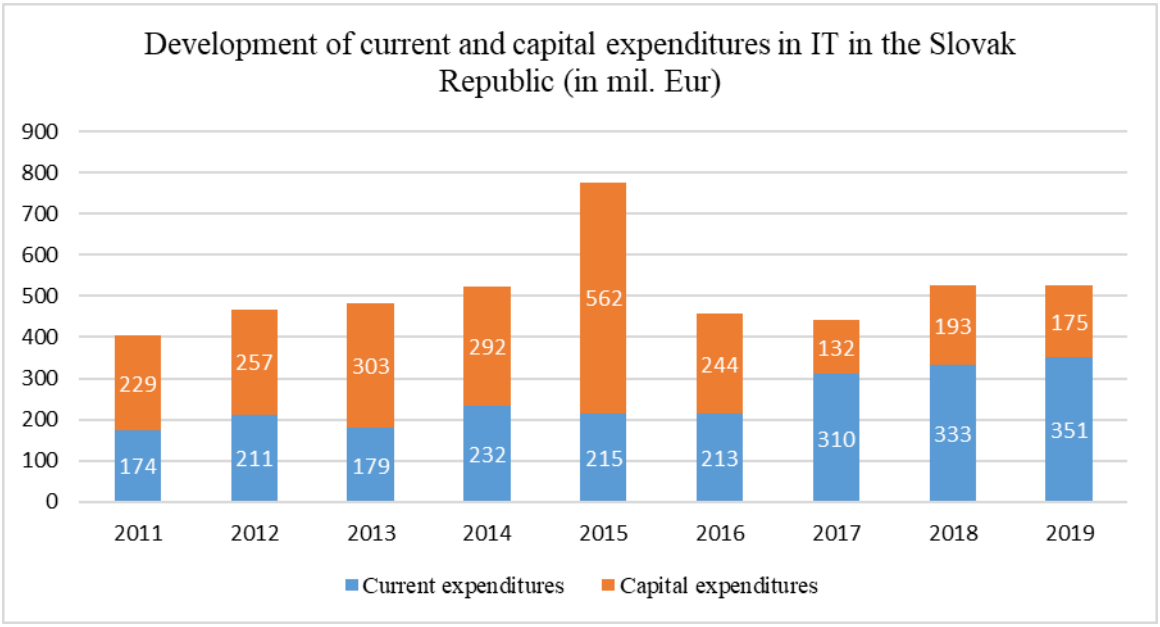
Of course, these intentions go beyond the intentions of eGovernment and are generally related to the digitalization of society, not only to the introduction of ICT in public services.

The intention to establish the Ministry of Investment, Regional Development and Informatization of the Slovak Republic was already declared directly in the Program Statement of the Government of the Slovak Republic for the period 2020 – 2024 [28]. The Government of the Slovak Republic has also incorporated another entity into the management of eGovernment in the Slovak Republic, namely the newly established state joint-stock company Slovensko IT, a.s. The establishment of a state joint-stock company was not a manifestation of the implementation of the government's program statement, as the explicit mention declaring this intention is absent in the government's program statement. However, the communication of the Ministry of Investment, Regional Development and Informatization of the Slovak Republic as well as of the Prime Minister of the Slovak Republic [37][38][15] indicated that the declared intention is an effort to implement some of the priorities of the Government of the Slovak Republic, as well as a response to the dissolution of the Slovak branch of the Wire Card IT company.

Slovensko IT, a.s. was established on 5 September 2020 as a joint-stock company of the Slovak Republic, on whose behalf the Ministry of Investment, Regional Development and Informatization

of the Slovak Republic acts. From the original staff of the Slovak branch of the Wire Card IT company approximately 85% of the employees moved to Slovensko IT, a.s., which was an effort to use the personnel capital of the IT sector in the Slovak Republic and to create a state IT center focused on providing comprehensive IT services for the state. The primary intention of Slovensko IT, a.s. is to focus on projects within the competence of the Ministry of Investment, Regional Development and Informatization of the Slovak Republic and on the needs of strategic IT projects of the state. [34][35][7]

At this point, we consider it necessary to emphasize that the distribution of tasks, competencies, and management among several central government bodies, with the coordinating position of the newly established Ministry of Investment, Regional Development and Informatization of the Slovak Republic, is not perceived as a comprehensive summary of all entities in eGovernment and informatization in the Slovak Republic. Other entities also play a substantial role, including all municipalities and cities, which provide electronic services for the inhabitants of the municipalities in the exercise of their original competencies. We provided a detailed description of the position and specific activities of municipalities and cities in the conditions of the Slovak Republic in the areas of providing electronic services, eGovernment and overall electronic activities of local governments in some of our previous articles. [32][31] Therefore, we did not aim to provide an inventory of all entities at various levels of state administration and self-government, or to list other interested actors in eGovernment and informatization from the private and non-profit sector, but to point out the current and new changes in this area in the Slovak Republic for the last period.



Graph 1: Slovak Republic expenditures in IT
Source: [19]

In addition to the institutional management of eGovernment and informatization in the Slovak Republic, we would also like to point out the expenditures that have been invested in recent years as current and capital expenditures in IT in the Slovak Republic. Based on the Summary implementation report for 2019 [19], the Slovak Republic spent 526 mil. EUR per year in the last two evaluated years on IT operations and investments. Within operating costs a year-over-year increase in these expenses can be seen. Despite these annual additional investments and an increase in operating expenses, the Slovak Republic has long remained below the EU average in the eGovernment benchmark reports and DESI assessments.

4. Discussion

An ambitious step in the management of eGovernment in the Slovak Republic is the establishment of the state joint-stock company Slovensko IT, a. s., which should provide comprehensive IT services for the state. Such a step, however, contradicts the emphasis on the importance and effectiveness of outsourcing IT services in the private sector. According to Kubán (2020) [22], IT outsourcing is a necessity. Based on the summary of Gorla and Somers (2014) [14] IT outsourcing represents 67% of all global outsourcing activities with the potential for further growth, while its positive effects can be detected mainly in the modernization of IT infrastructure, in the involvement of quality human capital, and cost savings, and on the other hand the negative effects represent themselves in the risks of slower response to changing user needs, in potential delays in service delivery, or in slow implementation. The president of the IT Association of Slovakia, which was founded 22 years ago, unites more than 100 members from the IT industry in Slovakia and represents more than 30 thousand employees of associated companies, stated that in principle they are not against the establishment of a state IT company, but at the same time this effort contradicts the reality of the IT market, where the number of project managers, analysts and architects are insufficient even in the commercial sector. [13][20] It needs to be considered and evaluated over time whether the centralization of IT services within a state-run company will mean a step towards improving eGovernment and improving the position of the Slovak Republic in eGovernment rankings, or to reduce spending on IT services. The outputs of a state-owned company would need to be examined via three criteria, i.e., whether there was an increase in performance, effectiveness, and productivity (Administrative efficiency and interoperability), whether the quality of the provided public services improved (Service improvement), and whether there was an increase in transparency and trust in government (Citizen-centricity).

The informatization of society, as well as the management of electronic services by the state, proved to be crucial even during the Covid-19 pandemic. On the one hand they positively affected the management of measures and the transfer of public administration activities to the online space, but on the other hand they were also perceived negatively because of the shortcomings in the management of electronic activities by the state. An example is the electronic registration system for vaccination, which has been assessed by IT professionals [23][33][21] as a failure. The negative reviews of the electronic registration system led subsequently to its redesign into a "waiting room", while considering the recommendations, suggestions, and proposals of the private IT sector. However, the introduction of the so-called "waiting room" did not end the problems of the state-controlled electronic registration system for vaccination, they only acquired a different character, which was also confirmed by Tomáš Szalay, the Director of the Health Department of the Bratislava Self-Governing Region, who coordinates two large-capacity vaccination sites within the Bratislava Self-Governing Region. Szalay stated that the waiting room is a fiasco of the state registration system for vaccination, for which the National Health Information Center is responsible as a state-funded organization founded by the Ministry of Health of the Slovak Republic, and he emphasized in particular the inconsistency of the system from the point of view of the truthfulness of the entered data, the absence of verification of the applicant's eligibility, the poor design, and he thinks that the transfer of registration to the self-governing regions would be the best solution, which would subsequently manage the registration independently. [6]

The failures of the state in digitalizing and electronization of the activities during the Covid-19 pandemic were substituted by the recommendations and proposals of IT experts from the private sector, and the local governments also played an irreplaceable role in this regard, who were represented mainly by the Association of Towns and Communities of Slovakia. The Association of

Towns and Communities of Slovakia, as a non-governmental organization that unites altogether 2784 municipalities, including 131 cities in the Slovak Republic [2], has provided invaluable advice, guidance and practical solutions for municipalities and cities since the beginning of the pandemic, including recommendations to conduct the meetings of municipal and city councils online, a free online reservation system for testing, assistance in the management of mobile sampling points for testing and more. [3][4][5]

5. Conclusion

The electronization of society, electronization of state activities, and eGovernment management were and clearly are defined as priority areas for the state, which were also emphasized in the Program Statement of the Government of the Slovak Republic for 2020-2024, and in practice they were applied, for example, in the establishment of a new ministry and of a state-owned IT company. In the period of 2011-2019 a total of more than 4.6 billion euros were spent on IT in the form of current and capital expenditures. [19] The Recovery and Resilience Plan of the Slovak Republic, as a response to the crisis period caused by the Covid-19 pandemic, projected to spend 584 mil. euros on the digitalization of the Slovak Republic in the areas of state electronic services, digital economy and innovation, development of the digital skills of seniors, cyber and information security. [39][29] However, the shortcomings and failures in the management of electronization and eGovernment by the state, especially in the crisis period of the Covid-19 pandemic, led to a situation in Slovakia, when the roles of the central state authorities had been taken over by the private sector, IT experts, and local governments. On the one hand, the joint efforts of the various stakeholders may help to reach the desired results, but on the other hand, this situation identifies the shortcomings in the management of electronic activities at a time when these state services are needed the most.

From the perspective of future development, it will be necessary to analyze the overall contribution of the following factors to the improvement of the level of eGovernment and informatization in the Slovak Republic when compared to the international trends: changes in the institutional management of eGovernment and informatization in the Slovak Republic, establishment of a state joint-stock company, growth of current and capital expenditures in IT, prioritizing the improvement of the position of the Slovak Republic in the international evaluation within the Digital Economy and Society Index, as it was declared by the Program Statement of the Government of the Slovak Republic. Such an analysis will then have to consider other success factors as well when identifying the strengths and weaknesses of the process. In the framework of public policy-making for the field of electronization of society and eGovernment it proves to be crucial for the state to take into account the suggestions of the professionals when managing the individual activities, who should not only point out the shortcomings and failures ex post, but their suggestions should be incorporated into the process of formulating and executing specific public policies, since they can be key to the success of the formulated effort and the achievement of the set goals.

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Artificial Intelligence, Machine Learning

LEARNING TO TRANSFORM BY IMPLEMENTING AI INTO ADMINISTRATIVE DECISIONS – DISRUPTIVE MINDSET AS THE KEY FOR AGILITY IN THE CRISIS

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Abstract
The Objectives of the research paper are investigations in how a disruptive Mindset can have effects on interaction by representatives of German Authorities in times of crisis. The interdisciplinary focus of human transformative learning maybe sets linking options to machine learning approaches to speed up qualified decision making. The Approach is in addition to an introduction of implementation strategies for AI technology in the local governance of German Municipalities, what competencies of persons in charge are required to get use of technological possibilities. In this respect, the investigation bases on findings of three studies in field of "scenarios for AI in the public sector", "AI as impact on competencies in the field of corporate finance" and "competencies in a digitalized working environment". The Results concern the understanding what preconditions for human and AI-oriented learning systems are necessary in suitable scenarios of public sector performance. Also, convergent competence structures, based on transformative learning theories, should show a way for implementation based on models for interaction in critical situations. The Value of the paper lies in the combined View of administrative requirements in relation to learning-strategies considering technological scenarios of AI for professionalize the decision-making processes in times of Covid-19 pandemic crises.

1. Introduction

One of the main challenges of the current Covid crisis in Germany and Europe, as well as the continuation in the coming years, will be to reach an understanding of process automation and the use of AI in the public sector. The network age requires 'future skills' from employees to implement the level of efficiency in the regular operation of standardized and automated service provision in everyday life. How can this succeed?

2. Situation

The basic mindset of public administration should include openness, innovation, solidarity, and agility aiming at a user-centered service orientation. The scenarios of implementing change management should not only focus internal structures and processes, but also innovation design in external services. Digital transformation requires an iterative culture for strategic model development (see Brandes et al., 2014).

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It is precisely the spirit of disruption in crisis mode developed from various sample projects that opens an entry point for iterative loops of organizational learning, which should be permanently established for the necessary creation of ideas for the digital revolution. These lighthouses require stabilization, which can be created through frameworks and legal experimentation clauses.
In addition to legal and political hurdles, barriers within administrative institutions must also be overcome to achieve results of added value for society. In the context of the implementation of public law in Germany regarding the question of full automation of administrative decisions, various legal issues come into focus. Unification across the federal state is particularly important in the Federal Republic of Germany. The German government landscape is characterized by different powers of the federal states regarding requirements in the EGovernment or autonomous rights of the municipalities in municipal economy. This often results in different speeds in the implementation of digital advances and priorities. Regional pilot communities are often positioned far ahead of national standards in areas of innovative services. However, for most government agencies, despite the level of administration, there are major challenges in process optimization and automation. The distinctly small-scale landscape of public authorities can only be overcome with the most consistent standards of legal prerequisites and organizational implementation concepts as possible.

The European Union has also recognized this and has considered the perspective of the authority of values and morality for Europe. Europe-wide ethical guidelines for the development and use of AI technologies (see European Commission, 2020) will be used to develop a manageable AI strategy in the member states based on these three pillars:

1) Research and Development,
2) Social and
3) Education.

The German Government has already established an AI strategy for Germany, whereby concrete rules for action and design requirements for the authorities have yet to be established (see BMBF, 2018).

Intelligently networked cyberphysical systems also require clarification of regulatory and ethical issues for acceptance management. Clear deployment scenarios, transparent impact chains and efficiency gains compared to conventional task performance must be communicated to convince decision-makers in the public sector. In addition to the abstract regulations in ethics and legal design at national level, professional development projects of the implementation of technology have always to be related to the design of application scenarios to related business processes on site. No blanket guidelines or checklists can be applied here.

The Algo.Rules (2019) provide an example of a model catalogue of formal criteria for the socially beneficial design of algorithmic systems. They consider a framework with the following aspects to be essential to smooth the scenario of the ‘constructive combination of human and artificial intelligence’:

- Building skills in the workforce: The functioning and possible effects of an algorithmic system need to be understood.
- Defining responsibility: A natural or legal person has always to be responsible for the effects of using an algorithmic system.
- Document ingenuities and expected impact: Comprehensible documentation must be made available to everybody before use.

- Ensuring security: Mechanisms to secure an algorithmic system must be established and continuously guaranteed.
- Labeling: The use of an algorithmic system must be made transparent.
- Ensuring traceability: The decision-making of an algorithmic system has always to be comprehensible.
- Ensure control: An algorithmic system must be and remain manageable throughout its use.
- Review impact: The impact and autonomous decision-making of an algorithmic system must be reviewed regularly.
- Allow complaints: Questionable decisions of an algorithmic system that affect the rights of a data subject must be able to be explained and reported.

Rather, dimensions such as the acceptance and standing of innovation, organizational structure, information forwarding and documentation, and key figures on service standards are to be surveyed via methodical processing. Transformation in this form can be achieved via qualified pilots with strong methodological expertise in agile frameworks and New Work values (see Schachtner, 2019).

3. Theoretical Framework

To be able to professionalize service in order of social transformation through agile decisions, the concept of absorptive capacity generates advice on an abstract level. The importance of innovation in sustainable systems is included in the perspective of ‘absorptive’ as ability of an organization to absorb new external knowledge and combine it with internal knowledge (see Cohen & Levinthal, 1990). This requires using assimilated knowledge in a value-creating cycle of continuously expanding proactive-strategic effect.

Linking options of established learning theories of adult education in relation to deep-learning approaches of artificial intelligence basic technologies can be derived from the consideration of Todorova & Durisin (2007), which refer to cognitive research, according to which new knowledge can be built up even if there is no connection to existing structures.

With neural networks of adult learning, common perspectives can thus be found in reinforcement learning, where algorithms must make decisions weighing up the consequences, as well as supervised and unsupervised learning self-sufficiently leads to further development of the reflective ability (see Illeris, 2009)

Aufgrund der Schwerpunktsetzung dieses Beitrags wird an dieser Stelle nicht weiter auf Konzepte des Lernens wie „Transformative Learning“ (see Mezirow, 2003) oder „Communities of Practice“ (see Wenger, 1998).

To increase their maturity towards an innovative and forward-looking organization many government institutions support organisational learning (see Schreyögg & Duchek, 2010). To activate the process of optimization on site in the organizational units, potential assessments have a dimension of ethical regulation and reducing barriers for innovation due to personal consideration of individual benefits. So-called ‘change agents’, a role in cross-functional project teams, can help to achieve progress in new forms of work (Bateson 1972).

4. Research Design

Secondary evaluations will provide a framework for analytical engagement with research- or theory-based evidence in the field of andragogy and the psychology of learning in the public sector field. Through the concept of competence derived from the educational sciences, forward-looking planning, situational control, and socially relevant expansion can be expressed in different fields of application, which can be developed accordingly when using learning theories.

4.1. Research Question

Essentially, the following research questions will be answered, combined with the corresponding hypotheses (H0-H2):

1. What are the barriers and risks associated with the use of artificial intelligence for acceptance reasons, legal or ethical considerations?
   H0: Human expectations regarding the use of AI are currently divided. Fixed regulations and transparency of the efficiency of AI with defined application scenarios help to develop an openness to algorithm-based systems.
2. What are user scenarios of AI for public administration?
   H1: AI can be used in the Everyday life, the world of work in production and service as well as in continuing education and training. The degree of complexity ranges from routine processes to *future forecasting based on existing decision documentation.*
3. What are possible suggestions to implement a strategy of rise competencies among the staff?
   H2: The acceptance of digital transformation can be promoted through the development of competences of the administrative staff. Top-Management is in demand to establish a culture of design and reflection of optimization approaches. AI can be used for various specialist procedures or activities at any functional level, but support on implementation by internal project managers is necessary.

4.2. Methodology

To obtain an increase in complementarity to the exploratory research subject of digitization in the field of public administration, the methodology includes a mixed method approach with several surveys. To collect data, three different empirical methods were used: an expert questionnaire, an online Delphi, and a foresight method. So, the secondary data analysis from the method triangulation was fulfilled in parallel design with different focus orientations. The qualitative surveys on competencies and future scenarios were combined in the interpretation of the results (see Kuckartz, 2014).

The following overview intends to show the focus of the studies, the methodical setting, and the expected value for the research questions:

1. **Reinhardt et. al. (2018) 'AI as impact on competencies in the field of corporate finance':** The study examines a shift to jobs and roles in financial management through the effects of artificial intelligence applications. 164 financial management experts from Germany, the USA, Asia, and Switzerland were questioned. The standardized questionnaire survey was carried out in a qualitatively oriented way based on 184 path-dependent questions. The focus of the question on each role and function was the development of activities and competences related to the use of AI.
2. **Opiela et al. (2018) 'EXEKUTIVE AI 2030 - Four scenarios for the use of AI in public administration':** Four future scenarios and development possibilities of AI to public

administration to be set up until 2030 have been developed by an interdisciplinary team of experts of the Competence Center for Public IT via a Foresight approach. In particular, the human-machine interactions regarding work organization and decision-making processes have been studied in relation to classic administrative actions.

3. **Münchner Kreis (2020) 'Living, Work, Education 2035+':** Through an online expert Delphi (two-stage expert survey with prior registration of national and international experts), the systemic interplay of life, work, and education through the design of AI applications was queried. Particularly the education sector is of increased importance in bringing about a change in (educational) society due to modified professional requirements of new activity profiles.

4.3. Results and Value

The strategic capability and competence perspective for digital transformation among the responsible decision-makers and project managers has focused on the study on the influence of AI on competences in corporate finance (Reinhardt et. al., 2018). A high degree of consistency can be assumed to be consistent with similar competency requirements in core processes in terms of AI's potential in optimizing business processes or intelligently predicting decision-making options. More complex cognitive processes for analyzing patterns in document processing, using neural networks by using predictive analytics applications to create dynamic forecasts and report on future demand developments, plus assessing risks or compliance violations by examining unstructured data sources using RPA technology.

The maximum exploitation of potential is becoming increasingly important and therefore requires competence management with the fusion of human and technological capabilities through convergent competence structures (see Reinhardt, 2019). This also goes hand in hand with the design of innovative business models for the public administration with its own data models (also in cooperation with, for example, industrial partners and start-ups), modern work structures with the result of changed occupational profiles. In the future, human beings as knowledge carriers will continue to be the decisive basis for successful service delivery but can only be thought of in combination of human and humanoid skill development through the training of effective methods and applications. Results from the research show that substituting human potential and a build-up of convergent competence structures is necessary to work together with the AI on problem solutions to be targeted according to the respective performance advantage.

The study on changes in competence structures foresees the long-term reduction of functional roles, such as that of the accountant, but strengthens the need for human analytical competence in professional profiles such as the financial controller or the auditor. At the same time, AI as an incubator will ensure that new job profiles are created or become more important, such as the Data Scientist, the Treasury Consultant, or the Trusted Business Advisor.

As the study by the Competence Center for Public IT of Opiela et al (2018) shows, concrete scenarios for an AI-influenced future up to 2030 are already available in public administration.

Mandatory employment must also be subject to ethical issues, so that confidence-building standards, certifications or quality controls can also be controlled - if necessary, by the courts - of the assured traceability of self-sufficient AI decisions.

To create a cultural change to human-machine interaction, it is a good opportunity to clarify the similarities in the processing of information. The concept of absorptive capacity can help to enter a higher level of reflection of one's own actions and to introduce learning loops up to Deutero-learning. In addition, a heterogeneous set of traditional and innovative instruments, combined with a consistent and unreserved critique of tasks, need to be introduced to preserve values of the current, network-oriented world of work.

In the "Münchner Kreis" study on the future (2020), the links between the effects and potentials of AI on areas of everyday life, the world of work, and education are considered holistically. Therefore, the essential area findings will be presented in isolation.

Area of everyday life:

On the part of the experts, negative tendencies of AI technologies in general areas of life are attributed a low impact. Nevertheless, (inter-)nationally fixed standards for interdisciplinary use cases are to be issued by means of guidelines. The experts believe that legal certainty for all citizens can only be guaranteed if the degree of maturity of the automation potential, systematic user-centeredness, comprehensive transparency, verifiable procedures for data refinement, and the ethical framework parameters for creating neutral training data sets to avoid bias mechanisms are auditable and disclosed. Digital sovereignty is to take a step forward by standardizing test criteria.

The world of work:

Before AI technologies are deployed, rules must be anchored in employment law. Based on these legal foundations, organizations must find internal agreements together with staff committee to concretize the intra-organizational daily work with AI technologies. The importance of human competence in contrast to AI technologies needs increasing transparency and new evaluation criteria of work performance. The core insight must be that human intellectual strengths are complemented, but not replaced, by the potential of AI technology. Particularly, this holds true with respect to the use of AI-based algorithms as part of team achievements in complete chains of action of business processes.

Education:

In the experts' view, educational concepts must be more interdisciplinary and transdisciplinary, so that AI cannot be a technological topic alone. Other disciplines such as pedagogy, psychology, or organizational studies offer opportunities to increase innovation in creative work. Individual development of human strengths in interaction with AI generally need to be incorporated into university curricula in a timely manner, as well as adult education in the corporate context. This also entails a change in job profiles in workplace learning, where specific competencies of employees to design new contexts in the use of AI appear central.

5. Conclusion

The above statements make clear that politics and society are currently in the process of developing a common picture of desired use scenarios for AI technology. Interactions of conflicting goals and contradictions with human expectations in the work concept must be recorded and discussed.

Fixed regulations and transparency with test access about the mode of action of AI as well as competence building can be the basis for promoting acceptance and a positive image of the interaction between humans and machines. The importance of regulation, development and education needs in AI mode can thus represent as key to the prosperity of society. At the same time, the speed of implementation is essential for Germany and Europe in a globalized world in competition with other nations.

In this respect, similar and other occupational profiles, such as those in the field of legal tech in public administration, are also conceivable. The acceptance and design of the challenges posed by digital transformation go hand in hand with the pre-emptive development of competences and must therefore be tackled by the top management. A culture of questioning, evaluating, and reflecting value propositions needs to be developed. At the same time, this vision must be translated for different target groups and needs to be communicated, accompanied, and implemented into identifiable criteria of achievement and, thus, the requirements at each functional level.

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IN THE WAKE OF ALGORITHMIC DECISION MAKING: MAPPING AI-RELATED ADVANCEMENTS IN THE HUNGARIAN PUBLIC SECTOR

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Abstract
Utilizing artificial intelligence (AI) is among the most substantial challenges of our time, raising numerous issues concerning work organization, technology implementation, legal and ethical issues. This is especially true in public administration when it comes to the systems that support the operation of public services. The paper begins with a review of the various uses of artificial intelligence in public administration (starting from the observation that in many cases the different issues of process automation and predictive algorithms-backed decision support systems are not clearly separated), followed by a discussion of the dilemmas and problems which must be dealt with. After drawing a theoretical framework, the research reviews the systems currently employed by the Hungarian public administration and those planned to be introduced in the near future. Finally, the authors evaluate different aspects of the widespread use of algorithmic decision making in the Hungarian public administration in the future, with special emphasis on the integration of AI-developments in public administration development policy documents, the organizational and legal components, and the potential general acceptance of such AI-based public services.

1. Introduction – artificial intelligence is gaining ground

Artificial intelligence (AI) can be defined as a general-purpose technology, and in recent years it showed a great effect on the everyday life of people and businesses. Implemented it in a prudent way, it holds the potential to improve the well-being of people, to contribute to positive sustainable global economic activity, to increase innovation and productivity, and it has been already deployed in many sectors ranging from production, finance and transport to healthcare and security [1]. Current datafication and digitalization trends can be observed also in public administration, as there are increased attempts to use massive amounts of data to improve governmental practices [14]. People who work in government and do business with public administration are coming up with more and more ways to use AI.

In 2018, the High Level Expert Group on Artificial Intelligence (AI HLEG)[4] was formed by the European Commission in order to advice for the implementation of its Artificial Intelligence Strategy. The Expert Group developed the document *Policy and investment recommendations for trustworthy Artificial Intelligence* [9] in which they emphasized the crucial role the public sector can have in AI-related innovation and growth. The publication enumerates areas, focal points and actions how the public sector "as a platform"

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can fulfill this role, including providing more targeted and effective services for individuals and groups as a catalyst for innovation and growth.
Engstrom et al. underline that artificial intelligence has the potential to transform how government agencies do their work: they conclude that current rapid developments in AI can contribute to reduce the cost of core governance functions, improve the quality of decisions, and unleash the power of administrative data, thereby making government performance more efficient and effective. Their empirical research showed that the range of AI solutions in federal level government in the USA is diverse and spans the federal administrative state, as nearly half of the federal agencies studied (45%) have experimented with AI and related machine learning (ML) tools [7].

The first Automating Society Report (*Taking Stock of Automated Decision-Making in the EU*, which is using the term automated decision making (ADM) instead of 'artificial intelligence', defining ADM as "*algorithmically controlled, automated decision-making or decision support systems are procedures in which decisions are initially—partially or completely—delegated to another person or corporate entity, who then in turn use automatically executed decision-making models to perform an action.*") was published in the beginning of 2019 [21], and in the introduction section of the second report (published at the end of 2020), the editor writes that ADM systems in Europe were mostly new, experimental, and unmapped when the first report came out, but the situation has changed rapidly as the deployment of ADM systems has vastly increased in just over a year. [3] As it is usually pictured in the literature dealing with the implementation of different technologies into public administration processes, the public sector has trailed behind the private sector in adopting AI, but governments are seeking to rapidly catch up [1].

Evaluating AI-related developments in public administration, as the mapping of such initiatives is just beginning, the number of such applications is constantly increasing, and many projects are in early or experimental stages. It is also unclear how effectively AI solutions are being adopted and used by government and whether they are having a social or economic impact. This paper examines the policy background, organization aspects, and maps AI-related initiatives as a first step towards assessing algorithmic decision-making in Hungarian public administration. The authors are completing their landscape review on the potential reception of automated public services among citizens.

2. Background – what is AI and why is it important (for public administration)

2.1. Artificial intelligence: wide range of definitions, meanings and emerging research areas

In the last few years, citizens and businesses have been increasingly encountering AI-based technologies and solutions in many areas of life, ranging from communication via social media and by email, to chatbots and digital assistants, to product recommendations and many more. Despite the fact the research field of AI can be originated back to the 1950's, there is no uniform, widely used definition of artificial intelligence [20], and therefore many reports and recommendations begins with a working definition of AI. For example, the 2019 OECD Recommendation on Artificial Intelligence [23] declares that an "*AI system is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy*."

The probably most detailed definition was adopted by the High Level Expert Group on AI of the European Commission [9]: "*Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital*

dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions. As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber-physical systems)."

An AI Watch[5] report demanded the development of a process to establish a reference AI definition [20], and its subsequent operationalization into a taxonomy and representative keywords. The authors of the report considered the cited definition proposed by the HLEG and their proposed operational definition (based on the review of 55 relevant documents) is composed by a concise taxonomy characterizing the core domains of the AI research field and transversal topics (*Figure 1.*); and a list of keywords representative of such taxonomy.

	AI taxonomy	
	AI domain	**AI subdomain**
Core	**Reasoning**	Knowledge representation
		Automated reasoning
		Common sense reasoning
	Planning	Planning and Scheduling
		Searching
		Optimisation
	Learning	Machine learning
	Communication	Natural language processing
	Perception	Computer vision
		Audio processing
Transversal	**Integration and Interaction**	Multi-agent systems
		Robotics and Automation
		Connected and Automated vehicles
	Services	AI Services
	Ethics and Philosophy	AI Ethics
		Philosophy of AI

Figure 1: A current AI taxonomy by Samioli et al. [20]

The broad definitions (and the rich set of AI keywords collected by the AI Watch report) show how diverse and multidimensional can be the application of artificial intelligence in the public sector, and it is also reflected in the scientific literature, essentially based around the term 'algorithm'. Algorithms are at the center of AI-systems, as they can be seen as the "*encoded procedures for transforming input data into a desired output, based on specified calculations"* [11], or as Willson put it "*An algorithm is delegated a task or process and the way it is instantiated and engaged with in turn impacts upon those things, people and processes that it interacts with - with varying consequences*". Gradual deployment of algorithms has sparked renewed interest across disciplines in how algorithms can be applied in the organization of public life, and it is resulted in the

[5] https://knowledge4policy.ec.europa.eu/ai-watch_en

emergence of research field *algorithmic governance*, which is at the intersection of digitalization, datafication, and governance through technology [12].
Danaher et al. stress that algorithmic governance is a natural extension of a longer historical trend toward the mechanization of governance, as sociologist have been highlighting how the originations of the state are subjects to the very same modernizing ambitions as the industrial factories and businesses entities. This trend has led to a machine-like system of governance (with subdivided task and specialized roles in order to achieve as efficient operation as possible), which has always depended on the collection of data about the society and citizens and computers have been involved to automate some parts of different procedures or entire processes [6]. To a large extent, the application journey of AI in government fits well with the research tradition of eGovernment: the use of ICTs to improve government services and practices [14].

Establishing AI in government to assist with service delivery and decision-making comes also with risks and new obstacles. Although an algorithm may promise greater precision and efficiency in many fields, the same efficiency cannot be automatically replicated in the public service domain, where caseworkers must exercise discretion in applying complex legal frameworks affecting individual lives directly [15]. Pääkkönen et al. distinguish between two roles in which algorithms can bring power: automating or supporting human decision-making. *In the first case, where discretionary power is located at different stages of the development and maintenance of the algorithmic system, algorithms are used to replace humans* in certain tasks in programmatic and automated decision structures. In other cases (e.g. risk assessment models in court by judges), *algorithms serve as support systems that can guide or extend human actions while allowing an element of discretion.* The authors argue that algorithms enter into complex interactions with humans both in their supporting and replacing roles [18].

As Vogl et al. put it, there are basically two different approaches for designing algorithms: ‘top-down’ (in which the ruleset exhaustively defined for the algorithm) and ‘bottom up’ (in which the algorithm is given a learning rule and trained on large datasets in order to develop its own rules). The authors conclude that in recent years there have been major changes in the design of algorithms, and one of the most important changes is the shift from ‘top-down’ algorithms to ‘bottom-up’ (mainly AI-based) algorithms, which trend arises problems in terms of transparency and opacity of algorithmic governance systems [22]. Futó [10] examined the public and state administration decision support system landscape in Hungary and concluded that deduction-based expert systems, the classical version of artificial intelligence applications, can be more suitable for the public administration (instead of the newer, mainly (big) data-lead approaches), where the functioning of the institutions and their decisions are based largely on normative regulations.

2.2. Artificial intelligence in public service provision – wide range of use cases

The scope, goals and practices of public sector use of AI are really diverse. Based on their research among federal agencies in the USA, Engstrom et al. [7] highlighted five main areas of governance tasks where AI tools are already implemented (using a wide range of AI techniques, from machine learning to “deep learning” with natural language and image data):

- Enforcement, relates to the enforcement of existing regulation, such as those that identify or prioritize targets which require enforcement or inspections.
- Regulatory research, analysis and monitoring, refers to AI use cases which assist in the policy making processes, such as collecting, monitoring and analyzing data to augment policy-makers decision-making capabilities and make them more evidence based.

- Adjudication, which AI systems are used in order to assist or conduct the granting of benefits or the entitlement of rights to citizens.
- Public services and engagement: These AI solutions include those that are used to support the provision of services to the citizens and businesses or to facilitate communication with and participation of the general public are part of this category.
- Internal management: These AI use cases are used to assist in the management of the internal organization, such as human resources, procurement, ICT systems or other utilities.

The results of the first exploratory mapping of the use of AI in public services in the EU [14] show a wide variety of initiatives and efforts by Member States to adopt AI-enabled innovations. The report proposes a classification based on 10 application domains – called 'AI typologies (*Table 1.*), align with the operational taxonomy proposed by the AI Watch and an earlier AI in government–specific taxonomy by Wirtz et al. [24], who also suggested 10 AI application areas, describing their value creation and functioning as well as specific public use cases.

1. **Audio Processing**	These AI applications are capable of detecting and recognizing sound, music and other audio inputs, including speech, thus enabling the recognition of voices and transcription of spoken words.
2. **Chatbots, Intelligent Digital Assistants, Virtual Agents and Recommendation Systems**	This AI typology includes virtualised assistants or online 'bots' currently used in not only to provide generic advice but also behaviour related recommendations to users
3. **Cognitive Robotics, Process Automation and Connected and Automated Vehicles**	The common trait of these AI technologies is process automation, which can be achieved through robotized hardware or software
4. **Computer Vision and Identity Recognition**	AI applications from this list category use some form of image, video or facial recognition to gain information on the external environment and/or the identity of specific persons or objects.
5. **Expert and Rule-based Systems, Algorithmic Decision Making**	The reason why these apparently distant AI developments are joined into a single application is their prevalent orientation to facilitate or fully automate decision making processes of potential relevance not only to the private but also to the public sector
6. **AI-empowered Knowledge Management**	The common element here is the underlying capacity of embedded AI to create a searchable collection of case descriptions, texts and other insights to be shared with experts for further analysis.
7. **Machine Learning, Deep Learning**	While almost all the other categories of AI use some form of Machine Learning, this residual category refers to AI solutions which are not suitable for the other classifications.
8. **Natural Language Processing, Text Mining and Speech Analytics**	These AI applications are capable of recognising and analysing speech, written text and communicate back.
9. **Predictive Analytics, Simulation and Data Visualisation**	These AI solutions learn from large datasets to identify patterns in the data that are consequently used to visualise, simulate or predict new configurations.
10. **Security Analytics and Threat Intelligence**	These refer to AI systems which are tasked with analysing and monitoring security information and to prevent or detect malicious activities.

Table 1: An AI typology, developed by Misuraca and van Noordt [14] on the basis of Wirtz et al. [24]

Based on the rapidly changing technology landscape, a taxonomy can serve more as an aid to further understanding new AI cases than a definitive list of imaginable use cases, therefore we applied this taxonomy during the mapping process as a guide.

3. Artificial intelligence in Hungarian public administration

To begin the mapping process, we turned to different methods and information sources. During a desk research phase, we examined the main policy documents and strategies to explore the extent to which AI is incorporated in public administration development plans. We also reviewed documents/information from the last programming period on public administration development projects, as well as planned developments, then we validated our findings with expert interviews from officials working in this field. Finally, we also consulted the database from the Good State Public Administration Opinion Survey, which gives us an idea of how these developments can be perceived among citizens.

3.1. Strategy and policy level – AI is on the rise

For the programming period 2014-2020, the main policy documents in this domain are The National Infocommunication Strategy 2014-2020 (NIS) (with four pillars, one of them is "digital state") [17] and the *Public Administration and Public Service Development Strategy 2014-2020 [19]*. Artificial intelligence is directly mentioned only once in the NIS (under the measure Encouragement and support of the R+D+I activity of the ICT sector), and has no direct mention in the public administration development document. The latter, however, is talking a lot about the benefits of digitization, and there are some isolated mentions of automated processes, both front- and back-office level, as a possibility.

A new strategy on this filed, the National Digitisation Strategy (NDS) is currently being prepared by the Ministry of Innovation and Technology as the successor to the National Information Communication Strategy. The Digital Success Programme[6] initiated the establishment of the Hungarian Artificial Intelligence Coalition at the end of 2018. The members are including multinational and domestic businesses, universities, scientific workshops and professional and public administration organizations. The coalition contributed to the most important recent policy document in the domain, which is the national strategy on AI adopted, in the second half of 2020. The Hungary's Artificial Intelligence Strategy 2020-2030 [13] proposes the following main groups of measures (Figure 2.):

- *Foundation pillars*, which aim is to prepare society to manage inevitable changes resulting from AI effectively and to fully exploit the advantages of the technology. It's divided into two sections: the AI value chain covers the internal conditions (ensuring access to public and private data, building both a community and researchers and an ecosystem supporting the use of the technology), while the AI frameworks provide the "external" conditions (human skills, availability of software and hardware, clear regulatory environment).
- *Focus areas*, which aim to strengthen the growth potential of the Hungarian economy and to improve its efficiency in a targeted and conscious manner through the use of available AI technologies, on the one hand; and the development of future technologies, on the other. The

[6] https://digitalisjoletprogram.hu/en

strategy favours supporting specific sectors that could benefit most from AI-based applications.

- *Transformative programmes*, which do not include programmes in a traditional sense, but rather complex means-end schemes provided in a form that is readily comprehensible for society as a whole.

As Figure 2. shows that focus areas (State Administration – "Data-driven, service provider state") and transformative programmes (automated administrative procedures in Hungarian) both includes state administration. The Strategy says the main aim is to facilitate electronic access to, and the digitalisation of, public services, with AI being one of the enabling technologies, which is in line with the current concept of public administration digitalization, focusing on integration and developing processes, the efficiency of which can be improved and where new channels can be provided with services more effectively. There are some concrete topics mentioned in the strategy, among others the introduction of control systems for use by law enforcement, the development of complex modelling systems to simulate decision-making situations and development of systems supporting the oversight of financial and taxation processes [13].

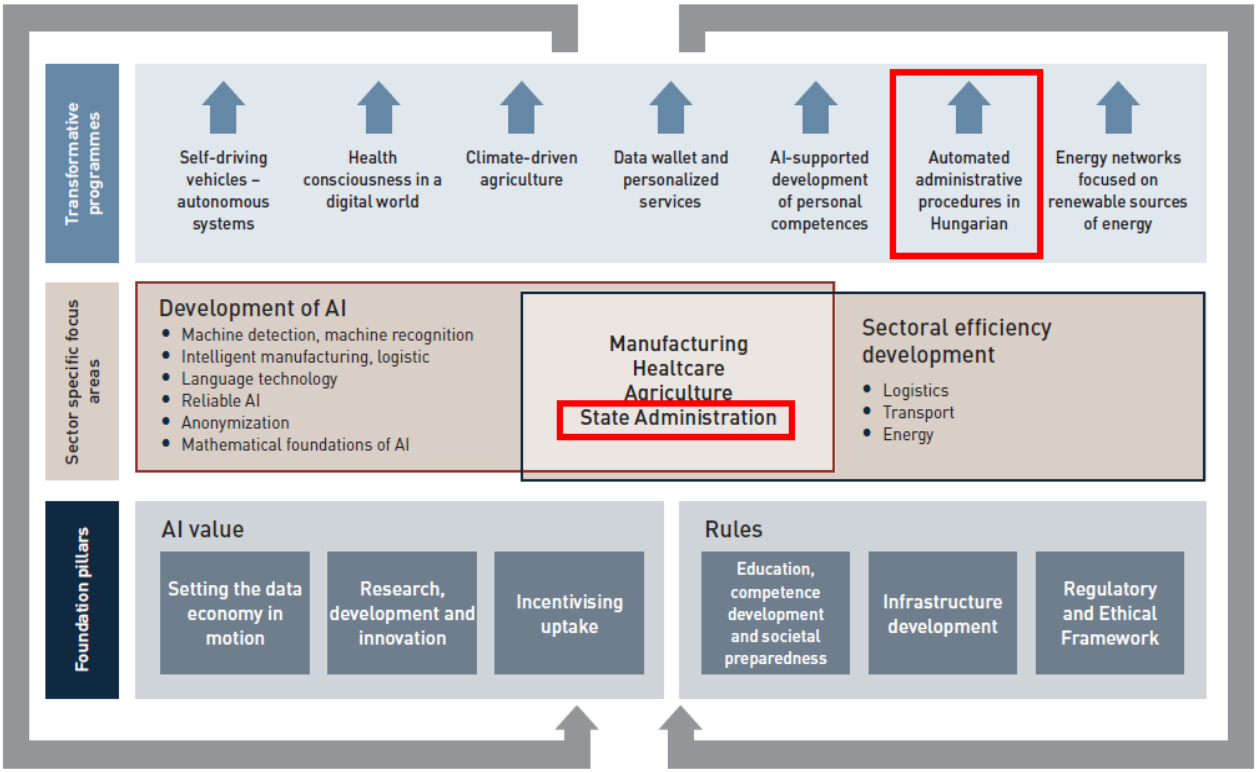

Figure 2: Measures of the Strategy and their relationship with each other (Pubic Administration related measures are indicated) [13]

Many developments and projects focusing on public administration digitalization are taking place under projects funded by the European Union, therefore it is important to mention the Public Administration and Civil Service Development Operational Programme (KÖFOP, with EUR 935 million funding), which aims to improve the services provided by the public authorities and the increase efficiency of public administration, in line with the cited strategy documents. Public administration digitization is also included in the draft of the Digital Renewal Operational Program (DIMOP), which at this stage of the planning process, can be considered as a continuation of the Public Administration and Civil Service Development Operational Programme (KÖFOP). If the

programme is accepted, there will be even more emphasis on digital transformation in this respect. According to the draft summary/structure published for public consultation[7], the content of DIMOP would consist further digitazation of public services, where the realisation of data-driven administration (process automation/automated decision making and the application of AI and robotics would play a central role) can be a priority. This would be supported with the extension of the Central Government Service Bus (KKSZB) interoperability platform.

3.2. Practical level – actual or planned use of AI in Hungarian public administration

Currently, the main responsible body for public administration digitization is the Ministry of Interior, which recently opted strongly to implement artificial intelligence-based solutions, with the dual aim of improving customer centricity as well as the efficiency of workflows.[8] Another argument is that automated decision making could provide greater transparency and reduce the possibility of corruption.

We examined the content and scope of the projects which are founded under the umbrella of the Public Administration and Civil Service Development Operational Programme (KÖFOP), and two major project addition to the KÖFOP in the last year (however not yet under contract) reflect this trend:

- The placement of artificial intelligence supported customer service points (KIOSKs) at government offices (HUF 2.6 billion). KIOSKs are service points/terminals where certain cases/services can be handled fully automatically (for example, passport, identity card and certificate of good conduct requests), using various technologies and algorithms for identification (portrait-based or using the national eID card), speech recognition/ conversion and an AI-augmented procedure support application, connected with public registers. There are working examples of the terminals, out of which 400 will be installed in the project.
- Developing an Automated Public Administration Decision Making system (AKD) as a regulated electronic administration service (SZEÜSZ) (HUF 1 billion). In consequence of this project, an integrated service will be implemented, with which administrative steps between the opening and closing of a case can be carried out without human intervention, provided all the information necessary for the decision is available (in public registers). This model can be further developed and expanded, through which a public administration institution will be able to simplify and automate its own administrative processes by integrating this service.

We see some other references in projects running to automate case handling (e.g. EKEIDR project, which aims to extend a unified file and process management system to territorial administration, or an another project set up for the review and simplification of proceedings instituted by a public authority), which are involved in wider administrative burden reduction or workflow reengineering measures and basically the activities of these projects mainly target the automation of some part of the process or the evaluation of possible future automation.

In other areas, technology similar to that used for setting up KIOSKs has been considered or already implemented. One such area is the introduction of chatbots into the processes of the Governmental Hotline (1818)[9] in 2021, the customer service provides information regarding public administration

[7] https://www.palyazat.gov.hu/digitalis-megujulas-operativ-program#
[8] https://www.youtube.com/watch?v=XHVPqmsJrZk
[9] https://1818.hu/home

procedures, which would include portrait-based identification, speech recognition/conversion and automated case handling. Portrait-based identification is also used in relation to border control. It is also worth mentioning that the National Tax and Custom Administration, based on the enormous amount of data (7,5 petabyte) it collects (e.g. from a near real-time online cash register system), is implementing different artificial intelligence-based solutions, one of them is a fraud detection system [16].

One of the most important development principle we identified is the intention of integrating of AI-technologies into the system of regulated electronic administration service (SZEÜSZ). Regulated electronic administration services are IT building blocks that can be integrated into many services in the same way and in this way, complete digital procedures can be built from this building blocks. Hungary has been pursuing this centralized model of e-governement development since the first half of the last decade [2][4]. One analogue for the AI-related expansion of different SZEÜSZ' is the central identification solution, the Central Authentication Agent, which supports the use of different electronic identification and authentication services (Client Gate, national eID card, Partial Code Telephone Authentication). Different identification solutions (based on portraits/pictures or touchless fingerprint recognition) will be developed to be another building block for digital processes, as well as a customizable chatbot with speech and text recognition and processing capabilities.

Most of the developments are in pilot, testing or planning phase, and it is important to emphasize that in many cases, to achieve the fully automated case handling, regulatory changes are also necessary and under negotiations.

3.3. Citizen's perspective

In closing, it's worth taking a look at how customers approach the state's automation efforts. The empirical basis of this section is the Good State Public Administration Opinion Survey, which was carried out in Hungary in first half of 2020. The survey questions were tested on a representative sample for the adult (age 18+) Hungarian population. The sampling method was multistage, proportionally stratified probability sampling, while the database was also corrected ex post with matrix weighting procedure in respect to age, gender, region, settlement type and education. The survey provided the opportunity to gain a large representative database, with data about citizens' usage and experience of different areas of e-government services, their channel preferences and the obstacles they face while dealing with public administration procedures. One of the questions asked the respondents whether they try different ways of machine-assisted case handling (*Table 2.*).

There are significant differences related to age and education: only 20-25% of the respondents and 18-29 refuse to try the listed methods, while the ration among respondents who are above 70 years of age is ranging between 80-90%. Respondents with no more than elementary education are less likely to try the new channels and methods, which is in line with earlier research [5] as they probably feel that they will not get enough support using the novel technics. Among internet users, the more frequently one uses the internet, the more likely they would try the automated/remotely supported way of the procedure. The numbers show that there is receptivity for automated case handling and for AI-assisted procedure handling, as approximately two thirds of the respondents would at least try these methods, but they certainly cannot work for everyone at the moment.

	By no means would I try it	I would only try it if I benefit from it (e.g. I can save time)	I would like to try it out
Using online chatbot for gathering information	37	38	25
Using video calls for complete procedures online	32	40	28
Using a terminal in customer services/physical one stop shops instead of interacting with a clerk	38	37	25
Using video calls at customer service/physical one stop shops	37	33	29

Table 2: Preferences towards different AI-assisted methods for interacting with public administration (Good State Public Administration Opinion Survey 2020)

4. Conclusion

Reviewing the current policy documents and development projects and initiatives, we can conclude that there is a growing level of presence and importance of implementing artificial intelligence (and automation) into public administration, a trend which started around 2018. One of the main catalysts was the establishment of the Hungarian Artificial Intelligence Coalition at the end of 2018, but an important aspect could be the constant innovation pressure on the public sector to engage with state-of-the-art technologies already widely adopted in the private sector. Currently, the technologies and solutions used, tested or piloted by the Hungarian Public Administration (using the AI-typology from *Table 1*.): Audio Processing; Cognitive Robotics, Process Automation and Connected and Automated Vehicles; Chatbots, Intelligent Digital Assistants, Virtual Agents and Recommendation Systems, Computer Vision and Identity Recognition; Natural Language Processing, Text Mining and Speech Analytics. Some initiatives are combining almost all of these methods, while big-data or machine learning based solutions are not widely used. One explanation for this could be that artificial intelligence is seen as a possibility to extend the system of regulated electronic administrated services, which means that these solutions can be an integral, standardized part of digital procedures. The AKD project is aiming for fully automated processes, which can pave the way for an even more integrated approach, as currently we can state that present activities related to AI is determined by the "eGovernment rhetoric legacy" [14], or the translation of administrative procedures in digital format. Citizens appear to be receptive to (more) automated case handling and to AI assisted procedure handling, but in practice this receptivity can vary widely between different segments of the population and between different cases and services. The human or organizational aspect is equally relevant in terms of public administration bodies: besides the overcoming of existing legal barriers and fine-tuning regulations to make automated procedures possible, administration without human intervention must follow a different approach to responsibility and public administration management.

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DATA PROTECTION CHALLENGES IN THE ERA OF ARTIFICIAL INTELLIGENCE

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Abstract
Nowadays, various applications of artificial intelligence (AI) are clearly seen in many fields, therefore, it may seem like a technological achievement of the 21st century. However, its origin dates back to the middle of the last century.

The questions arise as to how AI can be illuminated from the perspective of data protection, and especially what the main data protection concerns are, moreover, what kind of data protection risks it poses, and what practical solutions are known about the topic. The purpose of this paper is to provide an insight into the data protection approach to AI through some practical examples.

Based on the results it can be established that this futureproofing technological solution poses several challenges for data protection. As a learning algorithm based on poor foundations can also lead to erroneous conclusions, AI requires a fair amount of appropriate data in order to provide reliable results. It should also be highlighted that profiles can be created from enormous amounts of data and conclusions may be drawn about our habits, which raises concerns. Additionally, its reliability is in question, not only due to the basic data, but due to the self-learning, "black-box" system. The knowledge on which it bases assertions about "something" is very limited. It is obviously a high risk from a data protection perspective.

1. Introduction

In the 21st century, it is becoming more and more apparent that AI is having an increasing effect on people's everyday lives, not just on the side of technology. However, it should not be forgotten that the origin of AI dates back to the mid-1950's. [19] The pace of development has been strengthened by the fact that a few decades after laying the cornerstones of AI, in September 2020, an article by GPT-3, Open AI's language generator, was published in The Guardian. The question may arise as to why it is different from any other articles. As it is a cutting-edge language model, which uses machine learning to aid "its" performance, it can write texts like humans. [9]

Today, we can find solutions based on AI in many areas of everyday life. Some examples are listed as follows. In the field of social media AI has key impacts, we only have to think of the deep learning of Facebook, which helps to draw value from a larger portion of its unstructured datasets to update the over 2,7 billion monthly active users' [28] statuses. [21] In the case of Instagram, AI is applied - with the use of big data - to target advertising, fight cyberbullying and delete offensive comments. Another social networking site, namely Twitter, uses AI from tweet recommendations to fight inappropriate or racist content and intensify the user experience, furthermore, learning over time what the preferences of the users are. In the context of self-driving and parking cars, deep

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learning is used for recognizing the space around a vehicle. AI-powered functions can be found in email communications as well, for instance in Gmail smart responses, which help users to respond in an easy way by accepting the typical, brief responses offered. In Google's predictive searches the reflection of AI can be seen by typing search terms and then finding recommendations to choose from. The search engine of the above-mentioned company learns from the results and AI is used to help in the determination of the quality of the content and match it to the questions of the users. [21] It can be observed that in recommender systems (e.g. music, film, product and service) various AI techniques have been applied in order to enhance the user experience in a personalised way and increase user satisfaction, thereby making the decision process easier for users. [33] During the difficult and challenging times of the Covid-19 pandemic it can be established according to Vaishya et al. that applying AI can help in the early detection and diagnosis of the infection, monitoring the treatment, contact tracing of the individuals, the projection of cases and mortality, the development of drugs and vaccines, reducing the workload of healthcare workers and in the prevention of the disease. [31]

The question arises as to how AI is assessed from the perspective of data protection, with particular regard to the challenges, risks and, principles of processing personal data, and what practical solutions are known about the topic in the legal sphere. The purpose of this paper is to provide an insight into the data protection aspect of AI through literature and practical examples, and provide responses to the above-mentioned questions as well.

2. Issues of AI

This paper is not intended to provide a broad definition of AI. However, briefly, the approach used is that AI is able to make independent decisions (decision-making system) based on data and its environment, and that it comprises self-learning algorithms as well. In 1985, the concept of AI was determined as "the theory that a mechanism can perform those functions of human intelligence: reasoning, problem-solving, pattern recognition, perception, cognition, understanding, and learning" by Waldman. [32] According to Kaplan and Haenlein, AI is defined as "a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation". [17] It should be noted that further definitions and classifications are known in the literature. In this particular case, the focus is not on the regulatory issues of AI from a technological point of view, but rather on data forming the basis of the learning algorithm, which is a key element of its operation, drawing attention to some data protection issues. Basically, three issues can be viewed in connection with AI systems: input, operating principle (algorithm), and output.

2.1. Input data

Just as the structure of a building depends on its foundation, the quantity and quality of data is crucial for the outcome of AI. The reliability of the data table and/or the methodology applied can lead to biased results, which pose several challenges and potential risks, its relevance being extremely high.

On this issue it is important to briefly provide an insight into the term of input data. When deploying an algorithm, it is fed with new, unseen features, which is the input data. These are evaluated against the parameters of the model for taking actions or making decisions. The browsing history of people without yet knowing if they would click on a certain ad can be mentioned as an example. [7]

2.2. The "black-box" problem

Having regard to the fact that the AI system will be a self-learning algorithm at a later stage, its operating principles can be compared to a black-box. Bathaee draws attention to a significant concern and potential risks of AI that if an Al program is a black box, it will make predictions and decisions as humans do, but - the difference is - without being able to communicate its reasons for doing so. Moreover, the thought process of the AI may be based on patterns that human thought cannot perceive. With regard to this finding only a "little can be inferred about the intent or conduct of the humans that created or deployed the Al, since even they may not be able to foresee what conclusions the Al will reach or what decisions it will make". [2]

2.3. Output issues

There is serious relevance to how reliable the output is. For example, if the input data and the question waiting to be answered do not completely cover each other. Hence, if someone intends to analyse the movements (location) of people in general, then in this case conclusions can only be drawn for those who have constantly enabled this feature, for those who have not, or may not have continuously enabled it, it cannot be done.

From an international dimension, the importance of monitoring the software was highlighted in the case of Wisconsin v. Loomis in 2016. The defendant claimed that his constitutional right to due process was violated by the court's reference to the risk assessment report at sentencing. The report contained scores estimating the risk of recidivism that were calculated by the proprietary algorithm. The defendant also stated that the software used at sentencing by the Wisconsin authorities had not been cross-validated on (i.e. tested against) a Wisconsin population. The significance of this case was underlined as despite no violation was found in this case, the Wisconsin Supreme Court ruled that any pre-sentence investigation report must contain information on the limitations of the software, including notification that the algorithm compares defendants to a national sample, and not to the population of Wisconsin. In addition, the court also noted that the software must be constantly monitored and re-normed for accuracy due to changing populations and subpopulations. [30; 7]

The importance of data protection issues becomes truly emphasized in the context of the consequences, as if the pattern does not correspond to the whole picture, it distorts the outcome, which related to all. It is highlighted that if an AI system that has been trained on biased or misguided data it will formalize and amplify errors. [16]

3. Data protection challenges

Based on the data table and the methodology applied, there are a several significant issues concerning data protection, which can lead to serious legal problems. The purpose of the following parts is to provide insights into some of the data protection-related issues. Today, AI is surrounded by an enormous number of regulatory questions, many of which have not been answered yet. Nevertheless, it can be established that various recommendations have been published, and a white paper has been issued on the subject as well.

The White Paper on Artificial Intelligence – An European approach to excellence and trust (hereinafter referred to as 'White Paper') of the European Commission expressly determines the following as main risks: fundamental rights, including personal data and privacy protection and

non-discrimination. The White Paper explicitly highlights risks in the field of data protection indicating potential cases: "[t]hese risks might result from flaws in the overall design of AI systems (including as regards human oversight) or from the use of data without correcting possible bias (e.g. the system is trained using only or mainly data from men leading to suboptimal results in relation to women)".[8] In the following sections of the current paper some of the relevant issues from the perspective of data protection will be presented, drawing attention to the challenges of AI.

3.1. AI in the context of data protection

The Regulation (EU) 2016/679 of The European Parliament and of the Council (General Data Protection Regulation; hereinafter referred to as 'GDPR') [24] determines the concept of personal data in a broad sense in Article 4(1), which means any information relating to an identified or identifiable natural person. This includes the conclusions to be drawn as well. Moreover, the GDPR explicitly specifies the term of profiling in Article 4(4). Technology seems capable of inferring certain personal attributes based on data not instantaneously related thereto. [29] For this reason, it is extremely important that the data used as the basis of the learning algorithm is appropriate in order to avoid distortions, bias and discrimination. Notwithstanding to the fact that processing of special categories of personal data (e.g. race, political opinions, religious beliefs, trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health, sexual orientation) is prohibited based on Article 9(1) of the GDPR, algorithms are capable of deriving this information through other data respecting for privacy boundaries. [5; 29]

According to Article 22 of the GDPR, the data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling. Thus, individuals may object to any kind of processing of their data, which is conducted without any human oversight or involvement. In accordance with Articles 13-15 of the GDPR, related to information and access to personal data, it is required of all organisations which intend to put data into an algorithm that will afterwards make a decision affecting an individual, to inform the individual that such processing will take place . Based on the provisions of the GDPR, automated individual decision-making is not under a total prohibition, some exceptions are determined in Article 22(2): this kind of decision-making is necessary for entering into, or the performance of, a contract between the data subject and a data controller; it is authorised by Union or Member State law; or the explicit consent of the data subject has been given to the automated decision-making. In case of special categories of personal data, the level of protection, including the restrictions on automated decision-making established by the GDPR, is much higher. Approaching automated decision-making in another way Araujo et al. established in their study that data from a scenario-based survey experiment with a national sample (N = 958) interestingly shows that people often evaluate decisions taken automatically by AI on a par with or even better than human experts for specific decisions. [1]

The provisions of the GDPR affect the issue of profiling, including the rights of the data subject in this question. Nevertheless, several risks are confirmed. Data mining can be used to create digital profiles, permitting substantial decisions to be made without the knowledge of the individual. [15] It is underlined in case of profiling as "the construction or inference of patterns by means of data mining and as the application of the ensuing profiles to people whose data match with them". [13] Ishii pointed out that "if the resultant data misrepresent the individual's personal aspect, or the data reveal excessively intimate behaviors of the individual, such data would greatly transgress the person's expectation of privacy. Automated decisions would distort others' reasonable evaluations of the person". [15]

3.2. Principle of data minimisation and accuracy

Article 5(1)(c) of the GDPR determines the principle of data minimisation, that personal data shall be adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed. Potential risks and further questions arise to comply with this principle, as in case of AI it is precisely the fact that a large amount of data is required and processed. In this case there is a collision, as according to the GDPR personal data should be minimised, however, AI needs a great amount of data, - and of course an appropriate algorithm - which can contain personal data as well. At first glance it can seem to be a real challenge, but in practice this may not be the case. The key point of the principle of data minimisation that you can only process the personal data you need in accordance with the purpose, so there is no provision in this case, which prohibits processing personal data. The terms "adequate, relevant and limited" are also case specific in the context of AI systems. A number of techniques exist, which can be adopted in order to develop AI systems that process only the data you need, while remaining functional. The individuals accountable for the risk management and compliance of AI systems play a major role in it. [14]

According to Article 5 (1)(d) of the GDPR, personal data shall be accurate and, where necessary, kept up to date; every reasonable step must be taken to ensure that personal data that are inaccurate, having regard to the purposes for which they are processed, are erased or rectified without delay. It should be noted that it is also necessary to comply with this principle regarding the processing of personal data when using AI systems.

The Information Commissioner's Office, which is the UK's independent authority set up to uphold information rights in the public interest, promoting openness in public bodies and data privacy for individuals, published a guideline that underlines that accuracy in AI refers to how often an AI system fathoms the correct responses, measured against correctly labelled test data. It is important to emphasize that in many contexts, the responses provided by the AI system become personal data. For instance, based on their behaviour on social networking sites an AI system can infer the individuals' demographic information or their interests as well. [14] In this context, it is important to know how the outcome can be examined and checked, if an AI system predicts something regarding an individual, as well as, how misstatements can be detected? Another challenge is the reliability of the systems, it is likely that latency is high on this issue; where applicable, the controllability of how frequently the system makes mistakes, and how this can be measured.

Challenges surrounding AI also include the issue of liability [16], if an injury or any harm occurs "due to a decision of AI", in which case who can be held liable. This issue draws attention to the importance of the need for regulation.

3.3. Face recognition

The concept of face recognition technology is determined according to Berle as: [it] "is a biometric software application designed to identify a specific person in a digital image. This involves the capture of facial biometrics, to create a searchable biometric database of facial images to verify the identity of an individual". [3] It is also important to comply with the aspect of data protection, since data is one of the key elements of it with the self-learning algorithm in AI. This statement is also underlined with real cases from the United States. Last year it came to light that two black men were arrested in the Detroit area due to the mistakes of facial recognition technology. It is known that facial recognition is less accurate for darker-skinned people. However, this technology-based support is widely used by police departments in the United States. [25]

In a new study [23], researchers have established that due to the exploding data requirements of deep learning, requesting the consents of individuals has been abandoned by degrees. A further challenge is related to surveillance and potential discrimination, due to this "practice" more and more personal photos of individuals were incorporated into systems of surveillance without their knowledge. It can cause unforeseeable consequences with these data sets, which may unwittingly comprise photos of minors, use racist and sexist labels, or have poor quality and lighting. [11; 23] One of the legal bases of data processing is the individual's consent, that is the reason why the results of the study draw attention to these new risks, since they can be harmful to fundamental rights.

There is nothing new in the finding that language-generation algorithms can contain racist and sexist ideas. [10] However, based on Steed and Caliskan's new study [27] it can also be true for image-generation algorithms. In a photo of a man cropped right below his neck, he will automatically be dressed in a suit in 43% of the cases by the algorithm. When there is a woman in the cropped photo, it will autocomplete her at a rate of 53% wearing a low-cut top or bikini. These results highlight the importance of this issue, image-generation is just one element, which impacts on all computer-vision applications, for instance, the previously mentioned facial recognition. [10]

From an international perspective, it is worth mentioning the case of China, where facial recognition technology is widely used in parallel with privacy concerns. In October 2019, China had its first lawsuit over the use of facial recognition technology, which was followed by many debates. In line with the changing circumstances, last February, China introduced such facial recognition technology that can identify faces even wearing a mask, but it should be noted with a slightly lower accuracy rate. [18]

3.4. Bias and discrimination

Using AI can pose a number of risks of discrimination, given that it is based on data, moreover AI learns from it, which may be unbalanced and/or reflect discrimination, it may create outputs which have discriminatory impacts on people based on their gender, race, age, health, religion, disability, sexual orientation or other attribute. [14]

It should be noted that the output could lead to discriminatory consequences. At different stages of the process, "the data used to train and test AI systems, as well as the way they are designed, and used, might lead to AI systems which treat certain groups less favourably without objective justification". [14] One approach in the context of big data, underlining the importance of the quality of data, establishes that if the training data reflect existing biases for instance against a minority, the algorithm probably incorporates these biases, which can lead to less auspicious decisions for members of these minority groups. [12] Bias should be interpreted in a broad sense, many types of it can occur. For instance, algorithmic bias, can be experienced when a machine-learning model produces a systematically wrong result. Just as an example of it, bias is a reflection of how the authors of the data algorithm choose to use their data blending methods, practices of model construction, and additionally how results are applied and interpreted. It should be kept in mind that these processes are driven by human judgments. [22]

It is apparent that the field of human resources has changed a lot in recent years, digital transformation has greatly facilitated effectiveness, for instance using AI to help to decide which candidate would be the best for a position. On the other hand, AI-based tools have challenges from the point of view of data protection and discrimination. It is important to emphasize that if the basis

(e.g. data table, data set) is not appropriate, the algorithm will learn from incorrect data, which may cause further biased consequences.

With regard to decision-making based on AI, the importance of the quality and quantity of data should be emphasized, as the results provided by AI depend on all this. This idea brings us to the issue of privacy. As Kaplan and Haenlein wrote: "external data and AI go hand in hand". [16] In this context it should also be underlined that it was pointed out that "[t]he power of AI is driven by the amount of input data present and the performance of algorithms and hardware to learn from such data". [16] The question arises, why all these are so important. The response can be given by a practical example. If AI is biased due to training and processed data, then the outcome will have errors. It should also be mentioned that they might not be noticed at first glance, and it could happen that these errors will only come to light when it is too late, having caused further errors. In 2018, Amazon used an AI Recruitment System for hiring. The algorithm had been built on historical job performance data, when white men had been the best performers in the company. The reason for the biased outcome was that most of the employees were white men and white male candidates were given higher scores by the algorithm and women candidates were discriminated against, even though the sex of the candidates was not used as a criteria. [4; 20] Cappelli et al. highlighted that several questions arise in the case of retrospective analyses applied by algorithms, which can cause biases based on the data set. If this happens it may lead to a disproportionately high selection of white men and discrimination against women candidates in the process of hiring as in the example of Amazon. [4] The programs were edited by Amazon to make them neutral to these particular terms. However, because there was no guarantee that the machines would not devise other ways of sorting candidates that could prove discriminatory, the Seattle company stopped this project. [6]

Avoiding bias also has a key role to play in the field of criminal law, considering the principle of fair trial and non-discrimination. AI can be used for this purpose as well. In this context, an example of good practice can be found in San Francisco, where technology helps the work of prosecutors in avoiding bias. According to the description it is a "blind-charging" tool, which was built by the Stanford Computational Policy Lab, which "removes racial information from police reports when prosecutors are deciding whether to criminally charge suspects". [26]

4. Conclusion and future-related questions

In different areas of life, it has already become apparent what great opportunities AI holds, especially in the case of repetitive tasks, where it can greatly accelerate processes and advance efficiency. However, it should be noted that there are many risks in its use. This paper is focused on the current challenges of it from a data protection point of view, with special regard to compliance with the principle of data minimisation and accuracy of the GDPR, issues of face recognition technology, discrimination and biased outcome. The aforementioned examples underline in practice, the importance of data and the methodology applied in the context of AI, as it includes self-learning algorithm(s). It poses major challenges and can generate serious problems in real life if the self-learning system is not based on the right foundation.

To sum up, the broad sense of personal data also covers the conclusions that can be drawn from it, which is the reason why it is particularly important for AI to focus on data sets and the protection of additional personal data resulting from them. As a self-learning algorithm based on poor foundations can also lead to erroneous conclusions, which is a high risk from the perspective of data protection.

AI may also raise further questions from a data protection perspective for the future as to whether it can take over the humans' personality, combined with inappropriate information, if someone talks to a self-learning AI-powered robot instead of a human being. Moreover, the extent to which it can be substituted.

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Education

ISSUES OF LEGAL REGULATION OF HUNGARIAN HIGHER EDUCATION IT SYSTEMS

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Abstract
The operation of IT systems of Hungarian higher education institutions is governed only by general law. These institutions have a large amount of personal, economic and research data. The management of these organizations is defined by internal regulations which are not controlled in terms of form or substance. As a consequence, the security of Hungarian higher education IT systems currently varies from institution to institution. Internationally, the first step in the legislative regulation of higher education systems was published in the United States in 2004, followed by only general rules from European legislators. In recent years, however, this situation has changed, and in several countries, including Hungary, the extension of the legislation on state institutions to higher education systems has begun. At present this has manifested in placing of research institutes under national security protection. In the light of international trends and Hungarian development, it is expected that this process will continue.

One possible way to raise the IT security level is to place higher education institutions under Act L. of 2013. This, in addition to not being a simple process, would create a serious financial burden for the maintainer and would have a noticeable impact on institutional autonomy, teaching and research freedom. There is currently no public source of information on IT incidents or their success and management in higher education IT systems in Hungary. In my presentation, I review the IT data assets of Hungarian higher education and based on my personal experience, I give an overview of IT attacks on the sector and a what can be expected based on changes in the L. Law of 2013.

1. Informatics in Higher Education

The world economy has changed at an unprecedented rate with the emergence of the internet. With few exceptions to economic competition, those who introduced and applied IT developments were allowed to remain viable, while other organisations, especially public organisations, had to adapt. Each country has developed its registration systems and electronic administration processes according to their level of development. Over the past decade, the number of cases that can be dealt with electronically has increased for both institutions and citizens. As a result, today's IT systems in developed countries handle large amounts of data, the protection of which has become critical.

Hungarian National Security Strategy [4] highlights the importance of protecting information systems and cyberspace on a number of points and draws attention to the potential for operational disruptions to affect the country as a whole. To this end, these countries have developed their own cybersecurity frameworks that define their legal environment and defense organisations. Their

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primary objective is to maintain the functioning of the economy, to protect the economic system and the public sector. The operation of areas outside them is little regulated, even if they are maintained by the government. This is why, with a few exceptions, institutions in the academic sphere are subject only to general legislation.

However, the role of universities and research institutes has grown significantly in these areas in recent years. Research on COVID-19 was also carried out by higher education research teams, while their IT systems only operate according to their internal rules. Although the research unit of some universities in Hungary has been placed under national security supervision, there are already visible signs in some countries that in the future the IT systems they operate will be able to function under much stricter legal regulations.

The central issue of this article is the examination of the legal regulation of Hungarian higher education IT systems and the fact that the existing rules are no longer sufficient.

2. Legal Environment, Services

The Hungarian cybersecurity framework is relatively well defined and covers the legal and organisational areas necessary for the performance of cyber defense. The strategic context is based on the National Security Strategy and the National Cybersecurity Strategy [6]. This Government Decree of 2013 needs to be updated from time to time due to the rapid development of information technology and in order to be in line with the EU Directive on the Security of Network and Information Systems.

Hungary's National Security Strategy focuses on the protection of Hungarian cyberspace, attacks from cyberspace, and the avoidance of their negative effects. Its military approach is in line with international practice, which defines cyberspace as the fifth area of operations, defining cyber assets capable of causing significant material damage as weapons. It sets the task of developing the cyber capabilities of the Hungarian forces and emphasizes the importance of international cooperation. It identifies e-government as a priority sector, as well as utilities, strategic companies, and vital components. The strategy identifies organized crime, international terrorist organizations, cybercrime groups, extremist religious communities, private security companies and international networks as the most common perpetrators of cyber-attacks. It highlights the growing intensity of cyber-attacks, the importance of research into this, and the importance of user information security.
The main goal of Hungary's National Cyber Defense Strategy is to draw the attention of political and professional decision-makers to the existence and management of cyber security problems. The strategy is in line with the recommendations of the “Cyber Security and Defense” 2012/2096 (INI), NATO's Strategic Concept for 2010, the Cyber Defense Policy for 2011 and the Alliance's cyber defense principles and objectives.

Neither the National Security Strategy nor the National Cyber Defense Strategy mentions higher education institutions.

At the top of the organisational hierarchy of Hungarian cyber defense is the Ministry of The Interior (BM), which is different from general international practice. State and local government organisations are supervised by the National Cyber Defense Institute (NKI) within the framework of the National Security Service (NBSZ), which covers three professional areas. The Government Event Management Center (GovCERT) is an organisation specialized in threats or attacks from cyberspace. The National Electronic Information Security Authority is responsible for enforcing the

law and verifying their compliance. The Security Management and Vulnerability Investigation Department supports the operation of organizations covered by the Information Security Act [5], including the development of their security capabilities. NISZ Zrt. provides centralised infrastructure and related services to the entities covered by the law. The NAIH is an independent authority under the Constitution.

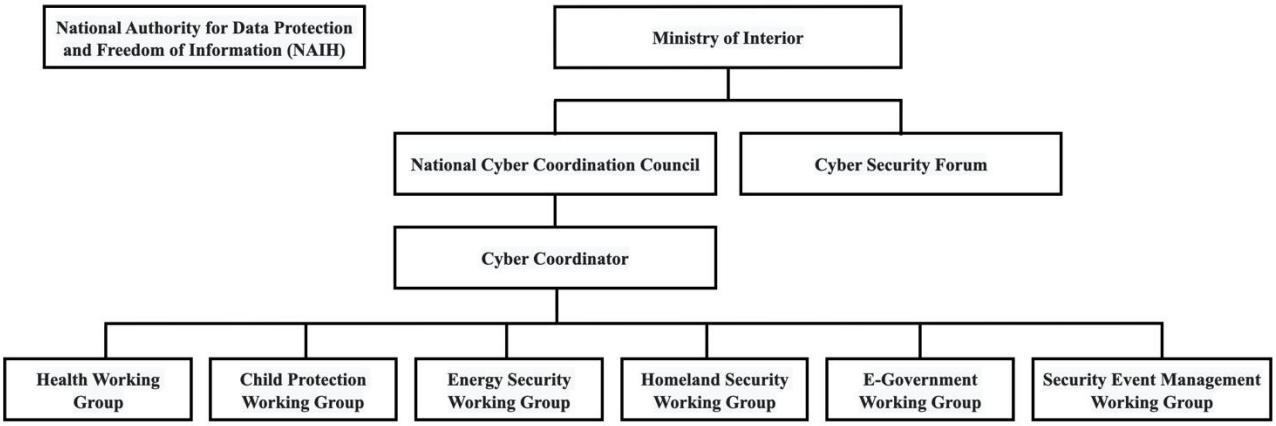

Figure 1: Strategic level of Hungarian cyber defence. It was created by the author.

These organisations do not provide IT security services to the academic sphere. GovCert's activities in higher education appear only secondarily, and HM CERT, which operates within the Military National Security Service of the Ministry of Defense, specializes exclusively in military organisations. Systems of municipalities and hospitals are regularly inspected, sometimes carrying out vulnerability checks and indicating the vulnerabilities discovered. Higher education is not within the scope of any of them, so with a few exceptions, they only report spam activities. CSIRTs are not responsible for handling damage which has occured, they are not investigative officials and therefore do not have such authority. For higher education, in theory, these tasks are performed by two organizations, Hun-CERT and KIFÜ CSIRT. The stated aim of the former is to provide professional and network security advice to the entire Hungarian Internet community. The Government Information Technology Development Agency (KIFÜ) is an organisation managed by ITM, which supports, among other things, Hungarian public education, public collections, higher education and research institutions. Its aim is to develop the IT infrastructure of the institutions and to provide the services based on it, as well as to operate the KIFÜ CSIRT. Its main services, which can be used free of charge, are the improvement of cyber security, the forecasting and prevention of incidents, and the provision of regular information. Unfortunately, it is not the priority of the CSIRT's to protect higher education. There are a number of incidents in middle education institutions, thus the KIFÜ CSIRT's services are mainly targeted at those.

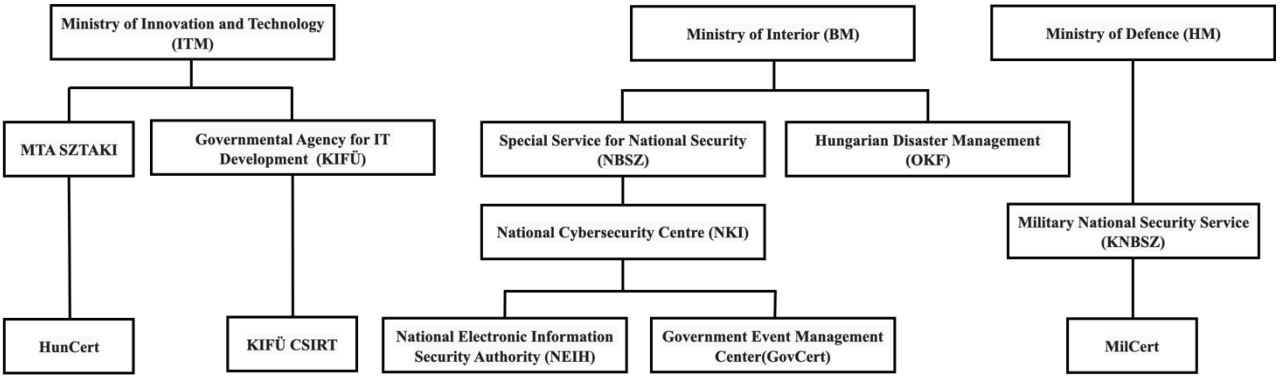

Figure 2: Operational level of Hungarian cyber defence. It was created by the author.

The protection of research institutes and research results is not based on legislation of general application. The 2009/2015 Government Decision[2] placed the research teams and research institutes of the Budapest University of Technology and Economics, the University of Debrecen, the University of Dunaújváros, the University of Pécs and the University of Szeged under national security supervision, but they do not cover the entire Hungarian research sphere. In the case of protected institutions, the National Security Service shall provide security protection against threats from cyberspace in its information security functions and shall require the relevant departments to comply with stricter data protection procedures.

Strict regulations are not common in foreign practice either, but as of 2004 the need to protect higher education IT systems and the creation of legislation can be traced back. Since 2004, the State of California in the United States has been required to report data breaches. Due to the rising number of incidents and the alarming amount of data leaked, a similar law has been put in place in other states of the country within a number of years, which has highlighted the numerous incidents in education systems. Since 2011, such cases have also been reported in Australia, Canada, India, Italy, Pakistan, the United Kingdom, Norway, New Zealand, Belgium, Mexico and Morocco. These cases have predicted the general spread of the notification obligation and made clear the need for regulation.

Australia has recently put its universities squarely in the critical infrastructure category, making it the first to assume its maintenance burden [1].

3. Higher Education's Data Assets, Motivations for Attack and Incidents

Defining cost-effective protection, based on risk analysis, is a fundamental task in the design and development of the protection of any IT system. In doing so, the impact of the damage caused to the operation of the organisation in the event of partial or complete loss or leakage of data content must be recorded in each of the IT systems, as well as the probability of its occurrence. In determining the latter, we can rely on previous incidents, predictions and possible attack motivations.

Intel's cyberattack motivations document lists the motives for IT incidents in 10 groups [7]. These include damage caused by unprofessional treatment, obtaining business and organisational benefits, religious and ideological causes, dissatisfaction, revenge, personal satisfaction, notoriety and dominance.

[2] https://net.jogtar.hu/jogszabaly?docid=A15H2009.KOR&txtreferer=00000003.TXT

Higher education information systems cover three main areas. Their risk analysis should be examined taking into account data assets, motivations and previous incidents.

3.1. Administration

The systems in the administrative area shall support the functioning of the institution. The most important elements are personnel systems (HR, payroll and related systems) and general economic systems (management, finance, procurement, material management and related systems). They are complemented by a number of other information systems, from tendering systems to the target software of technical units providing technical maintenance of buildings to vehicle use accounting. It also includes management information systems or software to assist with various risk analysis.
The economic systems of higher education have been centralised in recent years, and an SAP-based economic system has been developed on the server park of Eötvös Loránd University (ELTE). Central protection of this is not the responsibility of client universities, but local infrastructure and access regulations are. In contrast to centralized systems, most institutions are distrustful. In that case, the full customizability of the professional system, the definition of its scope of functionality and the foundation of other functions on the existing professional system will disappear. In many cases, centralized systems do not allow direct access to the data stored in them, so application programming interfaces (APIs) cannot be created, often as a result of double administration. On the other hand, the development of centralised software relieves the institution of the development and operation of the infrastructure and distributes responsibility between the external operator and the data host. In current practice, the costs of these schemes are a significant financial burden for universities. A software that is mandatory for all universities is supposed to be a well-designed system, including security planning for its entire life cycle. Unfortunately, this is often not the case for isolated, proprietary software designed to solve a task quickly.

Centralisation does not mean data protection. The stored passwords of the computers providing access, the exported data, statements, and possible data backups from them are easily attacked points that are not affected by a strong central protection.

The main motivation for attacks on the administrative areas of the sector is to obtain direct and indirect benefits. Although other motivations are worth considering on a theoretical level, I did not find any Hungarian public practical examples of these. In the USA, however, the perpetrator of the first attack on a higher education institution was motivated by obtaining social security numbers and credit card information.

In most cases, social engineering or phishing techniques are used to obtain economic benefits, in which targeted attacks and whaling techniques against managers have also appeared. Eszterházy Károly University (EKE) was also involved in a series of scams in which attackers used internal information to force employees of the financial office to change the bank account number of one of the recipients of a large amount of regular monthly payments by an administrator in the accounting system. Payments were made to the fraudsters' account from then on.

In 2020, the salaries of staff at several Swiss universities were stolen and transferred to foreign bank accounts with access data cheated by phishing letters [11].

3.2. Education Systems

The most important element of education systems is the administrative study system[3], on which many additional services are built in most institutions. The study system contains not only the personal data of current students, but also the personal data of former students. Hungarian higher education institutions have recently undergone a number of organisational changes in which university faculty have been reallocated to other universities. When migrating data from study systems, redundant data necessarily appears, thus this redundant personal data is fully accessible in multiple systems. Study systems include not only the personal data of students but also of teachers, which, since HR and payroll systems are present in every institution, this information is therefore redundant.

Although the sensitivity of data in a study system is not comparable to that in a hospital system, special data is also included. The scope of data to be stored is defined in the CCIV of 2011 on National Higher Education Act (Nftv.) and related legal regulations, therefore the health data influencing the student's studies and the method of examination have also been recorded (visual or hearing impairment, dyslexia, etc.).

The loss of study systems would be fatal for a higher education institution. In addition to the current educational tasks, it would be impossible to certify previous studies and diplomas, and in the case of some institutions, to show the number of state-supported semesters.

In order to identify the risks related to the study system, it is also worth considering the data of the Higher Education Information System (FIR), which contains the data of the students of 74 Hungarian higher education institutions graduated since 2006. This is regularly updated on the basis of the data provided by the universities, so we can get an idea of the number of students and lecturers involved. The national data announced in January 2021 in the FIR are summarised in the table below:

Total number of students in Hungarian higher education:	1,832,965
Number of students on 14 January 2021:	608,301
Total number of people working in higher education:	69,602
Number of people currently working in higher education:	51,020

Table 1: Number of personal data stored in the FIR. It was created by the author.

The aggregate data of the FIR include those students who have participated in several higher education courses more than once, so it should be interpreted in terms of the amount of personal data and not the number of students. Therefore, at the time of writing this, the EKE study system contains much more personal data than the statement of the FIR, 108,417 students and 5,649 employees.

Among the professional systems supporting education, it is worth highlighting the library, not only because of the personal data stored there, but also because the dissertations and doctoral dissertations prepared in the institution can be found in the university repositories. They are not necessarily public and members of the public may want to obtain them for the purpose of cybercrime.

[3] As of 2017, the study system of all higher education institutions in Hungary is Neptun developed by the SDA.

The main internal motivations for challenging the study system are hacktivism from students, changes in study results or possibly tuition fees [12]. Among the external motivations, the acquisition of a large number of personal data is most likely, although there is also a Hungarian example of an internal attack.

A staff member managing the study system of a Hungarian university committed fraud of approximately EUR 225,000 by manipulating the data of the study system. In some cases, the offender transferred it to her own account after paying the tuition fees and temporarily cancelled the payment obligation for that semester. The offense lasted for nearly eight years, which could have been prevented by requiring the four-eye principle and checking the processes of the system. Her activity was revealed when the financial system was replaced, and the data was migrated. As logs of IT systems were not available for such a long period of time, the evidentiary process encountered serious difficulties.

In 2009, access to the University of Pannonia's study system was distributed by an attacker to some of the Hungarian press. During the investigation of the incident, it was established that the access codes and passwords came from the university's own system. [2].

In July 2020, a new type of operational incident was found at the University of Utah, whose IT system was infected with a ransomware. Unlike in the past, the data was not only simply encrypted, but also stolen by attackers. The blackmail of the university did not end with the purchase of the key needed for the restoration, as they were threatened with the disclosure of the stolen data if the ransom was refused. The university eventually paid the attackers nearly $457,000 to preserve its reputation. This type of extortion appeared in 2020 and has been used by attackers ever since [8].

3.3. Research Data

The volume and quality of so-called intellectual property vary greatly between universities. Research institutes at universities conduct a wide range of research, in many cases in international cooperation. Some of the research results are less useful scientific results in economic life, which can only be obtained by smaller groups. Others are related to economic or national interest. In Hungary, the results of technical and medical research are typical, but last year's COVID-19 research also plays a key role. The already mentioned Government Resolution 2009/2015. ensures the protection of some research groups and research institutes, which strengthens the security of the research results produced there.

Attacks aimed at obtaining research data are therefore in most cases of economic connection, seek to obtain scientific results and the personal data of researchers which can be sold to economic organizations.

In 2012, an error in the IT system of the University of Pécs caused a loss of patient care and the service of students. The case also deserves attention because there was a partial data loss as well [3].

There have been four successful ransomware attacks at EKE since 2013, but just one of those resulted in a loss of research data. The simplest and most effective technical step to protect against extortion was to restrict the transmission of zip attachments in e-mail.

The three areas are not sharply separated, in many cases they operate as data connection paths as a result of local developments. EduRoam, which also operates in the international relations of higher education institutions and public collections and provides unified WiFi access, usually operates on the basis of the institutional directory and, in the case of students, on the basis of the study system. In order to avoid the administration of guest users, 43 Hungarian institutions have joined the EduID[4] federation, which also identifies its users on the basis of the institutions' internal systems. Due to possible name identities, EduID requires additional registration of logged out users, which forces the retention of additional personal data. However, the registration of personal data is not always centralised, in most cases this is not how it works in library systems.

4. IT Incidents in Higher Education

An IT incident is usually defined as a complete or partial loss of an unplanned service in an IT system, or a deterioration in the quality of the service. Their effects are different, in most cases minimal[5]. Incidents that require intervention are usually not the result of a cyber-attack, but of user or operational failure. Therefore, defense design should focus not only on cyber-attacks but also on operational and administrative protection.

The easiest way to determine the extent of a threat is to establish the number of previous incidents and to analyze trends. Data on this is not available in all countries, and for reasons of defense, it is far from certain that the publications are complete. In the US, only three university data breaches were registered in 2004, but the number of data records stolen was 2 million. By 2017, the number of known incidents in higher education had increased significantly, with 187 cases reported in 43 states. However, due to the lack of a reporting obligation in non-US countries, no data was published until 2011. Since then, however, incidents at universities in at least 45 countries have become known [10].

Details of U.S. attacks are also available. EduCAUSE database contains a brief description of 9,015 U.S. incidents between 2005 and 2019. Educational institutions were affected in 848 cases, most of which were from higher education. The cases are divided into eight categories, with numerical summations shown in the table below [9].

[4] https://eduid.hu/en

[5] The basic condition for the safe operation of an SMTP server is that only authorized users can send mail. In the case of a public server, attempts are made almost every few minutes to find out passwords. This increases the load on mail servers, resulting in slower response times, effectively depleting the definition of incident.

#	Type of breach	Incidents
1.	Fraud Involving Debit and Credit Cards not via Hacking (skimming devices at point-of-service terminals, etc.).	1
2.	Hacked by an Outside Party or Infected by Malware.	290
3.	Insider (employee, contractor or customer).	26
4.	Physical (paper documents that are lost, discarded or stolen).	61
5.	Portable Device (lost, discarded or stolen laptop, PDA, smartphone, memory stick, CDs, hard drive, data tape, etc.).	138
6.	Stationary Computer Loss (lost, inappropriately accessed, discarded or stolen computer or server not designed for mobility).	48
7.	Unintended Disclosure Not Involving Hacking, Intentional Breach or Physical Loss.	239
8.	Unknown.	45

Table 2: IT incidents affecting educational institutions in the US, 2005-2019. Based on [9] it was created by the author.

Attacks from cyberspace are the most difficult to defend against. This and other data leaks for unknown reasons, account for 40% of all cases. Thus, more than half of the cases could presumably have been reduced by administrative measures.

So far, I have not been able to find a complete numerical summary of the IT incidents in educational institutions in Hungary, the main reason for which is the lack of reported notifications despite the obligation. Statistics published by the Ministry of the Interior can provide data for the numerical investigation of attacks against IT systems [6.] It contains data on a total of 407,067 crimes between 2018 and 2020. Only 2% of this, 8,892 cases, were connected to information systems[7], but it is not known how many of these were directed against higher education institutions. Therefore, the analysis of international data rather warns that higher education institutions should also pay special attention to the protection of their IT systems.

5. Current State of Higher Education

In the IT field of higher education, there has not been the same development as in the economic sector. The infrastructure of the institutions are very different, IT devices used are selected on the basis of the existing knowledge and skills of the IT staff. The modernisation of higher value assets is possible only in the framework of grants as the budget cannot cover their costs. As a result, many institutions have outdated IT tools, and long-term end-of-life network equipment and servers are not uncommon and cannot be replaced by institutions. The grant funds can be used only for the development of one sub-area, not for the central elements of outstanding importance for the whole institution. The poor financial situation is further aggravated by the public procurement obligation, which makes it difficult to select and procure the necessary assets on a number of points. The range of products available there is limited, it is not always possible to procure elements that fit into an existing system, which is why it is common for solutions to be found along trade-offs.

The IT organisations of Hungarian higher education institutions are mostly independent islands as there is hardly any organised professional relationship between them and they do not form a formal

[6] https://bsr.bm.hu/Document

[7] Types of offenses: fraud using an information system, breach of an information system or data, and circumvention of a technical measure to ensure the protection of an information system.

organisation. The HBONE Workshop, organized by KIFÜ and its predecessors, is perhaps the only event organized for the IT staff of higher education institutions and provides an opportunity to exchange information and share experiences. As a consequence, there is no forum through which the flow of information can be solved, in which the unification of defense experiences, good practices and IT tools can be shared.

There is no database known about sector incidents that would provide co-institutions with information on individual cases and trends.

Universities carry out their IT security tasks under their own authority, which is usually designed and developed by the head of operations. In day-to-day operations, availability is the most visible task and maintaining confidentiality and integrity requires less operational work. The large amount of data managed, the many different systems, the conversion and conversion constraints required by frequent reorganizations, and software limited to public procurement make it very difficult to manage them securely. Highly skilled professionals are paid much more at economic organizations, so they prefer to work there. Therefore, it is difficult to employ a good specialist in higher education and as a result the IT departments are small, their staff is overburdened and their replacement is problematic. It is not uncommon that one would have no applicants for a job post.

The protection of personal data is the responsibility not only of IT teams but also of data handlers. A significant proportion of incidents are the result of improper data management, lost media, lack of knowledge of rules, or e-mails sent to the wrong location. Data owners do not always understand the internal operation of their own system, the scope of access rights, nor is it common for all outgoing worker's access to be deleted immediately from all systems.

As a result of COVID-19, in spring 2020 higher education institutions had a week to develop a methodology and tools for virtual education and conditions for working from home. In such a short time, only those institutions that had already started this preparation, and during this period had organizational and minimal technical tasks, were able to meet this deadline. During this period, information security and data protection considerations became secondary because the focus was placed by all operators on completing the task on time. During this time, security aspects have temporarily become secondary. Immediate start-up of the home office has caused serious information security problems. Completely unknown, in many cases non-university-owned, and thus uncontrolled home IT devices accessed internal systems behind firewalls via vpn connections or ssh tunnels. Inadequate security settings for clients used by the whole family, illegal software running on them, torrented applications, and infection hotspots created by cracks caused difficult moments for administrators.

Policies relating to IT systems are also prepared on their own authority. Some universities have developed them in the spirit of Act L of 2013, but there are no legal requirements in this regard either. Leaders of the largest universities, on the other hand, know and apply this when designing their own regulations. The person responsible for information security (if any) is often the IT manager, which would be incompatible in the public sector. There are no precise rules for the protection of systems, no official controls are in place, and although the GDPR requires the reporting of incidents involving IT systems to the NAIH, in my view this is only partially the case in practice. Overall, it can be said that the IT systems and processes of Hungarian higher education institutions are not limited by any legal regulations, apart from some general regulations, each institution develops them according to their own ability.

6. Conclusions

Lost data in a system, albeit at a high cost, can usually be replaced. However, damage caused by data leakage cannot be fixed. Some personal and health data cannot be pulled back and will remain public forever. The events of data theft no longer a surprise to anyone as there are a number of such cases almost every day.

However, if we compare the amount and sensitivity of the data processed in Hungarian higher education institutions with the local government of a small settlement, the difference between them is obvious. It is inconsistent that a small municipality is still subject to Act L of 2013, while this is not the case for universities.

Although the freedom of higher education is an important aspect, stricter regulation of the operation of IT systems is inevitable. The already mentioned international tendencies seem to confirm this assumption and it is expected that the Hungarian legal system must follow them as well.

However, change requires significant financial resources. Compliance with the law can only be ensured with the right professionals and the right equipment.

Both the EU and the US cyber defense systems are based on cooperation between member states. Following this example, the establishment of a common IT strategy would greatly improve the operation of the higher education sector, which covers almost a tenth of Hungary's population. This could unify the IT units of the institutions, implement uniform regulations and bring the currently highly heterogeneous systems closer together. The problem of isolation could be solved and standards could be set that could be developed in all institutions.

A clear management structure should be established for this, along with real responsibilities, and the professional support that had been available to Hungarian universities in previous years should be restored. A formal organization should be put in place to ensure a rapid exchange of information and response between operators in the event of incidents involving partner institutions. A Hungarian university CSIRT service could operate on the Dutch model[8].

Professional training, factsheets, forecasts and analyses are essential. Operators need to know actual cybercriminal motivations and hacking tools. The IT systems of the institutions should be designed to support the long-term conduct of forensic investigations and measures should be put in place to prevent attacks.

A system for educating and informing users on a regular basis needs to be set up. Recovery and penetration tests of critical systems should be performed at regular intervals.

These changes would greatly help institution leaders to operate well-regulated, incident-ready IT units at higher levels of protection and service in institutions.

Act L of 2013 and the related implementing regulation provide a framework that puts the operation of IT systems at a higher level of security. It provides help on specific points in a number of ways and clarifies the minimum level of tasks to be performed. International processes are already predicting the need for protection, which has led to an increase in the number of known incidents. A

[8] The Dutch university CSIRT provider, SURFnet-CERT, is available at http://cert.surfnet.nl/.

well-functioning legal background is available, it just waits to be applied. Thus, I consider it necessary that 2013 / L. extend the scope of the law to Hungarian universities and research institutes, regardless of whether they are funded by state, foundation or church.

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NEW DEGREE TRACKING METHODS IN HUNGARY

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Abstract
According to the Zoltan Magyary Program for the Development of Public Administration in 2012 the institution of civil servants' training and further training has started, called the National University of Public Service (NUPS). The mid-term vision of the Institutional Development Plan is to make NUPS: a solid training and research base of the development of Hungarian public service and of public service career model It is important for NUPS how develops the feedback of its graduates on the academic years. Within the framework of the Graduate Career Tracking System (GCTS), research is carried out via questionnaires, whose completion is voluntary, among the current students and alumni with a degree no more than 5 years old. One of the purposes of the GCTS is to improve the University's standards of service and education. The willingness of respondents is low from year to year, so the result of the questionnaire is lower than expected.

The purpose of the study is to present a method to better track the opinions, experiences and placement parameters of graduate students. This new method helps to evaluate the results of the questionnaire more widely. this will allow the university to develop the institution more effectively.

1. Introduction

Making data driven decisions in higher education is getting more and more important for the Hungarian educational policy, the boards of trustees, the present and former university or college students and all the affected participants in the tertiary education, so it is highly important for them to get proper feedback about the performance of each institution.

The aim of the present study is to present an effective method which is able to track the opinion, experience and job prospects of graduate students. This new method helps to evaluate the results of the questionnaire in a broader way which enables the institution to improve more effectively.

2. The presentation of the Central System for Tracking Graduates' Careers

First, it is important to make the notion of career tracking clear: every activity – a method, a process, a survey – is considered to be a tracking for career which gathers information based on definite topics about the labour market integration of university graduates and their carreer paths in the long run, in a shorter period or occassionally. The reference topics are typically the labour market relations, the quality of the educational process and the identification of the social-demographic background.

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According to the study „Suggestion for International Carreer Tracking", GCTS covers the following fields:

- graduates' success on the labour market
- integration of graduates in the labour market
- characteristics of graduates on the labour market
- utilization of tertiary studies
- evaluation of institutions
- subjective factors, e.g. job satisfaction
- personal and professional competences and
- essential competences for working.[1]

Among the aims of forming GTCS the emphasis is on the followings:

- applicants must have information about the perspectives on the labour market after graduation
- the institutions must have relevant information for departmental strategy formulation about the job and carreer opportunities of graduates
- the institutions must gain an accurate picture of the carreer pathes of their graduates so as to get continuos feedback on the quality of their trainings.[2]

The career tracking inquiries are based on the process above; besides primary sources with questionnaires, they try to connect different administrative databases in order to get a comprehensive picture about the active and graduated students in the tertiary education.[2]

2.1. Carreer path tracking experiences of foreign countries

Career path tracking is a fairly new field although in many countries it has already had a tradition in the past decades. These kinds of investigation have been conducted since the 1970s in North-America and Western Europe but you can find some more examples in other parts of the world, too.[3]

Some international and national rankings give suggestions to define the efficiency of tertiary education institutions on an objective basis, although this methodology is criticized by researchers. . (Altbach, 2006; Fábri, 2008, 2010 2013; Margison – Van der Wende, 2007; Rauhvargers, 2011; Van der Wende, 2008). Raugvargers suggests 13 ranking methodologies but only some of them are mentioned here: Times Higher Education Word University Rankings; the Academic Ranking of World Universities from Sanghai; The QS Word University Ranking; the Webometrics; the Universitas 21 but there is a need for a more practical system on the European level which can be ensured by the U-Map project supported by the European Union.

The lack of comparable international data is a challange for the U-Map. The European Commission and the Eurostat has launched a data collection method which makes the comparison of universities possible thoughout Europe. Until it develops the U-Map can rely on the national data, consequently it can make comparisions on the national level. [3]

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[2] Integrated Administration Database (henceforth ÁAI), which is also supported by the Hungarian education politics can be mentioned in connection with the latter. It enables us to find the necessary information about the university students as the database is responsible for combining the incoming data from each institution, so we can see and handle the objective information as a part of a whole system. In the present study I do not investigate this initiative which is more recent than the GCTS.

[3] In this study I do not discuss the history of tracking graduates' career. I prefer to focus on the tracking process from the 2010s.

By international surveys we usually mean the researches on the territory of the European Union or the ones required by the European Commission. The European Union puts an emphasis on forming a unified and switchable university system. To reach this goal and to support educational decision making, some informative analysis were made in the international surveys. The number of the cooperative countries has expanded, almost all the EU countries or European countries take part in the researches. The oldest regular observation is EUROSTUDENT, which assesses the social and educational status of students in the tertiary education. It helps researchers with grouping students and understanding factors behind different educational systems. By now 30 countries of the internationalisation network take part in the process.

Although initially the analysis of the labour market was in focus but later the emphasis has been put on its expectations. CHEERS asked graduates from the side of higher education, the core of the feedback was definitely the tertiary education. REFLEX is the first one where labour market is in the focus, namely whether university studies are able to ensure the vital knowledge, competence and skill-developing expectations of the job market. In HEGESCO (2008) the question of essential competencies is even more emphasized. [4]

In the non-European countries the system is mostly financed by the governments (even if the executive is a nonprofit organization), consequently their interests are detectable in the surveys. Online researches are applied in most cases as the cheapest, fastest and easiest solution but parallel to this the response rate is lower.

In the North-American countries and in New-Zealand carreer tracking has some decade long practice, so they are financed by the state, based on representative samples and on choosing cohorts. The data is available on the websites of the research institutions and universities get it for further analysis. In American countries the alumni system and the contact with the graduates means a significant financial power for the institutions.

Australia, Chile, South-America built up the presentation of their results and the feedback in a way that they can be attached to the data required by the interests of higher education. The Emirates, South-Africa, Philipines, Malaysia, Oceania and Singapore have one or two-decade long practice but on the level of the governmental decision making there is a need for data so they strongly influence the territories included in the survey. [5]

The international practice results are used in more ways: stakeholders are informed by them, university applicants are attracted by them; marketing goals, education development, quality assurance, strategy-planning in the institutions, supporting the decision are all benefits. What is more, it has also advantages on the governmental level, e.g. forming the supply of trainings, supporting financial decision making or the data of GCTS can be applied by employers, too.

Although in most cases we cannot see any payment for responding, the rate of participation is usually high. It is partly the result of the former good relationship with the institution: respondents share their opinion just to help us. On the other hand, the participant is glad to be asked to evalute the institution. Thirdly we can see solutions where there is no financial reward but respondents get some kind of value, e.g. access to an integrated search database or supplier package. [4]

In the North-European practice the willingness of participation is higher because the legitim central statistical office of repute interviews the graduates. The study of Education Kft. highlights that in the British and Irish GCTS model the attitude of students differ from Hungarians and it reflects in

higher respond rates. It is noted that „they do not respond the questions because it is compulsory but because they feel its benefits, even at their personal level." The strong bond to the universities and colleges and their reputation gives the basis of the successful research.

These are all factors which are worth to integrate into the Hungarian practice.

2.2. Carreer path tracking experiences in Hungary

The legal conditions of the Hungarian graduate career tracking system was laid down in the Act CXXXIX of 2005 on Higher Education [7] which was reinforced by the Act CCIV of 2011 on Higher Education (henceforth *Nftv*), so that is why this survey is reffered to be relatively new.

Until 2019 the mandatory institutional data supply was conducted with a standardized questionnaire and methodology, volunteerly filled online among those alumni students who got their pre-degree certificate in one, three and five years. [2] Later the GCTS was renewed and since then students are asked to fill out the questionnaires who finished their studies in one and five years. Furthermore, the concept of the questions was also changed radically compared to those of the previous years.[4]

The model of the Hungarian GCTS has two levels:

- the institutions collect data and ensure data suppy which provides the basis of different analyes at the institutional level
- a central institution – up until the end of 2015 it was the Educatio Kft, its assign is the Ministry of Education- which collects and processes the information at the national level; then later it makes statistics and analyses based on them and finally the results are announced. [2]

The exact topic, due date, frequency, method and the methodology of the data supply as well as the questionnaire based on the act is announced by the minister on the website of the ministry. The results and consequences of the career tracking must be published on the website of the university in a form of a concise summary and a full length study.

Although the law does not list the nonmandatory tasks of the institutions, but the extension of the standardized questionnaire with special institution and profession-specific questions as well as submitting the institutional GCTS database for projects and enquirers are considered to be two of them.

One of the biggest challenges of the Hungarian carreer tracking is the low and decreasing rate of response. One of the reasons is that as many of the potential respondents are not available at their contacts, consequently they cannot be informed about the survey. The other reason is the low willingness to respond, that is graduates do not see their interest in filling long forms. There are more possibilities for gaining the number of respondents:

A study by the State Audit Office „ A study on defining the focus fields and aspects of state audits in governmental actions towards gaining competitive knowledge and their use" suggests inventing the mandatory response of graduates. However the specialists note that in order to create a motivating environment, the aim of the research must be clear to the respondents: the development

[4] an international cooperation, a reflex project

of educational quality, the assurance of the practical use of the degrees, carreer advices and presenting possibilities in further education.
According to the study of the State Audit Office, techniques aiming the higher response rate (e.g. multiple requests, phone requests, financial and non-financial incentives) cannot be sufficient. It notes that empowering loyalty is important primarily for universitites as the good relationship with former students provides lots of advantages for the institution.

2.3. A report on the GCTS at University of Public Service

Under the law of Nftv the establishment of GCTS was started in 2010 at the university, which meant a new challenge as the university had been formed with the fusion of three predeccesors. The institution considers it important to know its students' and graduates' opinion, motivation and experience along with maintaining relationship in order to meet the requirements of both the labour market and that of the students. [6]

Just like in the national trend, the process of career tracking was completed between 2013 and 2018 among the students who got their pre-degree certificate in one, three and five years based on the regulations of tertiary education. During this period in order to enhance the willingness of respond a letter was attached to the link of of the questionnaire and weekly follow-up e-mails were also sent. Between 2013 and 2016 even a giveaway was promoted.[5]

As a general consequence we can say that filling in the questionnaires was difficult partly because of the partial lack of the e-mail adresses and on the other hand the low level of willingness in taking part in the survey. The poor quantity of response was predictable because the results of prior monitoring processes were similar to this one. (In 2012 488 people, in 2013 400, in 2014 451, in 2015 416, in 2016 585, in 2017 696, in 2018 571 and in 2019 440 people filled in the questionnaire.) Furthermore, many e-mail adresses were missing. The willingness of participation in the survey is between 9 and 11 % of the questionnaires sent out. (See the chart below)

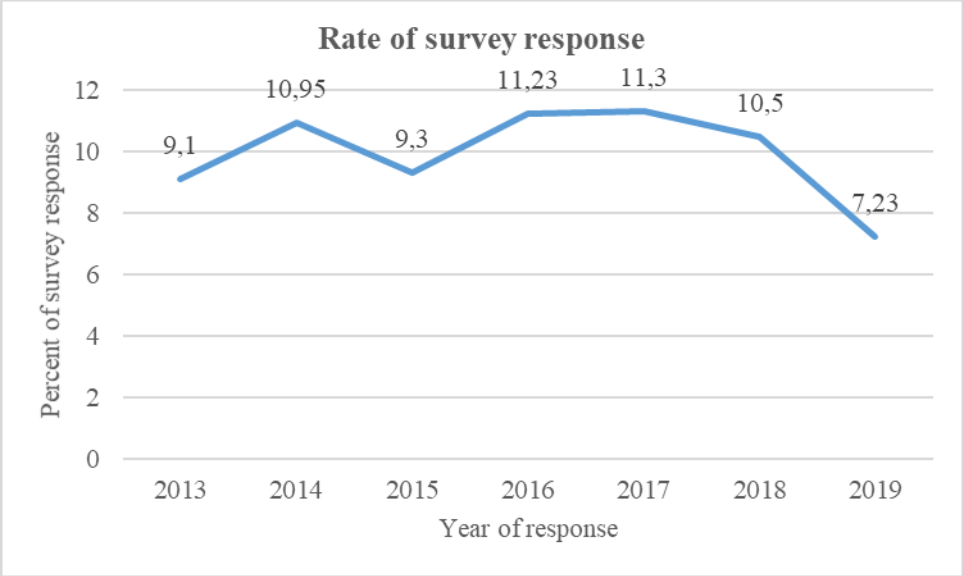

Chart 1:The rate of survey response at UPS[6]

[5] Career tracking investigation at University of Public Service between 2013-2016.
[6] Self-edited based on career tracking investigation at University of Public Service between 2013-2016.

Although after 2016 until the renewal of the GCTS the survey response rate reached 10 per cent, the answers cannot be considered to be representative because it can be referred to the population which sent the questionnaires back. The low number of response does not solely a characteristic of UPS it can clearly be seen that the survey is filled out mostly by the highly satisfied and the higly unsatisfied.[7] GCTS monitoring make it possible at the same time to measure different topics, such as the competences, skills and abilites of graduates; based on their opinions valuable insight is offered about their connection with the labour market and their chances of successful employment. The results of the survey and the analyis of the data can provide valuable information for those connected with University of Public Service. That is why it is worth to reconsider the operation of the system. [8]

3. Mobile applications in the career tracking system

As a consequence of the detailed correlation, it is worth to examine if a more effective method for career tracking exists. With the spread of mobile phones, people's needs have changed. It has become essential for them to get every kind of information in real time and the most suitable marketing tool for this is a mobile application. People spend more and more time with their mobile applications: while in 2015 this number was 2.1 hours, in 2019 phone usage was one hour longer: 3.1 hours. [9]

Why are mobile applications good and how could they be worthy in career tracking?

If we take the approach of the business side, it can be seen that the latest generation does not choose the Google search engine, they search in the application stores. Because of this we can say that if a company has a mobile application, it can be found easily in the search networks. A good-quality application provides such a good experience that the user will remember the brand name and services of the provider much longer. Why is it important in business life? Because it speeds up the growth, improves the quality of relationship and communication; it can provoke cooperative activity so closer relationship can be established. Mobile applications are the most effective marketing tools in the business sector to increase takings these days.

According to Comscore statisctics 87% of mobile usage take place on applications compared to the same rate on web search engine which is only 13%. [10] How can we establish closer links with mobile applications and how can they be used in career tracking? (see chart)

We must remember that applications work mostly among youngsters as they prefer them. Apps are really popular in the 18-44 age range. [8]

As I have already mentioned above, those students are asked to fill out the questionnaires who finished their studies in one and five years, so vast majority of the respondents are from that reference group.

[7] According to the institutional GCTS representatives one of the most challenging problem of GCTS in Hungary is the low and descending tendency of respondent rate, stated by Nyüsti-Veroszta.

Advantages of applications in business	*Advantages of applications in GCTS*
direct shopping on the way is possible	*It would make responding possible on the way. While it is a characteristic of surveys that blocks of questions and the questions themselves are built on each other, it is not possible to return to previous questions and the questionnaire does not let the respondent to go on the next section unless all points are answered. Meanwhile the application enables us to return to the question where we stopped or to switch to another question block.*
Push message sending encourages the user to act immediately. As a result of the immediate push messages, 70% of customers can be activated and it is 14 times more likely that they would purchase. These marketing tools are at the company's service for free.	*By sending a push message the user would be encouraged to act immediately. This way the willingness of respond could be improved.* *Email has been used to attract former students's attention to the survey. Students have to open their mailbox to do this. The downloaded application keeps sending messages which can be seen on the phone screen immediately, there is no need to enter the app.*
Useful tools are available on one platform (e.g. calculators, blog, social media, e-mail collection, QR coupons)	*Some useful tools could be added to the questionnaire function: reports, relations, calculators could be reached from one platform so that the user would get confirmation. With an extension like this, the actual results could be seen in the app.*
Marketing tools to establish customer loyalty (e.g. coupons, discounts, giveaways). Mobile applications contain more kinds of loyalty tools, they can be activated anytime and they are never left at home. Offers can be targeted both at everybody and a target group (e.g.GEO offence).	*Customer loyalty tools could be used as it is likely to increase the number of respondents. There are some institutions where they are already used.*[8] *At this point adapting the foreign practises would be favourable: e.g. providing access to certain services of the institution or a discount in taking part in a university course after filling in the right amount of questionnaires.*
By setting up exclusive content a unique field of interest can be established.	*By setting up exclusive content a unique field of interest can be established. Alumni system.*

Chart 2: Comparing advantages of applications in business and in GCTS[9]

[8] Based on reports of State Audit Office of Hungary, seven institutions introduced incentives in the form of gifts for respondents

[9] self-edited

In order to track career starter graduates, we have to discuss the basics of application making.

1. *What is the main aim of creating an app? What problem is it intended to solve? What utility does it have for the user? Why do users want to download it?*

   The aim of the application would be to substitute the questionnaires of GCTS with the app. Moreover the app could be expanded with the combination of data collected by the different institutions. The questions would still be from the institutional GCTS online survey's question [11] bank but it would worth altering: the questionnaire consists of four blocks where the first one is about the studies. The first four questions of the thirteen reflecting on the previous studies are irrelevant because the Neptun /ETR system contains them. This information has been given by the university so as to provide their validity. The next block refers to the courses finished after graduation – if there is any. The questions are about the necessary motivation in finishing a course; the connection between the course and the employer; the relationship between the present and former studies are examined. The block can be shortened down to 20 questions if the respondent did not finish a course after graduation. The 12 questions of the third block refer to the respondent's status on the labour market while the fourth block ask for personal data. The users would be universities who could reach more people with their questions. By analysing the responds, institutional development would become more effective. The app would also solve the problem of the missing or non-existing email adresses and it would also help forming an Alumni system.

2. *Who is an ideal user?*

   The potential target group of the app would be the same as the respondents of the GCTS. It is a possible risk that only a smaller part of the target group would use the application. Its reason may be that not all the members of the group is an experienced mobile user. A larger target group can be reached when the app is simple to use as long questionnaires also may discourage the reader from filling out the forms. With the app the rate of the responds could be higher. By building in sales promotion tools, such as PR materials, pens, diaries or discounts on tuition fees can be motivating for the target group.

3. *Is a website unsuitable for this aim?*

   Functionality, problem solving and marketing are those small details that define whether an application is needed or not. A mobile application should be compared to an existing website in order to see its real utility. But if the user can solve everything on the website, it is unnecessary to use an application. [8] Data can be analysed with the GCTS questionnaires and the results can be sent via email or it can be downloaded by the respondents but the application can offer more and this is the key of success. It makes possible to ask students about their positive experiences which can strengthten the goodwill of the university. This is one of the best ways to communicate about students' satisfaction. We can ask for proofs of their opinions, e.g. videos, pictures or other content.[9] There are no functions like this in the questionnaire.

4. Is there a similar solution on the market? Who can be rivals?

When you search for mobile applications, you can find different applications and survey apps but none of them are in connection with students' career tracking.[10] That is why a new career tracking app would be a unique option to develop based on other survey programmes. While an average app is available and downloadable for anybody, the career tracker should not be open for everybody. The app must be attached to universities because according to some researches it is the institutions' task to ensure commitment; plus the results of GCTS are also applied by them as they can complete the questionnaires provided by the Ministry of Education with their own questions. In my opinion, a basic application containing the mandatory questions of the ministry would be enough and the institutions could add their own questions to them. The logo of the institution could help with the searching process as the user could identify the college or university. To limit the number of respondents and to control them, entering the former students' ETR or Neptun code could be the solution. As this code is registered and attached to students in the institutions, the system could allow the response only for those who finished their studies in the reference year. At this point the question of anonymity may rise. Up until now it has been ensured while filling in a form. The institutions could choose which anonymity they prefer in the questionnaires: the research methodology type one is when every respondent receives a password-generated survey which is unique in the sense that it independently exists without bonding it to a person. In this case the IT anonymity means that questionnaires are not generated in advance, but with a help of a link the respondent can reach and fill in the survey. It is clear that passwords have been used to fill in forms, so the app could ensure privacy by using the Neptun /ETR code but it enables tracking filling the forms. In this case the applicant cannot be attached to any filled questionnaire.

5. Which strategy is suitable for spreading the application? How can the periodic maintenance and updates be solved?

User tests are really helpful to make the user experience better and to meet the needs of the target group. In business life it often happens that application owners focus on getting new users only and push aside communication and keeping in touch with them. Although it it true that users do not like to be bombed with push messages constantly, sometimes it is advisable to send messages for them to maintain the connection. Searching for new graduated students is unnecessary, it is done by the institution every year. As the application can create closer relationship than a questionnaire so practically an alumni system would be formed. Maintenance and updates would be solved by the institutions.

As we can see from the relations above, the idea of a mobile application in the career tracking could work. However, the way towards creating an app like this raises some questions, too. Before developing the software, we should conduct a market research among the future target group of GCTS, as the size and the characteristics of the group and their demands. The assessment of recent results in the tracking system could also give help to know them better. I think a simple and easy usage should be combined with an eye-catching appearance in order to make the appearance more popular among users. [10]

[10] With English search words

4. Summary

Higher education institutions have recently discovered the significance of following their graduates: they can see a clearer picture of their former students' performance on the labour market and it may also play a role in institutional development. What is more, good results can mean a competitive advantage for the institution when students' make their educational choice.

It would be vital for the institutions to get more precise results as carreer tracking of graduates with a central question block is codified. During the last ten years the results of questionnaires have already proved that online survey is not successful, as respondents do not get the questionnaires and they are not motivated. Technological development in our everyday lives also suggests that we should rethink the old methodology and form it to a modern technological environment. It would seem that carreer tracking system adapted to a mobile application could reach more graduated people and the institutions would get better results. This technological development would give a more realistic picture of the job market and the chances of graduates on it. Employees and companies could also have a clearer picture about the skills and knowledge of a young graduate of a certain faculty. Last but not least universities and colleges can learn from the more exact results: the answers may encourage the institutions to adapt to the expectations of the labour market; to keep in touch with their graduates and to develop their institutions more effectively.

Since the execution of the Central System for Tracking Graduates' Careers in 2010 the results have been called into question: how good the results are and how much reliable are those answers to make decisions based on them. In 2017 the verified system was developed and as a result the rate of survey response dropped by 2019. Knowing and applying the opportunities lying in the technological innovations should be taken into consideration soon by the Ministry of Education and the institutions.

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NETWORK SECURITY THREATS TO HIGHER EDUCATION INSTITUTIONS

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Abstract
The Covid-19 pandemic has significantly changed the way higher education institutions (HEIs) operate around the world. Distance learning has become the unique opportunity that the process further education in conditions where most economic activities were put on hold. To ensure the quality of distance learning have been implemented and used extensively online learning platforms, applications, video conferencing and cloud computing facilities in HEIs. However, this has increased the threats to information security, so that in 2020, in the field of education in general, and HEIs in particular, the number of cyber-attacks has increased, which has led to significant financial losses but also to activity interruption and theft of personal data or intellectual property. In order to identify the biggest threats of the 2020 year, for HEIs, several security reports and scientific articles related to the studied field were analyzed, in order to identify the most common security threats. As a result, of the research conducted, the top Cyber threats of HEIs are: malware attacks, DoS / DDos attacks and phishing attacks. Securing university networks in 2020 was a challenge for specialists in this field.

1. Introduction

The 2020 year has been a real challenge for the whole world. The impact of the pandemic with Covid-19 on the field of Education was strong, the studies that until yesterday, took place in the auditoriums and classes, migrated this year in the virtual classes and online conferences. Higher education institutions are no exception, so the vast majority of institutions have continued to operate online. This decision was made by most institutions around the world to stop the spread of the virus.

The Covid-19 pandemic was a real test for digital educational resources, because no one expected such a big traffic explosion in such a short time.

Thus, modern information technologies have been widely implemented, replacing the classic hours, which until recently took place offline. Technologies such as: video conferencing applications, online learning platforms, websites and Cloud Computing (CC); have been used extensively and, according to the latest research conducted by 2023, the online education market will grow by an average of 16.4% annually [16]. Both students and university staff had to adapt to new conditions to ensure the continuity of education.

Online education has led to a substantial increase in cyber-attacks, in 2020 the education domain had a loss of $ 3.90 million for data breach, according to IBM & Ponemon Institute [14], which conducts cybersecurity research. Referring to another study realized by CheckPoint [3], a leading provider of cyber security solutions to governments and corporations globally and in Europe too,

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the average number of weekly cyber-attacks per academic organization in July-August 2020, increased by 24%. In contrast, the overall increase in the number of attacks in all sectors in Europe was only 9%.

The need to configure the new applications, used for distance learning, as optimal as possible in terms of information security, but also to ensure that students' home networks meet minimum security requirements, has become in the new reality a mandatory condition for ensure the availability, confidentiality and integrity of information conveyed.

This article will analyze and expose cybersecurity research data, which will reflect relevant security threats to higher education institutions, based on several 2020 reports submitted by companies such as: IBM & Ponemon Institute, Kaspersky, VMware, CheckPoint, Barracuda, Datanyze, ISO, Jisc; but also scientific articles published in international journals: Procedia Computer Science, Journal of Computer and System Sciences, IEEE Transactions on Professional Communication, Network Security, Computers & Security, etc.

The purpose of the analysis is to demonstrate that cyber security threats in higher education institutions have increased due to online activity, in 2020. The use of online learning platforms, video conferencing applications, centralized storage resources in university networks and intense email communication have created new vectors of attack to gain unauthorized access to the university network.

2. Background

HEIs are targeted by cyber-attacks because of the information they hold. Information that is of interest for attackers are:

- *Intellectual property*, in particular institutions that have conducted studies for the development of a vaccine against Covid-19 or various studies in this field. As with many institutions in the UK, which, according to a study by VMWare, who did research to explore the extent of cyber-attacks and the implementation of the IT security standard within HEIs in UK, at least 25% of universities have suffered intellectual property theft [17].
- *Personal data* of students, including dissertation materials, but also exam results, according to the same study [17], 43% of institutions experienced.
- *Research data* also represents a major vulnerability, about 28% of institutions have such experience.

The new challenges of 2020 are due to the vulnerabilities video conferencing applications and online learning platforms. An increased interest was the availability of network services and access to data, the aim being to interrupt the university activity and block the access to resources of authorized users such as students or employees.

3. Network threats in HEIs

To argue that the distance study had the effect of increasing cyber threats in HEIs in 2020, several security reports provided by world-renowned companies or the Governments of specific countries were analyzed.

According to the report by IBM & Ponemon Institute [14], the main types of compromised registrations in 2020 are personal information (80%), which averaged a loss of $150 per record and intellectual property (32%) with a loss of $ 147 per record. If we analyze the percentage change in the average total cost for compromised data, in Europe, the Scandinavian countries recorded the highest increase (12.8%) in 2020 compared to 2019, followed by the United Kingdom (4.4%). Negative trends are recorded in Germany (-4.7%) and France (-5.2%).

As stated above, these data are specific to HEIs, personal data of students and employees and of course intellectual property, which as reported, were the most targeted data by cyber attackers. Which influenced cyber attackers' interest in HEIs.

Attack vectors are the methods or ways selected by hackers to access a network. The basic attack vectors in HEIs are:

- Compromised credentials are the most common and costly vector of attack, common to other industries, but also to education, which has been identified in 43% of cases in this area in 2020 [17]. The hackers' interest in HEIs is to steal databases containing student credentials, and then provide this data to darknet organizations, or more recently, use it to initiate phishing attacks, which appear to come from within HEIs.
- Cloud misconfiguration has the same weight, especially since a large part of organizations use the cloud intensively in its activity, to minimize equipment and maintenance costs. Using CC, HEIs are able to organize virtual laboratories and simulation environments for the practical activity of students or provide online platforms for study and access to educational resources. But improper CC configuration, increase university network vulnerabilities.
- The vulnerability of third-party software, in 2020, registered a rather significant increase and represents the third attack vector used by hackers. All applications that have been used by HEIs for online study have significant vulnerabilities. If you consider video conferencing applications in Europe, the applications used are shown in table 1, as shown by Datanyze [4], world leader in technography.

Ranking	Technology	Domains	Market Share
1	Zoom	30583	36,15%
2	GoToWebinar	18486	21,85%
3	Cisco Webex	14628	17,29%

Table 1: Use of VCs in Europe

Other vulnerabilities related to third party software are the vulnerabilities of online platforms, widely used by HEIs during the epidemic, for sharing courses content, but also, for online exams. On this segment, leader in Europe, is the platform Moodle (65%), Blackboard (12%), Ilias (4%) and Sakai (3%) [10].

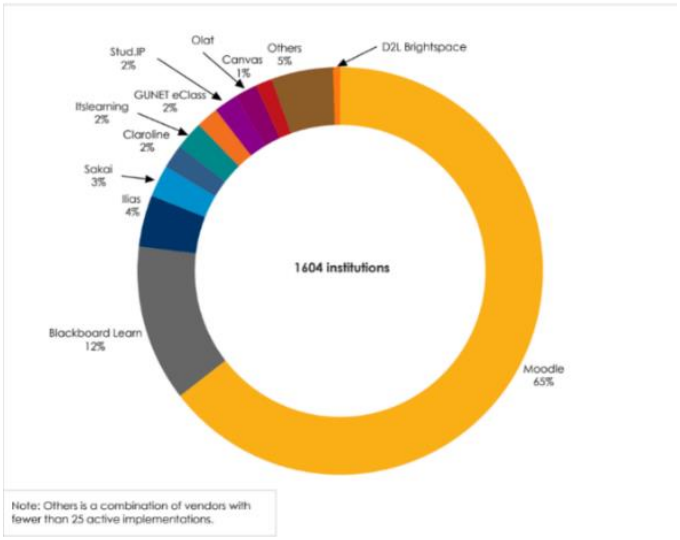

Figure 1: LMSs Distribution Percentage of European HEIs [10]

Learning platforms have several technical and human vulnerabilities, so that the number of vulnerabilities officially discovered and included in the CVE list [11], of the most used learning platforms is more than 400.

In 2020, the number of users who encountered various threats related to online learning platforms and video conferencing applications increased by 20455% [8]. It can be demonstrated by analyzing the data collected in January-June 2019 (left figure) versus January-June 2020 (right figure).

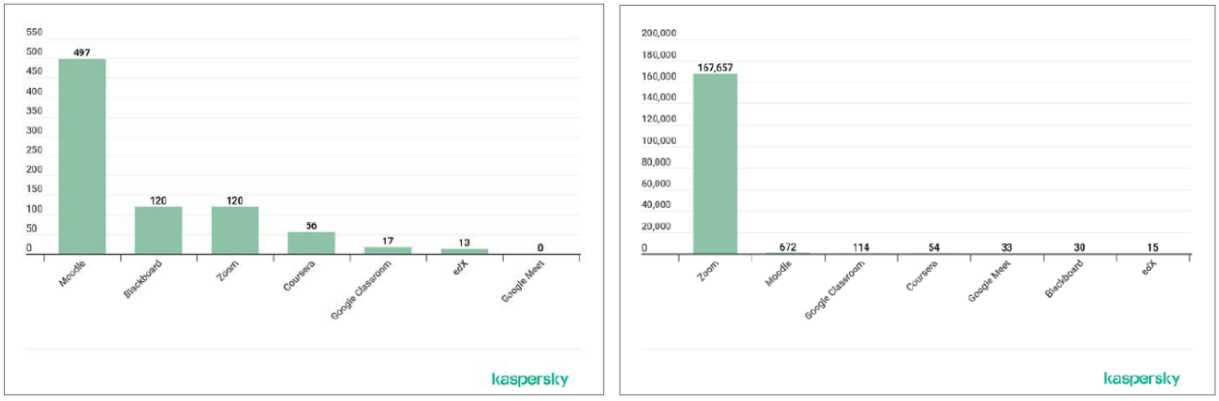

Figure 2: Number of unique users who encountered threats, related to online learning platforms/video conferencing platforms, January-June 2019 versus January-June 2020 [8]

Thus, it can be seen that the number of unique users who encountered threats in 2019 was 820, and in the same period in 2020 it was 168,550. Top 3 most targeted platforms being: Zoom, Moodle and Google Classroom. It can be seen that Zoom was the most vulnerable platform, which can be explained by the popularity of Zoom, which in April 2020, had 300M daily participants in the meeting. The more users download and use the platform, the more interest it has for hackers who want to attack it.

It can therefore be said that the number of cyber threats in HEIs has increased substantially in 2020, due to the distance study that allowed the continuity of the education process in HEIs. The detailed analysis of the threats will allow to identify the risks and to elaborate effective strategies to protect

the university networks and the users. The biggest threats in the education industry have been: malware attacks, denial of service or distributed denial of service (DoS / DDoS) and phishing [8].

3.1. Malware attacks

In June 2020, Microsoft Security Intelligence reported that 61% of the 7.7M malware attacks recorded in the last 30 days, were related to the education domain, more than any other sector of the industry [8]. From the report presented by Jisk [7], a UK company that analyzes the cyber security in educational field, malware infection ranks first in HEIs.

The malware that has targeted educational domain the most in 2020 is ransomware. Since August 2020, the UK Government has identified an impressive increase of ransomware attacks in education [13]. Ransomware is malicious software that allows a hacker to restrict access to authorized users, such as students or university staff, by encrypting disks and then requesting a form of payment to lift the restriction [2].

University networks are open to provide educational services to students, so attackers can exploit this by attacking authorized user and gaining access to the network. Once on the network, ransomware encrypts all drives, limiting legitimate users' access to resources. The administration can only: pay the reward to restore access to the data, restore the backup data, lose the data or break the encryption key using brute force [9]. For the reward, bitcoin payment is most often used because it does not require a financial institution to manage the process. Restoring from backup also presents problems, because most often ransomware programs will search the disks specifically for backups to encrypt them, and if this has been done, respectively, it will not be possible to recover the data. Breaking encryption keys is a difficult process that can take years to break.

Other families of malicious programs are adware and downloaders, due to the fact that students have had to download several applications. Downloaders are malicious programs with the goal to subversively download and install malware (eggs) on a victim’s machine [15]. Adware is software which generally makes pop-up, banner etc. advertisements to appear on the user’s computer [19].

The vectors of malicious attacks [13] are:

- Remote Desktop Protocol (RDP) is a Microsoft proprietary protocol, which provides a graphical user interface for remote access connections over the network. It is one of the most scanned service on the Internet owing to its security importance [6].
- Vulnerable software or hardware is very often used for unauthorized access.
- Phishing emails that contain a malicious link or file that hosts malware.

Famous cases of malware infection in HEIs 2020 are:

- Malicious programs caused the shutdown of European supercomputers working on Covid-19 research in the spring of 2020, and the affected academic institutions were forced to temporarily take their systems offline. Data centers in the UK, Spain, Germany and Switzerland have confirmed the intrusions.
- Newcastle University in England was infected in August 2020 by a ransomware attack that affected almost all IT systems and the network.
- The University of California San Francisco (UCSF), in June 2020, paid $ 1.14 million in Bitcoin to recover data from their medical school.

- The University of Utah paid $ 40,000,000 in August 2020 to unlock its systems IT from ransomware.

Research to identify the Covid-19 vaccine, or related research, has increased the interest of hackers in HEIs in 2020, which has resulted in increased attacks with malicious ransomware programs that have encrypted sensitive information. Another aspect of interest is the access to educational resources, because all university activities went online, the encryption of storage units of university networks had the effect of interrupting the activity. Thus, the attackers obtained access to intellectual property and could manage academic activities.

3.2. DoS/DDoS attacks

In the latest report published by Kaspersky [8], DOS/DDoS attacks have increased, in educational domain, by 350-500% in 2020 compared to the same period in 2019. Denial of Service (DOS) and (DDOS) Distributed Denial of Service attacks have become a major security threat to university campus network security [12].

The substantial increase in DoS / DDoS attacks in HEIs is primarily due to distance learning, as the vast majority of university services, such as: access to the university library, study hours, access to course resources, exams and intermediate assessments, admission to studies; this year have been in the online environment, and disruption of these services shall interrupt academic activity.

This statement is also supported by experts from Kaspersky [8], which states that the increase in DoS / DDoS attacks in the field of education, which can be seen in Figure 3 is due to distance learning.

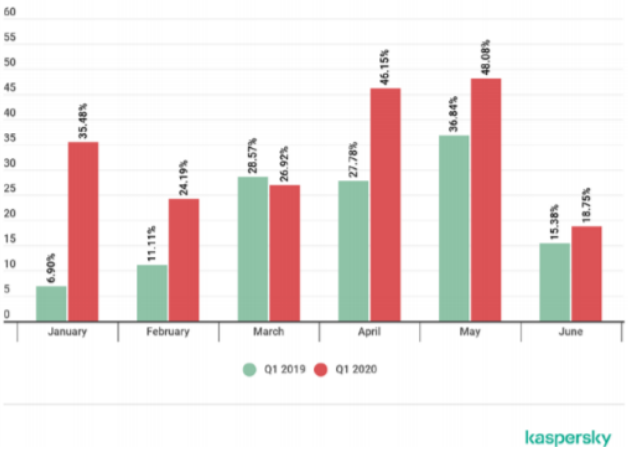

Figure 3: Number of DDoS attacks that affected educational resources in 2020, versus the same period in 2019 [8]

In most scenarios, the targets are:

- *Web servers*, each university has at least one web page, which informs students and employees, it contains personalized information, such as: personal data, academic situation, study schedule. Disruption of access to the page will lead to misinformation authorized users.
- *End devices and network devices*, such as switches and routers. Blocking network devices makes it impossible to access online learning platforms, access to virtual labs or other

university services provided online. In cloud environment also DDoS can reduce the performance of cloud services significantly by damaging the virtual servers [20].

The vectors of DoS / DDoS attacks are:

- The depletion of the bandwidth through flood attacks, that are launched by an attacker sending huge volume of traffic to the victim with the help of zombies that clogs up the victim's network bandwidth with IP traffic [5]. Another attack that uses that vector is the amplification attack, the attacker sends a large number of packets to a broadcast IP address [5].
- Resource depletion that is used to exploit protocols and attacks using malformed packages [5].

Famous cases of DoS / DDoS attacks in HEIs 2020 are:

- In April, a large Turkish university was forced entirely offline for 40 minutes after it was hit with a DDoS attack on the morning of exams [8],
- In June, a major university in the northeastern United States had its exams disrupted after a DDoS attack affected its online test platforms [8].

The purpose of DoS / DDoS attacks within HEIs is to disrupt access to educational resources, especially during time-sensitive activities such as intermediate or final tests. It can therefore be deduced that with the transition to distance learning, DoS / DDoS attacks have increased considerably, the availability of university services being the main target.

3.3. Phishing attacks

The leader of cyber threats in HEIs, is phishing. According to new research conducted by Barracuda Networks [1], HEIs were targeted in June-September 2020 by more than 3.5M phishing attacks, more than 25% of phishing attacks occur in the educational sector. In the UK, according to a Jisc survey, phishing is the biggest threat to corporate network security in HEIs [7].

The most common attack vectors are:

- *Email-based*, where a perpetrator camouflages emails to appear as a legitimate request for personal and sensitive information [18]. For example, emails sent to students, informing them that they have missed or are late to an online course scheduled by teacher. When students accessed the link attached to the email, there was a risk of downloading various malicious programs to personal devices.
- *Video conferencing applications*, that expanded the possibilities for phishing attacks. In the data presented by Check Point Research, between the end of April and the middle of June 2020, approximately 2449 Zoom-related domains were registered, of which 32 were malicious and 320 were suspicious [3].
- *University Online platforms* and *web pages*, that provide false authentication pages for students or staff, to compromise their credentials, such as logins and passwords.

Famous cases of phishing attacks in HEIs 2020 are:

- Louisiana State University (LSU) in the United States, and Oxford, Brighton, and Wolverhampton Universities in the United Kingdom were hit by Shadow Academy, from July to October 2020.

- From June through September 2020, Barracuda researchers evaluated over 3.5 million phishing attacks, including attacks against more than 1,000 educational institutions such as schools, colleges, and universities [1].

The transition to education remotely, when teachers had to communicate with students via email, motivated hackers to make university email accounts a target. Using university platforms for studies and access to educational resources and video conferencing applications to provide online courses have caused also a great interest for cyber attackers, by creating new opportunities to gaining unauthorized access.

4. Recommendations and discussion

Following the analysis carried out in point 3, whose purpose was to identify the biggest threats to HEIs in 2020, it can therefore be said that most cyber-attacks that take place within HEIs refer to the violation of the principles of availability and confidentiality. The purpose of attackers is to disrupt users' access to data and gain control over sensitive data. Sensitive data held by HEIs are in particular the personal data of students and employees and research data.
The basic recommendations, are reflected in Table 2.

Actions	Arguments
Update systems	Software developers develop system updates and security patches to correct vulnerabilities identified in the software usage process. So timely installation of updates will result in more secure and robust systems.
Back Up	Backing up is an important step in not losing access to data and verifying data integrity after an attack. An important factor is to keep backups on off-network storage units to limit their encryption in the event of an attack.
User education	User education refers to both students and employees. This involves constantly informing users about cybersecurity and associated risks. Conducting extensive training and information campaigns within HEIs is a good practice to implement and quite effective, because 90% of attacks within HEIs are based on Social Engineering, it tries to influence authorized users to gain unauthorized access to the information system.
Implementing Defence in depth Model	Implementing the defense-in-depth model involves activating network-level firewalls, intrusion detection systems (IDS), intrusion prevention systems, network-level antivirus. This model allows to approach network security as a multi-level system that is based on the principle that it is more difficult to break a protection system that has several levels than a single level. In addition, an advantage is the extended time that will allow the system administrator to implement security measures until the attacker has escalated all levels.
Inspect network protocols and open ports	The services provided in university networks are quite extensive. Monitoring open ports and the protocols used to provide services will allow administrators to manage with them. Thus, non-essential services can be disabled. Creating a sheet containing information about the basic ports and protocols will allow after the network scan the identification of illegal services and unauthorized open ports. Disabling unused ports, using secure communication protocols, and disabling non-essential services is a good practice to limit unauthorized access to the university network.
Implementing Network Access Control (NAC) system	New devices, such as students', employees' or partners' devices, are often connected to university networks. To ensure that these devices do not bring new vulnerabilities to the university network, it is important to implement the Network Control Access System (NAC). NAC will detect any new devices trying to connect and will allow the connection if the

	devices comply with security policies (updating the system, activating the antivirus and firewall). NAC also allows you to configure user access by roles.
Control administrative access	Monitoring the activity of administrators will also allow to identify illegal actions. The password policy should be strict and passwords should have a limited duration. Also, the administrator account must be linked to a single person, who will not use it for anything else (checking e-mail or browsing the Internet) than for managing and monitoring the system.
Use of corporate emails	The use of corporate emails will allow centralized management, so it will be possible to set strict rules for filtering emails.

Table 2: Recommendations for network security in HEIs

The recommendations proposed above should be applied systematically, HEIs should implement an effective information security management system that will take into account all areas that need to be secured, for the protection of sensitive data.
In order to implement an effective information security management system, it is important to annually identify the real threats facing HEIs, and in this regard, it is advisable for governments to conduct annual studies to identify cybersecurity threats in this domain. The results of the studies will, on the one hand, allow HEIs to identify security risks and prevent cyber-attacks, and on the other hand, for governments, the results of the study will serve as a basis for developing security policies.

5. Conclusion and Future work

Analyzing several international cyber security reports, it was possible to identify the most current cyber security threats in higher education institutions, both globally and in Europe. The personal data of students / employees, intellectual property and research results are of increased interest from cyber attackers.

Thus, malware attacks, DoS / DDoS attacks and phishing attacks have been identified as the most used. The interest of the attackers towards HEIs, in 2020, due to the online university activity only increased.

To ensure data protection, a number of actions have been recommended aimed at limiting unauthorized access to the university network and monitoring it to detect illegal attempts in real time.

It is necessary to implement complex systems to ensure data security in HEIs. In this sense, in the future, it is necessary to identify through research, an information security management system dedicated to HEIs, by analyzing international security standards such as ISO 27000, COBIT, NIST, to promote an efficient and cost-effective security framework**.**

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eGovernment and the Pandemic III

COVID-19 DIGITAL CONTACT TRACING BETWEEN PRIVACY ISSUES AND CO-PRODUCTION WHY SOME HAVE WORKED AND SOME HAVEN'T

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Abstract
With the first outbreak of COVID-19, governments in the world adopted various policies to contain its spread. Major policies are: social distancing; identify and isolate who diagnosed with COVID-19; contact tracing and quarantine them; mass testing and quarantine those who are positive; and lockdown. Among these methods, contact tracing is used for contagious diseases and was used during the Ebola virus outbreak, as well as in the SARS outbreak. As COVID-19 has gone global, some countries have aggressively used digital contact tracing in an attempt to control outbreaks and they have been successful.

When contact tracing is performed manually, it needs staff interviewing people who have been diagnosed with the disease to figure out who they may have recently been in contact with. Then, they have to contact and tell those people they may have been exposed. This procedure needs well trained staff and is time-consuming. Thus, with the outbreak of COVID-19, this method became unrealistic to perform, opening the way to develop digital contact tracing methods.

This paper analyses various types of digital contact tracing developed and used in different countries and tries to understand why some worked, while others haven't, focusing on the issue of privacy and co-production, which are important issues in using new digital technology.

1. Introduction: COVID-19 outbreak as digital laboratory

Governments in the world adopted various policies to contain the spread of COVID-19. Major policies are: social distancing; identify and isolate who diagnosed with COVID-19; contact tracing and quarantine them; mass testing and quarantine those who are positive; and lockdown.

Among these methods, contact tracing is typically used for contagious diseases and was recently used during the Ebola virus outbreak (2013-2016: [27]), as well as in the Severe acute respiratory syndrome (SARS) outbreak (2002-2004: [3] [13]). As COVID-19 has gone global, some countries have aggressively used contact tracing in an attempt to control outbreaks and they have been successful, while some failed [1].

When contact tracing is performed manually, as in most previous cases, it needs trained staff interviewing people who have been diagnosed with the disease to figure out who they may have recently been in contact with. Then, they have to contact and tell those people they may have been

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exposed. This procedure needs well trained staff and is time-consuming. Thus, manual tracing was performed only at the very early stage of this pandemic and with the outbreak of COVID-19, this method became unrealistic to perform (Barret et al., 2020), opening the way to develop digital contact tracing methods in various countries, with the support from private sector as well as the civil society. The digital contact tracing, which includes contact tracing apps [8]; however, varies in its methodology as well as in its performance [4].

The effectiveness of contact tracing has been confirmed by many previous cases of contagious diseases [3] [27] [13]; although it is difficult to isolate the effectiveness of contact tracing strategy from other measures, as various measures have been introduced together in different combinations in various countries and regions.

For example, New Zealand is one of the countries in the world with less number of COVID-19 contagion and has aggressively performed contact tracing; however, it also performed other measures [21]. Indeed, New Zealand introduced short city-wide lockdown, when three cases of the variant B.1.1.7, so-called UK variant, were detected in Auckland on 15 February 2021 [18]. When the new strains emerged, many countries have adopted the dual approach of closing borders and increasing domestic surveillance, while some banned travellers from countries where cases of the new strains have been reported. New Zealand too, adopted selective travel bans and its borders were effectively policed and monitored, also thanks to its geographical characteristics; however, it reported the presence of new variants within their borders, confirming that short of total isolation, importation of the virus is almost inevitable. The country has lower community transmission rates, reducing the risk of an indigenous mutation. Therefore, it is the efficient implementation of domestic protocols rather than selective travel bans that ultimately provides protection. According to Menon [18], closing borders will not stop the new or future variants from finding their way in. The evidence suggests that countries that can implement domestic surveillance efficiently are managing the original and new strains better, with the additional protection from selective travel bans likely to be low or redundant. Improving domestic protocols or surveillance will be less costly and more effective than continuously increasing or prolonging border restrictions and the case of New Zealand seems to confirm this.

As the effectiveness of a certain measure to contain the spread of virus cannot be isolated from the other measures and strategies, although, the evidences suggest that some are more effective than others, and as the aim of this research is to analyse various digital contact tracing systems, not in terms of how they are effective in containing the virus, but in terms of effectiveness as a digital instrument, the paper focuses on digital contact tracing strategies of various countries independently from other measures and strategies adopted by them.

The paper, thus, analyses various types of digital contact tracing systems and tries to understand why some have worked and some others haven't, focusing on two issues: first, technical and legal issues of privacy and personal data protection [16] [14]; and second, citizens and civil society's co-production, which is essential in contact tracing, and depends highly on cultural and emotional aspects of the society [4].

2. Methodology and Design of the Research

Given the objectives of the research and the characteristics of the topic, the paper uses case studies to identify the common issues as well as case specific characteristics of these digital contact tracing methods, through analyses of secondary data and information, provided by the official channels,

such as documents of government institutions of the selected countries, media sources, such as articles of newspapers and magazines, and academic literatures, such as papers in scientific journals.

The paper first explores the contact tracing as a consolidated method, typically used to contain the spread of contagious diseases. It especially considers the recent cases, in which the technique was employed and consolidated Ebola virus outbreak [27], and the SARS outbreak [3] [13]. In the past, including these cases, contact tracing was performed manually, which requires trained staff interviewing people who have been diagnosed with the disease to figure out who they may have recently been in contact with. Then, they have to contact and tell those people they may have been exposed. This procedure needs a significant number of well trained staff all over the territory in question and is very time-consuming.

During the outbreak of COVID-19, however, initially utilise manual contact tracing methods were substituted by digital contact tracing systems. The scale and speed of contagion of COVID-19 were completely different from the previous contagious diseases outbreak, which required new approach substituting manual contact tracing; however, more importantly, the technological as well as societal conditions were significantly different from the previous periods, especially in terms of the use of digital devices. Indeed, the number of smart phone users worldwide grew from 2012 to 2021 from 1.06 billion to 3.8 billion [24]. There are 5.22 billion unique mobile phone users in the world today, in other word, 66.6% of the world population own mobile phone, the latest data from Ericsson show that the number of mobile subscriptions associated with smartphones now exceeds 6 billion, accounting for more than three-quarters of the mobile handsets in use around the world. The number of smartphones in use is growing at an annual rate of 7%, with an average of more than 1 million new smartphones coming into use every day [6]. Furthermore, now roughly 4.66 billion people around the world use the internet, which is 59.5% of the world's total population. Internet users are growing at an annual rate of more than 7.3%, equating to an average of 875,000 new users each day. 92.6% of internet users use mobile devices to go online at least some of the time. And the average global internet user spends almost 7 hours online each day. These show that the conditions were met to introduce digital contact tracing using smartphones.

Second, the paper examines three cases of digital contact tracing systems, from two points of view; first, technical and legal issues of privacy and personal data protection [16] [14], which is an important aspect in using digital technology; and second, citizens and civil society's co-production, which is essential in contact tracing, and depends highly on cultural and emotional aspects of the society [4]. The cases are; South Korea, Taiwan, and Japan. The first two countries are considered successful in containing contagion, thanks not only to digital contact tracing systems, but also to the combination of various measures adopted by their government. For example, South Korea adopted unique strategy: it never imposed country-wide lockdown, only short and local ones when necessary and many activities remained open, even big sport events [5]. In this paper; however, other strategies and measures are not analysed, neither the effectiveness of digital contact tracing system [2] in containing the contagion. The last case of Japan is a failure case, both in low penetration, which is fatal for the effectiveness of digital contact tracing system, and in various technical issues, including Android-linked bug, which caused malfunction of the app in registering contacts as well as in communicating to those exposed to the person tested positive [20], which, in turn, raised doubt on the effectiveness of the app among the users and distrust towards the app and government institutions in general.

The aim of this research is to investigate why some digital contact tracing systems have functioned, while others have failed, especially from the points of view of technology, privacy, and co-production with the civil society. The first two strongly relates each other; countries with more authoritarian approach were able to involve most population and centralised data to government institutions, while, for example, Japanese app does not allow the government to centralize data, use GPS to track people, or harvest information such as phone numbers and names and downloading the app is strictly optional [20]. Among the cases examined in this research, indeed, technology adopted by countries is strongly conditioned by the privacy concern of the society. The last point, co-production with the civil society [9], is influenced by the trust of the citizens towards government institutions as well as towards technology, and results in the effectiveness of the system.

This research adopts case study [28]. Data were collected from secondary sources, provided by the official channels, such as announcements and documents available in the public domain, that of government institutions of the selected countries, media sources, such as articles of newspapers and magazines, and academic literatures, such as papers in scientific journals. Case study research is appropriate for this research as it makes use of multiple sources of evidence in order to create a picture of the phenomenon under investigation and is methodologically appropriate when exploring complex issues like this or when researchers have little or no influence on the event being studied [28] such as in this research. Document analysis is appropriate, as documents are a rich source of data and in this instance they provided valuable primary data. Document analysis of policy documents and government reports contributed to the understanding of the case study in two ways: first, the document analysis allowed the context for the case study to be understood; second, it also provided a basic information of the government policies in relation to COVID-19.

The paper is part of the results of a research on “Improving operational efficiency in manufacturing and physical distribution sites through negotiations using AI”, which is awarded by “2nd Cross-ministerial Strategic Innovation Promotion Program (SIP), Cyberspace fundamental technology utilizing big data and AI”, a research on Big Data and Open Data in relation to evidence-based policy making in the area of sport policy, a research project awarded by Japan Society for the Promotion of Science (JSPS) entitled “Research on sport policy making based on Big Data: Olympic Games as a trigger” (Research ID: 18H00819 2018-2023), and a research on Digitalisation of public services, a research project awarded by Chuo University Grant for Special Research entitled “Digitalisation of public services in difficult places” (2019-2022).

3. Contact Tracing Technique for Contagious Diseases

What is contact tracing?

One of the recent, still previous example can be found during the outbreak of Ebola virus disease. Contact tracing is an integral component of the overall strategy for controlling an outbreak of contagious virus. It is defined as the identification and follow-up of persons who may have come into contact with an infected person. Contact tracing is an important part of epidemiologic investigation and active surveillance [27]. During the Ebola virus disease outbreak with established person-to-person transmission, new cases were more likely to emerge among contacts. For this reason, it was critical that all potential contacts of suspect, probable and confirmed Ebola cases were systemically identified and put under observation. Immediate evacuation of potentially infectious contacts with signs and symptoms of the disease to designated treatment centres or to the nearest healthcare facility prevented high-risk exposure. Contact tracing was therefore one of the most effective outbreak containment measures and must have been implemented prudently.

During the Ebola virus disease outbreak in West Africa between 2013 and 2016, contact tracing posed serious challenges, in part as a result of the wide geographical expanse of the outbreak, insufficient resources (human, financial and logistical), and limited access to affected communities. From these experiences, it was noted the importance to set up a functional system for conducting systematic contact tracing, through standardisation and scaling up coordinated contact tracing activities.

Major elements of contact tracing are: the procedures for conducting contact tracing up to the point of discharging the contacts; precautions to be taken by the contact tracing teams; data management; and a guide to estimate the resources needed for an effective system. The stages of contact tracing are: identification; listing; follow-up; managing contacts with signs and symptoms; supervision of contact follow-up; and finally discharge of contacts. Below are the standardised stages of contact tracing, used for various contagious diseases in various places around the world.

3.1. Contact Identification

Contact identification is an essential part of epidemiologic investigation for all cases meeting the standard/surveillance case definitions of the disease. These cases are classified as suspected, probable or confirmed. The epidemiologist/surveillance officer conducting the epidemiologic investigation should complete case investigation forms for all the cases and deaths meeting the standard/surveillance case definition. After completing the case investigation form, the officer should systematically identify potential contacts.

Contact identification therefore begins from a case. Identification of contacts is done by asking about the activities of the case and the activities and roles of the people around the case since onset of illness. Although some information can be obtained from the patient, much of the information will come from the people around the patient. Information, such as persons who lived with the case in the same households, persons who visited the patient, all places and persons visited by the patient, all health facilities visited by the patient and all health workers who attended to the patient without appropriate infection prevention and control procedures, would be collected and processed.

The exposure information should be verified and double-checked for consistency and completeness during re-interview in later visits to ensure that all chains of transmission are identified and monitored for timely containment of the outbreak.

3.2. Contact Listing

All persons considered to have had significant exposure should be listed as contacts. Efforts should be made to physically identify every listed contact and inform them of their contact status, the actions that will follow, and the importance of receiving early care if they develop symptoms. The contact should also be provided with preventive information to reduce the risk of exposing people close to them. Advise all contacts to: remain at home as much as possible and restrict close contact with other people; avoid crowded places, social gatherings, and the use of public transport; report any suspicious signs and symptoms immediately (by providing contact of follow-up team and/or hotline/call centre numbers). It was advised that contact identification and listing, including the process of informing contacts of their status, should be done by the epidemiologist or surveillance officer, not by the local surveillance staff/community health worker performing the daily follow-up.

3.3. Contact Follow-up

The officer responsible for contact tracing should assemble a competent team to follow-up all the listed contacts. This could include surveillance staff/health workers from health facilities, community health workers, volunteers and community leaders. An efficient contact tracing system depends on a relationship of trust with the community, which in turn fosters optimum cooperation. Communities should have the confidence to cooperate with contact tracing teams and allow the referral of symptomatic contacts to designated isolation facilities. Involving appropriate community members in contact tracing is critical in cultivating this good relationship, trust and confidence. The local surveillance staff and community health workers should be closely supervised by trained officers.

The contact follow-up teams and their supervisors should be trained with basic information on the disease, procedures and tools for contact tracing, and the required safety precautions. On this regard, SARS and MERS outbreaks served as an occasion to train health workers with contact tracing techniques as well as to prepare for an outbreak of contagious diseases in several countries and regions, especially in Asia.

3.4. Managing contacts with signs and symptoms

The contact tracing/follow-up team is usually the first to know when a contact has developed symptoms. This may be volunteered by the contact in a phone call, or the contact tracing team makes the discovery during a home visit. If a contact develops signs and symptoms, the responsible team should immediately notify the supervisor and/or the alert management desk/call centre. The alert management desk/call centre will immediately inform the case management team leader. The ambulance team is then dispatched to conduct an assessment and/or evacuation of the symptomatic contact to the treatment centre.

3.5. Supervision of contact follow-up

Close supervision and monitoring of contact follow-up is necessary to ensure that the local surveillance/community workers visit and observe contacts daily. Supervisors should join contact follow-up teams for home visits on a rotating basis to ensure that home visits are done correctly. Conduct regular meetings with all contact tracing teams to address any issues that might have an impact on the effective functioning of contact tracing. Other strategies may be needed to address non-compliance and the management of uncooperative contacts.

3.6. Discharge of contacts

While contact identification, listing and follow-up should start as soon as a suspected case or death has been identified, follow-up of contacts for suspect cases that test negative for the disease should stop and the contacts removed from the contact list. Contacts completing the follow-up period should be assessed on the last day. In the absence of any symptoms, the contacts should be informed that they have been discharged from follow-up and can resume normal activities and social interactions. The team should spend time with the contacts' neighbours and close associates to assure them that the discharged contacts no longer poses a risk of transmitting the disease. The contacts should ensure that they are not re-exposed to symptomatic contacts or probable/confirmed cases of the disease.

These steps were developed during the past outbreak of contagious diseases such as SARS (2002-2004) and Middle East respiratory syndrome (MERS) (2012-), and consolidated during the Ebola outbreak (2013-2016); however, various conditions, in particular the use of internet through mobile devices, especially smartphone, are completely different today under COVID-19, which opened the way to digital contact tracing.

4. Case Studies

Digital contact tracing systems follow exactly the same logic of manual contact tracing; however, the technologies employed for the apps and the management systems varies among cases. In this section, three cases of digital contact tracing systems would be explored and analysed from two aspects: technical and legal issues of privacy and personal data protection [16] [14]; and citizens and civil society's co-production [4].

4.1. South Korea

According to many researches, South Korea learned a lot from the previous experience of MERS, and people knew how to physical distance and how to wear masks [17]. South Korea performed aggressive testing from the very early stage of COVID-19 and contact tracing. Contact tracing has the manual part, but it has enhanced by facial recognition through closed-circuit television (CCTV) and also traces people via credit card transactions. CCTV, credit card transactions, and mobile phone data are used to retrospectively track the movements of people who have tested positive. The routes taken by people confirmed as infected are published online, while an alert is pushed to the phones of people who visited the same locations. South Korean authorities use data-surveillance techniques to get around the problem of people being unwilling to disclose, or unable to recall, close contacts. A law passed in response to an outbreak of MERS in 2015 allows authorities to use data from credit cards, mobile phones and CCTV to trace a person's movements and identify others they might have exposed to the virus [15].

In the early days of the outbreak, public-health officials treated each case more or less individually, with contact tracers compiling detailed histories of a patient's recent whereabouts and screening others accordingly [5]. However, with the first outbreak in February 2020, the authorities introduced systematic digital contact tracing. Restaurants, cafes, and even nightclubs and gyms have stayed mostly open, but often with limited capacity, and patrons must scan a QR code linked to a national contact tracing system before clients entering.

Contact tracing team gets involved immediately once someone tests positive. Public-health workers interview patients, asking them to list where they've been, when, and with whom. That information is fed back to the staff of contact tracing team, who are given access to GPS and transaction records as well as information from the QR code system in use in restaurants and other high-traffic locations. That information allows tracers to verify a person's movements and to find connections between cases. Tracing team tries to identify the likeliest path of transmission through suspected movement of the virus and possible superspreader. The goal is to have all contacts identified within a few hours, or a day at most, and ideally to trace infections back to their source [5]. When a person tests positive, their city or district might send out an alert to people living nearby about their movements before being diagnosed. A typical alert can contain the infected person's age and gender, and a detailed log of their movements down to the minute, in some cases traced using CCTV and credit-card transactions, with the time and names of businesses they visited. South Korean residents have been receiving flurries of emergency text messages from authorities, alerting

them to the movements of local people with the virus. Epidemiologists say that detailed information about infected people's movements is crucial for tracking and controlling the epidemic, but some question whether it's useful to make those data public [29].

Smart data-management systems can ease the workload of contact-tracers. Other tasks typically managed by contact-tracers can also be delegated to technology. The South Korean government says the public is more likely to trust it if it releases transparent and accurate information about the virus, including travel histories of confirmed patients. However, the specificity of the publicly available data has raised privacy concerns. The data trails released about some of the infected people have been so detailed that they could be identifiable [29]. In March 2020, Choi Young-ae, chair of the National Human Rights Commission of Korea, expressed concern that the "excessive disclosure of private information" could cause people with symptoms to avoid testing. In response, South Korea's Centres for Disease Control and Prevention announced that such detailed location information should be released only when epidemiological investigations could not otherwise identify all the people with whom an infected person had been in contact before their diagnosis. No other country has released data as detailed as in South Korea.

The public broadly supports the government publishing individuals' movement and the government sharing travel details of people with the virus. Furthermore, most seemed "prefer the public good to individual rights", according to several surveys [29].

Thus, it is fair to conclude that previous experiences, open and transparent data [19] [26], reliable technology, and trust in government are the major reasons of success of South Korean digital contact tracing system, although there are several concerns, namely, privacy violations, social sorting and abuse of power [22]. Regarding the privacy issue, Korea has stringent privacy protection laws, such as its 2011 Personal Information Protection Act (PIPA), which bans the collection, use and disclosure of personal data without the prior informed consent of the individual whose data are involved. PIPA was altered after the MERS outbreak to allow authorities to override some of these provisions in future epidemics. The government realised that the strict criteria found within PIPA were a barrier to their response to the MERS. As a result, Korea established a clear legal basis for collecting personal data during disease outbreaks that align with general data protection regulation guidelines. With digital contact tracing, the authority may directly access digital movements, thus, creating concerns around consent. Furthermore, the information published on the government's website from digital contact tracing is detailed and has the potential for privacy infringements [22]. In relation to abuse of power, there are concerns that digital contact tracing will be misused to implement unnecessary surveillance on citizens. There is the potential that digital contact tracing will be repurposed for other activities that it was not originally designed for. Thus, it is important to identify what the government can do with the technology, the data retrieved and how citizens are protected from abuses of power as a result of its use [22].

4.2. Taiwan

Taiwan is an example of effectively containing the virus employing various digital technologies.

According to Summers et al. [25], there are several reasons for the success. Taiwan established a National Health Command Centre (NHCC) in 2004 following the SARS epidemic. The agency, working in association with the Centres for Disease Control (CDC), was dedicated to responding to emerging threats, such as pandemics, and given the power to coordinate work across government departments in an emergency. Taiwan's pandemic response was largely mapped out through

extensive planning as a result of the SARS pandemic, and was developed in such a way that it could be adapted to new pathogens. It also has a very proactive policy of supporting production and distribution of masks to all residents, securing the supply and providing universal access to surgical masks from February 2020 onwards. The mask distribution system was co-created with civil society using digital technology, but also uses conventional channels such as convenience stores in the neighbourhood.

Taiwan's pandemic measures, with extensive contact tracing through both manual and digital approaches, and access to travel histories, meant that potential cases could be identified and isolated relatively quickly. This ability to track individuals or identify high-risk contacts resulted in fewer locally acquired cases.

Summers et al. [25] suggest that relying on identifying symptomatic cases and contact tracing may not be sufficient as methods for containing the virus. A subsequent analysis in Taiwan based on empirical data provided further evidence that case-based interventions (contact tracing and quarantine) alone would not be sufficient to contain the COVID-19 pandemic; however, many other studies suggest the systematic digital contact tracing has certainly contributed to the containment.

Taiwan strengthened its public health response through developing real-time surveillance methods pre-COVID-19 and already had a national alert system in place. Surveillance does not only mean contact tracing, but also national and regional disease and outbreak surveillance systems including sentinel surveillance and more specialised systems, such as wastewater testing. Development of both conventional and digital solutions to contact tracing has been effectively accompanied by isolation/quarantine monitoring. Taiwan is well-known for having developed an effective means of face mask distribution. This digital solution, such as the name-based mask distribution system, and distribution and sales controls implemented by the Taiwan Central Epidemic Command Centre, avoided hoarding and enabled distribution to those most at need. This could also be applied and extended to medicine distribution [25].

The Taiwanese approach is a combination of bottom up and top down as Kluth [11] puts "participatory self-surveillance". Taiwan enforces quarantines with mobile phone tracking and has stitched together various government databases, such as travel and health records. But, the whole country voluntarily partnered with the government to create a protean network of databases in which information flows both from the bottom up and from the top down. To make new online and offline tools for fighting the virus, "hacktivists," developers and citizens have been collaborating with the government on vTaiwan, a kind of online town hall and brainstorming site. One tool, indeed, prevented a run on face masks by mapping where the stocks were and allocating them wherever they were most needed. By involving people in the solutions, rather than just dictating policies to them, the process is transparent and inspires trust, even civic pride.

The case also shows the importance to establish cultural, societal and legal acceptability for these pandemic response measures. There are legitimate concerns regarding the use of big data analytics, particularly with the use of digital methods in public health responses. Other populations may also be less inclined than Taiwan's citizens to accept the imposition of stringent interventions that limit personal rights and liberties [25].

In order that digital tools being developed to work, people must actually download and use them. That means people must trust these apps. Digital surveillance must be in harmony with social values and must be proactively accepted by the population. Various opinion polls show that the health

minister Chen Shih-chung have been receiving a higher approval rating than any other top official, including President Tsai Ing-wen, who enjoys high approval rating herself with the COVID-19 measures taken by her administration. Taiwanese are particularly reassured by Chen's swift response, timely orders and candid communication style [30], confirming the importance of communication, transparency, and trust building. This case also shows the importance of co-production with the citizens, not only in terms of participating in digital contact tracing, but also in co-creating apps, such as digital mask mapping tool.

4.3. Japan

Japan is a unique case. It is generally regarded as rather successful in terms of containment of the virus, despite its rather "soft" approaches. Some points out two factors: a unique contact-tracing strategy [10] and early awareness that brought a positive reaction from the public. Without any official instruction, the public began hand sterilising, wearing masks and social distancing of its own accord. Everyone wore masks to protect themselves but the real effect was to reduce spreading by asymptomatic carriers of the virus. Japan used a particular approach to contact tracing [10]. While most countries adopted prospective tracing, Japan introduced the cluster-based approach, thorough retrospective contact tracing to identify common sources of infection. Japanese approach tries to find out where they were infected and then monitor people who visited that site. Four out of five coronavirus patients do not infect anyone else, so finding the superspreaders was a more efficient way to control the virus [10].

When it comes to digital contact tracing; however, Japanese app, named COCOA for Contact-Confirming Application, has had a malfunction since September 2020 and has failed to deliver notifications of suspected contact with people infected with the virus. In February 2021, the Minister of Health, Labour and Welfare publicly apologised for this problem and promised to fix the bug; however, so far, the various issues have not been resolved. The app has been downloaded almost 24 million times (approximately 20% penetration) since its launch last summer and has recorded 9,736 positive coronavirus cases [20], which are very few, suggesting structural problems. Figures suggest willingness among the public to download and use the app has been lukewarm at best.

Touted as minimally intrusive and with its use remaining voluntary, the app has added to Japan's reputation as one of the most privacy-savvy nations in Asia. Now, the very emphasis COCOA has placed on privacy is attracting fresh scrutiny, with some critics saying protections in the app prevent the government from collecting data essential to gauging its effectiveness. The app is based on what is known as an "exposure notification system", co-developed by Google and Apple, in which smartphones equipped with the app use Bluetooth signals to automatically exchange and log one another's randomly generated codes whenever they are within a proximity of one meter for 15 minutes or longer. If a user tests positive and agrees to confirm their infection status via the app, users whose smartphones swapped codes with theirs in the preceding days will be identified as possible close contacts, and notified by the app. Those who receive such notifications are then instructed to self-quarantine and consult nearby public health authorities, where it may be possible to arrange a test for free [20]. The privacy-first ethos has its downside. Officials say the way encryption has been used makes it all but impossible for the government to grasp the actual number of notifications sent via the app.

The Japanese case suggests three issues: first, manual contact tracing might have functioned to a certain extent, but it didn't guarantee the success of its digital version; second, digital contact

tracing would not automatically function by voluntary participation of citizens, but needs to be supported by professional manual work, as confirmed by Korean case and shows that co-production of citizens is a necessary condition, but not a sufficient condition; third, privacy-savvy system has a limitation in terms of effectiveness, confirming the original sin of digital tools; that an effective digital systems have privacy and/or data protection issues, while privacy-savvy digital systems are not effective.

5. Findings, Limitations, and Future Research

This paper aims to explore the digital contact tracing systems for COVID-19, thus, analyses various types of systems and tries to understand why some have worked and some others haven't, focusing on technical and legal issues of privacy and personal data protection; and citizens and civil society's co-production.

The findings from three case studies contributes to theoretical discussions, as they highlight empirical issues, such as the relationship between technology employed, privacy concerns, trust in government, and co-production with citizens, many of which are not explored in existing literatures. The cases contribute to the discussion of digital co-production of public service delivery [7] [12] as well, since they are examples of co-production.

Given the limitation of the number of case studies chosen, the further research would explore more cases, such as New Zealand [21], Singapore [23], and Germany and the United States, in order to include some other successful digital contact tracing systems, yet with some controversies like the Singaporean case, as well as failure cases with different characteristics.

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HOW COVID-19 CHANGED "THE ANATOMY" OF POLITICAL CAMPAIGNING

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Abstract
COVID-19 has rapidly affected our everyday life, businesses, disrupted the world trade and movements. It also impacted electoral processes around the world, changing everything – from how the campaign is conducted to voter engagement. Pandemic has canceled meetings, conventions, door-to door canvassing and moved a part of campaigning to the digital realm.

While some countries have decided to go ahead with elections, others with elections scheduled in 2020 have postponed them. Among those that have held elections during the pandemic, the South Korea has emerged as a model for having organised a highly successful electoral process, while protecting the health of its population. Others, such as the US, have set in general a very negative standard, ignoring health risks and putting both population and politicians in danger. However, it was a sharp difference between two competing candidates: Donald Trump and Joe Biden were taking very different approaches to campaigning during the pandemic and one of main difference was the way how they comply with pandemic rules.

This paper analyses how COVID-19 rewrote the rules of political campaigning in different parts of the worlds, taking as model for comparison the South Korea, the United States, Romania and the Republic of Moldova election campaigns.

1. Introduction

The current COVID-19 pandemic has exposed democracies around the world to considerable challenges in holding free and fair periodic elections. Throughout the past decades, they already have been faced various major crisis situations that have undermined states' capacities to hold elections, such as natural disasters, situations of armed conflict, terrorism, and other emergency situations, however, they typically had a more localised impact on elections.[3] In case of COVID-19, countries are under emergencies at the national level, the authorities being in the forefront of dealing with the consequences of this health crises, disrupting hundreds of elections scheduled in 2020.

The COVID-19 pandemic has been presenting severe challenges to the management and scheduling of elections across the world. There are two main options when it comes to addressing the issues the

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[2] The author is thankful for special contribution to Mihai Goian, "Dunărea de Jos" University of Galați, goianmihai@yahoo.com.
[3] For instance, hurricane Katrina that hit New Orleans during local elections in 2005 destroyed the electoral infrastructure and made voting insecure in many areas. As a remedy, wide postal voting options were provided to displaced voters as well as to those who could not vote in their home constituencies. In 2014 and 2015, Ukraine agreed to postpone elections in some territories against the backdrop of the armed conflict in the East.

pandemic poses to holding elections, postponement or the introduction of special voting arrangements to mitigate the threat of spreading the virus. Both options present challenges for electoral integrity and poses risks. Mitigation measures or the postponement of elections may encroach upon the right to political participation, as well as, upon the related freedoms of expression, association, assembly, and movement. If an election is postponed indeterminately, the criterion of legitimacy of government is at stake. Thus, striking a balance between these two is not an easy choice. Should the fulfilment of the social contract between a government and its citizens come at the expense of endangering their health and lives? Or should concerns related to the outbreak, as a result of the mass gatherings inherent to the societal ritual of voting, prevail over other considerations? Decisions are usually best made to suit local conditions and circumstances. There are some universal questions and concerns that can be asked about the running of elections and challenges that each of these options pose when the decision to hold or postpone the election is being put forward in this research paper.

2. Challenges to postpone the election during pandemics

Democracy is characterized by civic responsibility, exercised by all adult citizens, directly, or through their freely elected representatives. Therefore, a democracy holds regular and periodic elections. [6] This requirement is enshrined into Article 21(3) of the Universal Declaration of Human Rights and after specified in Article 25 of the UN International Covenant for Civil and Political Rights (ICCPR), among other requirements, such as universal and equal suffrage; the right to stand for public office and contest elections; the rights of all eligible electors to vote; the use of a secret ballot process; genuine elections; elections that reelect the free expression of the will of the people.[11] These core standards and principles represent the conceptualizations of electoral integrity, that shall apply universally to all countries worldwide throughout all stages in the electoral cycle, including during the pre-electoral period, the campaign, on polling day, and its aftermath. [34] However, there are situations when elections cannot be held due to different reason, such as natural or man-made hazards emergencies. In these cases, states can derogate from their obligations under civil and political rights treaties in face of the crisis situations. The conditions set in the respective treaties' emergency clauses - Article 4 ICCPR and Article 15 ECHR - are quite similar stipulating that "in time of public emergency which threatens the life of the nation", states may derogate from their obligations to the extent "strictly required by the exigencies of the situation".[4] COVID-19 pandemic is an obvious humanitarian case for delaying the conduct of elections where it might bring about immediate threats to human health and life.[5] Data collected and regularly updated by International IDEA in its "Global overview of COVID-19: Impact on Elections" confirms that during 2020, at least 75 countries and territories - faced with the prospect of potentially spreading the virus by holding their national and subnational elections under the pandemic have so far opted for deferring the vote. [10]

The postponement of elections purports several challenges and national authorities shall be aware of them. The humanitarian case for postponing elections shall be strictly time-limited to that necessary

[4] See Article 15 of the European Convention on Human Rights and Article 4 of the International Covenant on Civil and Political Rights provides for the possibility of derogating in case of emergencies.

[5] The circumstances are not new since in the past it occurred several situations when the elections were postponed due to epidemic reasons. Elections that have previously been postponed for public health reasons. For instance, in West Africa, Democratic Republic of the Congo and Liberia during the Ebola crisis (2013-2016), elections were postponed for public health reasons. In 2009, in Mexico campaign restrictions were introduced during the Swine Flu epidemic to prevent the spread of the virus.

to make elections deliverable, otherwise there are incentives for leaders to exacerbate an emergency. Postponing a vote also could mean that leaders and representatives who are not necessarily doing a good job will remain in office for longer. Citizens will be temporarily denied their right to shape public policy - perhaps at exactly the moment when they need. Therefore, postponement should be the last resort as the citizen need to be reassured that democratic life will continue.

In some cases, there are concerns that a government may capitalise on a crisis to avoid holding an election at all. Incumbent governments could be given an opportunity to reschedule at a moment when the opinion polls are more favourable. Moreover, election postponement does seem to be playing out differently by regime type. An analysis suggests that no democracies that have postponed without agreeing upon a new election date. [13] However, there are major risks in hybrid regime, such as Ethiopia, or in autocracies, like in case of Chad and Somalia, that have postponed but not rescheduled their elections.[6]

Postponement of elections often comes with various impacts on the regulatory framework governing elections. This includes practical considerations regarding, for example, the setting of different legal timeframes/deadlines, the registration of voters and candidates, the determination of the duration of campaign and monitoring of campaign finance, and the procedures for election dispute resolution. Importantly, different situations need to be distinguished. It is important that any changes made between the two election dates do not, or to the most minimal extent possible, interfere with the fundamental principles of democratic elections, namely the universal, free, equal and secret suffrage.[8] This includes preserving an equal level playing field among contestants, most importantly refraining from abusing the postponement of elections as a means of giving an advantage to the incumbent. The shorter the gap between the originally scheduled and the postponed election is, the less impact may be expected due to discontinuation of the electoral processes.[7]

3. Challenges to hold election during pandemics

While more than 75 countries postponed voting, 79 countries and territories have held national or subnational elections despite concerns related to COVID-19 [10], taking the difficult, and perhaps more dangerous road of still going ahead with their scheduled elections. The holding of local and regional elections in times of major crises may entail numerous practical challenges and risks. First, holding elections as originally scheduled may jeopardize public health and safety. Elections are large social events and bring millions of people together, making it difficult to maintain social distance. Special voting arrangements are necessary, posing new impediments to the transparency of the electoral process and adding financial and administrative pressures to ensure the safety of voters. [7] James and Alihodzic identified five key challenges to holding elections and maintaining electoral integrity during natural disasters, including the COVID-19 pandemic. [12]

[6] While the absence of an election date in Ethiopia has added more political turmoil in Ethiopia, the elections in Chad have been postponed five times since 2015 before COVID-19 caused this year's postponement.

[7] In the 2020 postponed presidential elections in Poland where the elections were held only de jure but no voting took place on the Election Day until new elections were announced and held almost two months later. In terms of particular impacts of election postponements, after the 2020 postponed elections in Poland, it was criticised that legal amendments to the electoral law adopted between the originally scheduled and the postponed election jeopardised the stability and clarity of the election legislation and had practical implications for candidate registration, campaigning and campaign finance, voting methods, and resolution of election disputes.

3.1. Threats to the opportunities for deliberation

Emergencies can fundamentally undermine opportunities for deliberation since they depend on information and news content from independent journalists. Campaigning can become restricted during emergency situations as many countries have imposed lockdowns during COVID-19 pandemic to prevent mass gatherings and citizens from leaving their house. In these circumstances, opportunities for campaigning become much more limited. Some candidates, having concerns for their supporters, may avoid political meetings and door-to-door canvassing. To some extent, electoral contestant may be dependent on the media to get their message out. Creative use of online platforms and digital technology is the safest way to facilitate engagement between voters and candidates. There is strong evidence that natural disasters do change voter preferences as the management of the crisis becomes the salient issue rather than other subjects.[8] This might be a lifeline for those who manage crises well but have a poor record on other issues during the mandate, and vice versa.

3.2. Equal opportunities for all candidates

Some candidates have a great advantage if they enter the campaign period with a concentration of resources and/or if they are backed by wealthy donors, however incumbents might have access to state resources, such as influence over the state-owned media sources. [23] During pandemic, in states where incumbents have control over the state media they may be able to continue to use this important campaign tool, while opposition parties remain unable to mobilize if they are restricted by lockdowns or weak communication infrastructure. Moldovan President Igor Dodon and Polish President Andrzej Duda used the same tactics and made television appearances at border checkpoints, hospitals, food banks, meeting convoys of aid from other countries (Dodon) and new production lines of hand sanitizer (Duda) during the early campaign of the 2020 presidential election, while opposition parties were unable to participate in such actions. Incumbent advantage over newcomer candidates can be more pronounced during a pandemic as the management of the crisis can become a more salient issue for voters than other subjects.

In South Korea, the incumbent government, formed by the Democratic Party, secured the largest majority since the first democratic elections in 1987. Although, in January 2020, the party's prospects had not looked so good due to economic issues and political scandals, the governments successful management of the COVID-19 response was credited with its election victory. In the Republic of Moldova, it was quite the reverse. Before pandemic Dodon's rating remained high, however, pandemic poor management, his negative rhetoric, and restrictions at the border against diaspora contributed to his defeat in the elections.

3.3. Equality of participation

During pandemic the main question is how all groups of voters can vote safely? Besides special measures to ensure the safety of all voters, there are necessary alternative measure, such as introducing or extending postal or mobile voting that are required to facilitate those most vulnerable to the virus, self-isolated or have the virus at the time of election. Early voting or voting over several days, is another option to spread the voter traffic and facilitate social distancing.

[8] See for instance, Atkeson, L. R. and Cherie D.M., Catastrophic politics: How extraordinary events redefine perceptions of government, Cambridge University Press 2012. Lazarev, E. et al., Trial by fire: A natural disaster's impact on support for the authorities in rural Russia, in World Politics, 2014.

Democratic elections in ideal situation shall be characterized by the high turnout and equal levels of participation across different groups in a society. Without this the result of an election may be shaped by some groups more than others. For instance, in the Republic of Moldova the participation in the election is characterized mostly by the involvement of elder groups and lack of participation of young voters aged 18-25 years.[9] Moreover, according to James and Garnett major threat to political equality within a country are because of uneven levels of participation, which are often partially driven by uneven access to resources and external factors. [14]

3.4. Robust electoral management delivery

The successful implementation of elections also depends on large, temporary, and experienced workforce. However, emergencies like COVID-19 can create serious logistical problems as these workforces may be not available to deliver an election [15]. Moreover, there are necessary additional funding to run safe and accessible elections during the pandemic, to provide suitable venues for voting and counting, appropriate personal protective equipment and hand sanitizer for voters and election workers along with other measures to facilitate social distancing.

3.5. Institutional certainty

Although there are numerous challenges to be overcome in holding an election during pandemic, going ahead with an election provides political stability and encourages the participation of voters as they come to believe that there will be an opportunity to remove the incumbent from office, if the last one have not delivered electoral promises. When the decision to postpone the election during a pandemic yields powers that translate to political and electoral advantages of the incumbent, then the election could be considered "canceled" an/or the next election would more than probably bring victory to the incumbent. [12] For instance, in March 2020 Hungary's parliament has passed a new set of coronavirus measures, including jail terms for spreading misinformation, which allows prime minister Viktor Orbán to rule by decree. However, these measure gives no clear time limit to a state of emergency, providing that "strengthening and extending the decrees issued during the state of emergency and give the government authorisation to issue decrees for an indefinite term as long as the state of emergency is in effect."[18] This included provisions that no local or national elections or referendums could be held until the end of the state of emergency. Following this event, the international mass media and scientific community even stated that "the coronavirus had killed its first democracy".[10] Even where such power-politics tactics are not being played, the sudden uncertainty in the electoral timetable might erode trust amongst rivals and citizens. However, when the postponement does not diminish political opportunities for other political actors - and even opens space for more solidarity and unity - then it would fit more neatly into the humanitarian postponement category.

[9] For 2020 presidential election their participation was 8.08% on November 1, 2020, and it increased to 8.44% in November 15, 2020.

[10] "I don't know of another democracy where the government has effectively asked for a free hand to do anything for however long," Renata Uitz, director of the comparative constitutional law program at Central European University in Budapest. See for instance, Coronavirus kills its first democracy, Washington Post, https://www.washingtonpost.com/world/2020/03/31/coronavirus-kills-its-first-democracy/. Accessed on 25 January 2021.

4. Lessons from the elections in the time of pandemic

4.1. Highly politized COVID-19

One clear feature of the 2020 elections was the politicization of every element of the electoral administration response to the pandemic in each country that opted out to hold an election. These countries took various steps to reduce the risk of voters and election officials contracting the new coronavirus disease. Indisputably, planning elections during a pandemic is challenging. Officials worldwide have struggled with securing enough funding to implement safety precautions, expanding mail-in voting, and communicating changes with the public, among other obstacles. Despite all differences and organizing the elections, a common factor for all election campaigns was the fact that COVID-19 was highly politicized and used as a campaigning tool, starting from its origin, incumbent government response, confidence in scientists, and support for protective actions, dividing societies almost in each democracy, around the world.

The first elections held during COVID-19 were closely watched and not only over the issue of how the government's early handling of the pandemic was managed but from a more global perspective. Many lessons have been drawn from their successes and failures in mitigating the impact of the pandemic on the election, providing answers for the most important question: it is possible to organize election without exposing voters and polling station officials to increased health risks? South Korea, which elections for the country's 300-seat National Assembly closely monitored and widely reported on by international media, proved that such outcome is possible. As in much of the world, the pandemic has dominated South Korean politics in 2020. Seoul's approach has been highly nationalist and politicized, as the ruling party lauded its pandemic response as the global standard and linked it to a larger, leftist-nationalist agenda. South Korea, along with China, has demonstrated a highly nationalist and politicized model of pandemic containment, linking a country's pandemic response to its global status and to the ruling party's political agenda. A nationalist approach facilitates collective mobilization and sacrifice to contain the pandemic, linking national pride to COVID-19 containment and but also come at large costs when it is about privacy.

In the US, these instances of the coronavirus pandemic have been exploited to oversee the actualisation of policy agendas in the election year, however, the incumbents undermined the threat posed by the pandemic. President Donald Trump impeded prospects of any multilateral cooperation by exploiting the pandemic as an opportunity to actualise the "America first" agenda vis-à-vis China, Mexico and Iran. Ahead of the 2020 elections, the "Chinese virus" presented Trump with an opportunity to once again make China a centerpiece in his run for the presidency. The US shifted blame on China not only for his administration's poor management of pandemic but also for its repercussions on American economy starting February 2020, when the Dow Jones Industrial Average plunged 9,000 points, effectively wiping out all gains made during his presidency. When Trump announced his support for industry bailout packages, he posted a tweet suggesting China was "responsible for the global economic damage". Thus, the interlinking of the already slowing American economy to the "Chinese virus" figured prominently in Trump's rhetoric's during all his campaign. If in 2016, Donald Trump's populist takeover of the Republican Party occurred largely due to his capitalisation on Americans' anxieties with the US' traditional commitment to globalization, in 2020, mishandling of the COVID-19 pandemic was also the main reason why Trump lost the election.

4.2. COVID-19 impact on the ability of political parties to campaign and reach their audiences

The COVID-19 outbreak also significantly affected the methods conventionally used by political parties and candidates to conduct their election campaigns. More conventionally, the candidates were able to send their campaign materials and information about their platforms to voters through printed election-related information booklets distributed to households nationwide. However, the tried and tested on-ground approach - where armies of volunteers go from door-to-door interacting with voters, hard-selling their presidential candidate by extolling their many virtues, holding large public rallies, fundraising cocktail parties, handshaking has taken a back seat for the Democratic Party in the US and candidates in South Korea. Yet, this was not the case for ex-President Trump, representatives of the Alliance for the Unity of Romanians (AUR) in Romania or for half of Moldovan presidential candidates.

Election campaigns in the middle of a pandemic need creative ways to reach voters as the restrictions oblige electoral contestants to resort to alternative campaigning methods to reach out their voters. Here, there have been virtually no limits to the creativity displayed for this. For example, in South Korea candidates have showed up on trucks, riding electric scooters or even horses. To reach voters, political parties and candidates had to change their conventional campaigning method, shifting to online and digital technology, mainly video messages disseminated through social media platforms, SMS and mobile phone apps.

For Korean elections, electoral events involved only very small groups and were restricted to the distribution of information leaflets. Inevitably, election campaigning activities for the 2020 elections had a much lower profile than in any previous election. The bulk of election campaigning was taking place online, on Facebook, Instagram and KaKaoTalk. Almost all candidates have their own YouTube channel. Some candidates went as far as using innovative methods, employing augmented reality (AR) technology, allowing supporters to digitally express their endorsement to his election pledges through a mobile application and their phone cameras. [28] Other candidates launched AR mobile services that enabled voters to digitally meet and interact with a 3D animated party's character. Some candidates conducted volunteer COVID-19-related work. For instance, a popular trend among candidates in South Korea was to show themselves disinfecting public facilities and playgrounds, obviously with protective breathing masks, which more often made it difficult for voters to remember their faces.

In the US, both the Democratic and Republican parties held their nominating conventions online for 2020 elections, a significant alteration of the usual practice of gathering party delegates and office holders. After COVID-19 restrictions relaxed over the summer, the rate of infection rose from September 2020 progressively[11], leading to a decrease in traditional campaign strategies, such as door-to-door canvassing, public events, and large rallies. As of September 2020, the two main campaigns diverged considerably in their approach. The Biden campaign suspended in-person canvassing at the beginning of the pandemic and has stood by that approach, saying it does not want to put people at risk of contracting COVID-19. Meanwhile, Trump's campaign volunteers, according to their own words, knock on 1 million doors a week. [31]

[11] See Coronavirus: Why are infections rising again in US? BBC News, 8 October 2020, https://www.bbc.com/news/election-us-2020-54423928. Accessed on 25 January 2021.

The Biden campaign promoted the idea that conversations matter - no matter the medium. Only in August 2020 it recorded 2,6 million conversations with swing state voters, mostly by phone or text message. [9] They also drop off literature door to door, however, canvassers likely did not seek out face-to-face conversations with voters. Biden himself has been a vocal advocate of mask use, and data from the Pew Research Center has found that Democrats are far more likely than Republicans to take the threat of the virus seriously. [32] Drive-in events have been a part of Biden's campaign - around 150 cars reportedly gathered to watch him accept the presidential nomination on the final night of the Democratic National Convention in Delaware in August 2020. Though down-ballot Democrats followed the rules for most of the pandemic, a handful of candidates in battleground states, such as Maine and Montana, were breaking with the Biden campaign and resuming door knocking.

While the Biden campaign has invested heavily in television advertising, particularly in six key swing states - Florida, Pennsylvania, North Carolina, Michigan, Wisconsin and Arizona[12], Trump had been trying to bridge the gap by heavily investing in digital advertisements on platforms like Facebook and Google.[13]

In Romania, Facebook was the main platform for promotion, being used by most of Romanians. AUR party benefited the most of online resources. The party had posts with tens of thousands of Facebook interactions and videos with more than million views, which can be considered as a record audience even for non-political content creators. AUR used all possible methods to promote their election messages on Facebook, WhatsApp, Twitter, Instagram.[27] In addition, ignoring all the imposed restrictions, party's members used traditional campaign methods. The populist messages on reopening the schools and accusations launched at the entire political class on imposing a "dictatorship regime", help the party to get seats in the Romanian parliament, which under normal conditions had no chance to cross the electoral threshold. Other political parties used mainly live option and support groups on Facebook, according territorial party organisations. Private televisions, which are politically affiliated for most of them, also played an important role in broadcasting messages to the elderly voters.

In the Republic of Moldova all candidates resorted to traditional methods, however, social networks also were actively used by electoral contestants. Facebook remained the most popular platform, which was actively used to promote electoral messages. Trough Facebook groups and live option, all candidates were able to contact voters nationwide and abroad. The two main contestants, Maia Sandu and Igor Dodon, used actively Instagram. In addition, PAS candidate Maia Sandu used Zoom platform to organize meetings with citizens in different parts of the country, this method being used first time for electoral meetings in the Republic of Moldova. Sandu used several social apps, including Tik-Tok, through each of them sending personalized messages depending on the target audience. Igor Dodon, created his own online show, entitled "The President responds", which was broadcasted weekly and aimed to address his political messages to voters and have a direct contact with them. These two candidates spent approximately 50% of the budged used in the election campaign for online promotion.[14]

[12] According to a report by the Washington Post, the Biden campaign spent around $90 million on television ads between August 10 and September 7, four times more than the $18 million spent by the Trump campaign.

[13] Quoting data from Bully Pulpit Interactive, the Hill reported that the Trump campaign has spent about $170 million on digital advertising on both platforms since 2019, while Biden has only spent $90 million.

[14] Maia Sandu spent MDL 2.700.000 and her opponent, socialist candidate, Igor Dodon MDL 2.000.000. Today Media, *Maia Sandu vs Igor Dodon: who spent more on advertising in the election campaign*, 16 November 2020, http://media-

4.3. Ensuring a safe voting environment during COVID-19

South Korea, which international health experts have praised for its extensive precautions at polling places, reported no new cases related to its April 2020 election.[5] The election was held amid a declining caseload and with nationwide coronavirus restrictions still in place. In the election day, an additional 20.000 poll workers compared with previous election, were deployed to staff the election while about 550.000 army of staff were tasked to prepare polling booths, disinfect and mark the 14.330 polling stations to ensure that, the 29 million eligible voters observed a distancing of at least 1 meter apart in queue.[28] Temperature checks were mandatory for all voters, and for those whose temperatures were above 37.5 degrees or showed signs of respiratory complications were redirected to special polling booths with heightened precautions. Every official in charge in these booths was required to wear full-body protective gear. Voters were also required to wear mask, sanitize their hands and wear plastic gloves while at the polling station which they removed and discarded when leaving the polling stations. Special polling stations were also created for COVID-19 patients. Additionally, asymptomatic COVID-19 patients and recent returnees to the country under government-monitored self-isolation were given a specific time window on April 15, 2020 to visit polling stations, while being mandated to report their movements to the responsible local officials via phone or a mobile app.[15] At each polling station, National Elections Commission (NEC) installed separate voting booths for this specific group of voters so that they would not come into contact with other virus-free voters. For confirmed COVID-19 patients with more serious symptoms staying at hospitals or designated treatment centres and unable to visit regular polling stations, NEC facilitated voting through "residential voting". These COVID-19 patients had to submit an early application to receive a ballot via mail, which had to be returned to NEC.[28]

However, the situation in the US was quite the reverse. The two main campaigns of Republicans and Democrats diverged considerably in their approach. Despite the US had one of the highest numbers of COVID-19 cases at the global level, ex-President Donald Trump reverted to the holding of large frequent in-person rallies that had been a feature of his successful 2016 campaign. Most of these events have been in violation of local or state restrictions on gatherings to limit the spread of COVID-19, bringing bring together thousands of supporters with little regard for social distancing and without wearing the masks. An analysis found that about half of the president's 22 campaign rallies held between June and September 2020 were followed by a considerable surge in COVID-19 cases merely two weeks after the events, suggesting the events may have led to community spread.[16] It also confirmed that counties that had a lower COVID-19 incidence prior to the rally and were more likely to have a visible increase in cases after the rally. The Trump administration has flouted public health guidance throughout the pandemic, and the president's choice to continue holding large rallies is no exception. Trump's political events have regularly violated state and local restrictions on gatherings. Both his White House and his campaign have fostered a culture that discourages commonsense mask-wearing and social distancing. By downplaying the severity and contagiousness of the virus - even after being hospitalized with the virus himself - and gathering tightly packed crowds in the nation's COVID-19 hot spots, Trump jeopardizes the health of the very

azi.md/ro/stiri/maia-sandu-vs-igor-dodon-cine-cheltuit-mai-mult-pentru-publicitate-%C3%AEn-campania-electoral%C4%83. Accessed on 25 January 2021.

[15] If an individual under this category showed up to a voting station without prior notice, or visited other places, they faced charges for violation of the Infectious Disease Control and Prevention Act No. 9847 of December 29, 2009.

[16] A group of researchers conducted a study on 22 Trump campaign rallies and concluded that "these eighteen rallies ultimately resulted in more than 30,000 incremental confirmed cases of COVID-19 (and would) likely led to more than 700 deaths (not necessarily among attendees). Center for American Progress (CAP), Coronavirus (COVID-19) Data in the United States," 2020, available at https://github.com/nytimes/COVID-19-data."

people who turn out to support him. Meanwhile, the Democratic Party's nominee Joe Biden has kept in-person interaction to a minimum. He opted out for smaller in-person speeches, press conferences and round tables, where mask-wearing and social distancing were made mandatory. His campaign also organised a number of virtual rallies, socially distanced events with a small number of supporters, in combination with "drive-in" rallies where supporters stayed in their cars at a parking area or sports ground.

This dispersal of policy-setting and the heightened partisan divisions in US politics, meant that a unified response to the COVID-19 epidemic proved hard to reach in many states. In order to mitigate the effects of COVID-19, the Centre for Disease Control and Prevention (CDC) provided guiding principles to ensure a safe voting process, these included maintaining social distance between voters, protective equipment such as face masks, sanitization and disinfectant and regularly cleaning and ventilation of polling stations, however, health and safety measures varied over time and by state.

In Romania, the government approved a special regulation for the presidential elections in November 2020, and social distance was introduced, at the entrance to each polling station, being mandatory to disinfect the hands, wear the a mask, which was allowed to remove only to recognize the voter's face. During the election campaign, to prevent the risks of disease and spread of COVID-19, meetings were banned allowing only less than 50 people to participate in, with a mandatory observance of the social distance and wearing masks.[21] Most of these rules have been followed by the majority of electoral contestants, who tried to show an example of responsibility in front of and toward citizens, except AUR party, which completely ignored the rules imposed by the government. The party's members showed skepticism about the existence of the virus and the seriousness of the consequences caused by it.[17] George Simion, AUR party's leader have organized numerous protests against restrictions imposed by the government related to COVID-19 pandemics, inclusively against wearing protective masks, using the people's dissatisfaction for being in lockdown. Defying all the rules of protection, AUR party's promoters continued the election campaign as if COVID-19 did not even exist, organizing several rallies in different regions of the country with little regard for social distance and without wearing masks.

Moldovan Central Election Commission (CEC) approved a similar special regulation for the presidential elections of November 2020, coordinated with the public health authorities. On election day, strict health and safety measures were in place; social distance of 1.5 meters should be adhered to, face masks were mandatory and polling stations needed to provide disinfectant and clean the polling station periodically.[29] The CEC provided a face mask for every voter, large amounts of gloves, hand sanitizer, disinfectant, visors, thermometers and protective suits for election officials.[4] In some areas in the country where buildings were not in accordance with security requirements, people could vote in specially arranged tents.

Similar measure with those in Romania were implemented during the election campaign, however most of these rules were ignored by the candidates, and no one was sanctioned for these violations, although fines were imposed. The then incumbent President Igor Dodon, using his high dignitary status, visited some hospitals and other public institutions during his election campaign, which

[17] George Simion, AUR party leader, even claimed that he did a test and he tested positive for coronavirus, although he had no symptoms. He said that this is an industry," Antena3, *George Simion (AUR), unexpected confession: I did a COVID-19 test and tested positive for coronavirus*, 12 December 2020, https://www.antena3.ro/actualitate/george-simion-aur-pozitiv-coronavirus-588650.html. Accessed on 25 January 2021.

disadvantaged the other participants. The official election campaign started on October 1, 2020, in the same day when Moldovan Extraordinary National Commission for Public Health establishes a state of emergency, declaring "Red Code" alert in the country. Group photos with candidates, little respect for social distance, and door-to-door canvassing in the process of collecting signatures and during campaign, contributed to around 40.000 new cases for the period of September - October 2020.[18] According to the WHO, the number of confirmed cases of COVID-19 in Moldova on election day November, 1 2020 were 76.040 and 1,785 deaths. On December 1, 2020, two weeks after second election round, the number of cases in the Republic of Moldova exceeds 108.800 cases of coronavirus.[2] This increase is, however, is not attributed only to the conduct of elections and there are numerous intervening factors that account for the spread of COVID-19.[2]

4.4. Voter turnout during the coronavirus pandemic

One of the biggest concerns is that holding elections during a pandemic could result in lower voter turnout. Some countries suffered low voter turnout, causing citizens to question the elections' legitimacy, while others saw high turnout and few coronavirus cases linked to voting. When officials do not widely communicate pandemic-related restrictions and electoral changes to the public, many citizens might skip voting out of fear they will contract the virus or out of confusion about where and how to vote.[19]

Exactly this scenario happened in Romania for the 2020 parliamentary election. After the proposal that the elections should be held in March 2021 was declined, Romania's Prime Minister announced that elections were scheduled for December 6, 2020. The conditions in which the elections took place can only be characterised as challenging: the COVID-19 pandemic has exacerbated structural problems, including the near-collapse of the public health care system and this election was the fourth electoral contest in the last year and a half, resulting in general political fatigue. Amidst the second wave of the pandemic, Romania registered a new anti-record of 31.84% turnout, proving the evidence that high number of COVID-19 cases can increase absenteeism. Romanian diaspora was not motivated enough to go to the polls, even though 748 polling stations were organized abroad, only 265.490 citizens voted. The low presence at voting in Romania facilitated the entry of AUR, a right-wing conservative and nationalist political party which also had excellent mobilization of its electorate based on distrust in the existence of COVID-19. Having previously demonstrated statistically that the turnout plays an important role in the victory of right-wing forces, it brought out in the first place Social Democratic Party (PSD), a left-wing party of oligarchic origin.

On November 1, 2020, in the Republic of Moldova, eligible voters were able to cast their ballot in 2143 polling stations, of which 139 were organized for diaspora.[24] At some polling stations abroad, for instance France and Azerbaijan, the opening hours of the polling station were shortened due to local COVID-19 restrictions. It was reported that people were not able to vote at the polling station in Frankfurt (Germany) due to the limited number of ballots sent. People were urged to go to other polling stations in different cities. The OSCE reported that overall procedures were followed, but inadequate voting premises led to overcrowding.[24] The data showed that the voter turnout stood at 48,54 %, which was lower than the turnout in 2016 with 49,18 %.[1] Since none of the candidates received at least half of the votes, a second round was held on 15 November 2020.

[18] See data from Woldometer, Moldova, https://www.worldometers.info/coronavirus/country/moldova/. Accessed on 25 January 2021.

[19] More than 55% of Romanians considered that the parliamentary elections should be postponed, according to the IMAS/EuropaFM opinion barometer, 40.9%, considering that it is a good thing that they take place.

Citizens staying abroad had to comply with the pandemic rules of host countries that impeded some citizens to vote in some countries, however, the second round gathered at the poll stations a record number of 262.739 citizens (58,22%) [1], in comparison with the second round in 2016, which had a turnout of 53,45%. The high turnout even during pandemics may be explained by the willingness of the Moldovan people to end up economic, political, and social instability, which has been in the country for a long time and has caused population exodus. Moldovans casted their vote against dictatorship, corruption, and poverty for the Party of Action and Solidarity (PAS) candidate Maia Sandu, who built her image as an incorruptible politician and fighter against poverty. By constantly criticising how socialist government managed the pandemic crisis and using people's fears that socialist candidate can win again, Sandu mobilized the electorate in the country and abroad and was able to get 93% of total votes in diaspora.[33]

Turnout in the South Korean election was at its highest since 1992, accounting around 66%.[10] In showing up to the polls in such large numbers, South Koreans demonstrated a strong civic responsibility amid dire circumstances that forced them to put their health at risk to vote under a pandemic. Paradoxically, rather than keeping them away from the ballot boxes, the unprecedented situation ended up giving even more value to the exercise of their right to vote they voted as a way to defeat, at least symbolically, the COVID-19 virus. Some commentators noted that high turnout may be partially also due to recent electoral reform for lowering the voting age from 19 to 18 years[28], however, other explanations may be premised on the polarization between the Democratic Party and the United Future Party. The impeachment of former president Park Geun-hye and progressive policies under the Moon administration created a hyper-partisan atmosphere in the lead up to the election, in which voters became sharply divided on most issues. In this context, the COVID-19 outbreak seems to have created a sense of national crisis for all voters, turning voting into an important civic duty - a nation-saving act.[20]

A similar situation was registered in 2020 US presidential election as it was characterized by the highest turnout rate in 120 years, with more than 158,2 million (66,7%) citizens[21] casting their vote in a hope to change the situation in the country. One reason is that in these highly polarized times, people believe elections matter. The Gallup polling organization reported a record level of people saying that the election matters more than in previous years[22] and claiming as arguments a lot of major issues facing the countries, such as coronavirus pandemic, social justice, the economy, immigration, health care, the environment etc. Where in-person early voting options were available, people showed up to vote. In some cases, they determinedly stood in lines for up to 11 hours.

4.5. Risk of populists raising to power during COVID-19

The 2008 financial crisis proved that new populist politicians may emerged in the most difficult times, offering deceptively simple and often extreme solutions to complex economic and policy questions. COVID-19 will likely have the same effect. Populism thrives on crisis, even depends on crisis. However, how populism plays out it depends on a country’s political dynamics and institutions.[16] Emerging markets with weaker institutions are likely to see their civil liberties

[20] In the last public opinion poll before the election, 86,1% of South Koreans said they were paying attention to the April 15 election, and 79 per cent said that they would “certainly vote.”

[21] See analysis of Michael P. McDonald, 2020 November General Election Turnout Rates, http://www.electproject.org/2020g. Accessed on 25 January 2021.

[22] See survey conducted by Megan Brenan, More voters than in prior years say election outcome matters, Gallup, October 19, 2020, https://news.gallup.com/poll/322010/voters-prior-years-say-election-outcome-matters.aspx. Accessed on 25 January 2021.

further eroded under authoritarian leaders such as Erdogan in Turkey and Bolsonaro in Brazil. Meanwhile, China is using its own comparatively successful crisis management as an endorsement of the superiority of its political and economic model. In developed markets, populist parties and politicians push centrist politicians further towards the extremes to stem voter losses.[16] In European parliaments with proportional voting, new parties can gain support quite quickly, which happened with Podemos in Spain and the Lega in Italy.

The mismanagement of COVID-19 has increased dissatisfactions among the population in many countries, which has been used by some politicians as an opportunity to get elected, by channeling their campaign on criticism of the incumbent government's management of pandemics and public health system. Populism, a top-down process, is a "plebiscitarian" form of linkage between the populist politician and their electorate.[3] Therefore, by using simple and repetitive language to espouse themes that place blame on political and economic elites for mismanagement of pandemic creates favorable conditions for populists to be elected. AUR party speculated as much as possible on the restrictions imposed during COVID-19 pandemic, accusing the government several times of using it as a pretext to ban protests. AUR representatives, many of them being controversial figures, spread fake news about COVID-19 statistics, convincing people that it does not exist, being used only to manipulate voters. They also actively promoted the anti-vaccine policy, being helped even by clergy who were skeptical on population vaccination. The party's representatives became popular on social media as a result of their positioning against measures taken by the government during the COVID-19 pandemic. AUR is described as supporting "anti-medicine, anti-vaccination" rhetoric.[20] The party's manifesto opposes secularism and condemns atheism, while at the same time claiming that Christians are persecuted in Romania.[19]
AUR's golden bus with the party's insignia was parked for weeks in Romania's capital main square, as well and tricolor tents installed near it. Several attempts to evacuate the protesters gave this Euro-skeptical party, which promote xenophobic messages and conspiracy theories, the opportunity to victimize themselves and draw voters' sympathy. They didn't have a clear concept for the development of the country, however, only using populist messages managed to get 9% of voters' preferences and enter the Romanian parliament, even if for the local elections in the same year they won only 3 mayories in the whole country and managed to get only 0.9% of votes.[23]

And it can happen quite the reverse if populists are already in the power. It is hard to name Trump as a Republican if to look at his rhetoric. The rigid two-party system means that, rather than a populist threat from the outside, politicians with populist ideals infiltrate the two major parties. Donald Trump's presidency illustrates this on the right as also the fact that he leads a populist radical-right movement. The pandemic concurrently feeds an "infodemic" - an "overabundance" of information that makes it "difficult for people to identify truthful and trustworthy sources from false or misleading ones," calls for preventive actions like "social distancing" have failed to accrue compliance in many places around the world.[26] Much of this falsehood was fueled by ex-president Trump. After he denied that he lost elections, his representatives and allies have alleged fraud in several key states, 95 lawsuits being filled in 14 states and the District of Columbia. At an institutional level, Trump's claims have made little headway; electoral authorities and courts, including Republicans, have rejected allegations of fraud. Additionally, demonstrations took place, leading to clashed between supporters of the different candidates. The culmination of social and

[23] See Digi24, 2020 parliamentary elections, final results: PSD - 28.9%; NLP - 25%; USR PLUS - 15%, AUR 9%. PMP and Pro Romania do not enter the Parliament, 9 December 2020, https://www.digi24.ro/alegeri-parlamentare-2020/alegeri-parlamentare-2020-rezultate-finale-psd-289-pnl-25-usr-plus-15-aur-98-pmp-si-pro-romania-nu-intra-in-parlament-1415280. Accessed on 25 January 2021.

political tensions in the aftermath of the presidential elections was the storming and brief occupation of the Capitol building by a pro Trump supporters on January 6, 2020, where the joint session of Congress to count the vote of the Electoral College and certify Joe Biden's victory was ongoing.

Since, the populist leader encourages the people to acclaim them and elect them, the most archetypal form of political participation in Trump's movement is the rally - a form of acclamation. Victimization is an essential element of the Trump's populist discourse as it emphasizes the innocence and the purity of the people (and their leader), claiming that they are the victims of a corrupt system and the "fake news media". In 2020 campaign, Trump campaign concentrated much on an "inner enemy", his rhetoric of victimization being also illustrated by the construction of the figure of an enemy who is no longer a foreign outsider but fellow Americans. The expression "enemy of the people" is not new as it has its origins in the Roman Republic, used during the French Revolution and there is a certain irony in Trump using a term made particularly popular by the Soviet Union while comparing the suppression by the media to what happens in a communists countries. Populist rhetoric helped him in 2016 and it could help him in 2020 to win the election, if not the mismanagement of pandemic, which can be considered the main cause why he was not reelected.

In the Republic of Moldova, during the election campaign, populism and fake news increased due to the COVID-19 virus. Unfortunately, all candidates involved in the campaign used a populist discourse; external aid was a central element to enhance their image and to emphasize the political vector promoted by the candidates. The government, which was subordinated to ex-President Igor Dodon, organized the reception of humanitarian aid, offered by Romania as a support package in order to fight the COVID-19 pandemic and accompanied by 42 specialists, under a bridge on the outskirts of Moldovan capital, which were considered as an act of humiliation and aroused a wave of criticism, especially from citizens with double citizenship (Moldovan and Romania) and unionist candidates. This topic of discussion was used in the campaign to promote their unionist values and visions.[24] However, Dodon, organized the military marching band for receiving an aid coming from the Russian Federation, much smaller than the one from Romania.[25] Dodon repeatedly violated COVID-19 precautionary measures imposed by his own government. As a reason to retaliate against his opponents and harshly criticize the Western model of COVID-19 management, Dodon was trying to give the impression that the situation in the Republic of Moldova is not so bad, compared to other states with a much bigger population. The figures related to humanitarian aid were also used by the PAS candidate Maia Sandu, who tried to assume as her own merit any aid coming from the West, thus showing her negotiating skills and her value in front of Western politicians.

4.6. The role of alternative voting methods and early voting

Facing challenges imposed by pandemics, states have opted for different approaches. Some countries have decided in favour of in-person elections despite the practical difficulties. Other countries have relied, partly or exclusively, on remote voting methods, such as postal voting or

[24] See Vitalie Călugăreanu, Brotherly help offered under the bridge on the periphery of the city, Deutsche Welle, 7 May 2020.

[25] Dodon, also promoted the Russian vaccine, which was promises by the Russian officials as an aid for the Republic of Moldova. Through these actions, he tried to prove that he is able to get the country out of the crisis deeply affected by the pandemic. When the situation got out of control, Igor Dodon declared live on Youtube, that this virus is not so dangerous but a simple cold. He was harshly criticized by his opponents, but also by Internet users.

electronical voting. The need for elections to be postponed is much weaker where there are is already the provision of postal voting and/or remote electronic voting. These are obvious workarounds for pandemics, which could be expanded.

Despite having a very large Diaspora, voters from the Republic of Moldova could only exercise in-person voting. Although several international organizations suggested Moldovan authorities to consider electronic voting or postal voting to minimize the risk of COVID-19 infection, Moldovan authorities ignored these recommendations. The lack of such alternative methods created for Moldovan voters living abroad a lot of difficulties in exercising their right to vote as many of them live very far from the polling station. Some of them traveled hundreds of miles to vote and stay for more than seven hours in the queue to cast their ballots.

In Romania, in September 2020, the Parliament adopted a number of changes to several election-related laws.[26] The OSCE SEAM, who was invited and accredited to observe the elections, noted that these changes were adopted "in a rushed manner and without public debate, contrary to international commitments and good practice".[25] The changes included an extension of the application period for postal voting by 30 days, out-of-country voting to two days, and it decreased the number of signatures required to register as a candidate by half, allowing for the possibility to submit these electronically. Expert Forum, a local CSO coalition which observed the elections, raised concerns regarding the timeliness of the changes.[27] Voters living abroad could vote in person over the course of two days at 748 polling stations in 92 countries. Eligible voters had the opportunity to vote in person on Election Day or were able to request the use of a mobile ballot box. Postal voting has been used as an alternative method for those living abroad. Although, the electronic voting system was proposed by several politicians, but until now it has not been implemented. The Electoral Permanent Authority (AEP) informed voters in a timely manner about the registration or non-registration of postal votes. Voters whose ballot papers were not received by the deadline were able to vote at the polling stations. Although, 35.880 special ballot envelopes were issued, only 21.600 were received back, which caused a huge media scandal, politicians accusing each other for disappearance of 14.220 envelopes that have never returned.[28] Such problems also existed in previous elections campaigns. The public statements of some political leaders and several articles in the media, although lacking conclusive evidence, have raised suspicions about the correctness of the organization of postal voting.

In South Korea, the country's NEC enacted measures to allow confirmed COVID-19 cases and suspected patients under monitoring to cast their votes. For these voters, the NEC facilitated special voting, upon receipt of applications, between March 24 and 28, and 22.8% of voters submitting the application to vote in this manner.[17] In addition, in a two-day early voting, which was conducted

[26] Amendments were introduced to the Law on Parliamentary Elections Act of 2015, the Law on the financing of political parties and election campaigns of 2006, and the Law on voting by correspondence of 2015. Paragraph 5.8 of 1990 OSCE Copenhagen Document states that "legislation, adopted as a result of a public procedure, as well as regulations will be published, this being a condition for their applicability. These texts will be accessible to all. " See Section II.2.b of the 2002 Venice Commission Code of Good Practice in Electoral Matters.

[27] See for details Expert Forum, Final report on the observation of the parliamentary elections December 5-6, 2020, 17 January 2020.

[28] See Digi24, Irregularities in voting by mail. Thousands of votes of Romanians in the diaspora were not registered, 5 December 2020, https://www.digi24.ro/alegeri-parlamentare-2020/nereguli-la-votul-prin-corespondenta-mii-de-voturi-ale-romanilor-din-diaspora-nu-au-fost-inregistrate-explicatiile-sefului-aep-1412642. Accessed on 25 January 2021.

at 3.500 polling stations about 12 million (26.6%) people voted on both days making a record high since the country adopted early voting system in 2013.[29]

The 2020 US presidential election saw a large rise in postal voting and expanded provisions with regards to early voting, allowing voters to choose from a wide array of options to cast their vote. Citing public safety, political parties, state officials, and non-profits all encouraged residents to use the new mail-in system to vote. There were concerns that election officials would be overwhelmed by a deluge of ballots delivered close to Election Day and that the US Postal Service would fail to deliver these ballots. Several arrangements and requirements regarding voter registration and voting procedures and methods were extended. Absentee or mail-in ballots arrangements were also extended, and in some states the deadline by which the ballots were to be received by election officials was up to a week after Election Day. Some states offered the option for curbside voting due to COVID-19.[30] Almost every voting site during the early voting and on Election Day provided electors the opportunity to cast their vote in a vehicle outside the polling station and some sites also provide a walk-up area. In some states, voters who live in a nursing home, assisted living facility, residential treatment center, group home, battered women's shelter or, be hospitalized or unable to go to the polling place due to incapacitating health reasons or a disability were able to apply for agent delivery. Over 22 % of the voters voted early, an increase in comparison with 2016, when nearly 17 % voted early.[10] The use of postal voting saw a large increase as well, from just over 17% in 2016 to over 41% in 2020.[10]

5. Conclusions

Elections are key element for a democracy, enabling citizens to hold governments accountable for their actions and vital for citizens to voice their concerns and choose representatives. Since the early stages of the COVID-19 pandemic, however, countries have faced unprecedented pressure regarding whether to hold or postpone scheduled elections, resulting in controversies in either case. South Korea proved that elections can be held safely and successfully even during pandemic. The 2020 elections were held as scheduled, not only because its government was confident of its capabilities to bring the outbreak under control, but also because it was accomplished. Of course, the elections held in South Korea is difficult to replicate. An obvious and important requirement would be that the level of pandemic outbreak must be somehow contained. In Romania, the US, and the Republic of Moldova, when elections were hold, the pandemic was not contained, which worsen COVID-19 crisis. Unless voting is conducted entirely through remote voting methods, it would be unconceivable to run an election while the country is in lockdown and/or with high number of cases.

One the biggest problem in holding safe election when country, such as the Republic of Moldova, has no alternative methods for voting. Online voting has never faced a situation as favorable as today. Amid the current COVID-19 pandemic, online voting is increasingly becoming the most logical solution for all types of elections, however, not many democracies have put in place such option. Online voting is not a panacea that can solve all internal problems of political parties,

[29] The purpose of the early voting arrangement was to grant those who cannot vote on the voting day to do so and reduce the crowding at the polling stations on the polling day.

[30] Curbside voters must sign an affidavit affirming that they are unable to enter the voting station. People were eligible to use curbside voting when they were unable to enter the polling station due to age or physical or mental disability, if they had a medical condition that puts them at increased risk of COVID-19, were unable to wear a mask due to a medical condition, or if they were experiencing symptoms of COVID-19.

however, in extraordinary situations and/or for countries with large diaspora, it may support country transformation into more democratic and digitalized, giving opportunity for all citizens, especially abroad to exercise their constitutional right.

Another important condition for holding elections during pandemic is to have a solid electoral framework in place. It is very difficult to pull off all the exceptional measures so timely and seamlessly, therefore, each country shall have numerous legal and procedural provisions to facilitate inclusion and participation of voters as a part of the electoral framework. It could be seen the example of Romania, being criticized for doing this not in a timely manner and according procedure as many questioned the integrity of the election.

Although, the US has a necessary electoral framework and alternative voting methods, allowing voters to choose from a wide array of options to cast their vote, a divided approach in how to hold and election campaign during pandemic had a disastrous effect. As millions of Americans turned out to vote, the nation was facing a rapidly escalating pandemic that was concentrated in some of the very states seen as critical in determining the outcome of the presidential race. The fragmented nature of the 2020 elections demonstrated that it is difficult to craft a consistent US-wide response to exogenous shocks to the electoral process. While Biden's campaign has adopted a cautious approach and has endorsed COVID-19 mitigation strategies like social distancing and wearing a mask; Trump has pointedly opposed several of these restrictions, claiming they are politically motivated.

While there is much to learn from the experience of the Republic of Korea and numerous successful aspects to be considered, not all countries, states and territories will be equally well positioned and able to adhere to the standards and approaches needed to ensure credible, safe and fair elections amid the COVID-19 pandemic. South Korea's unprecedented experience in running a national election under the outbreak of a global pandemic can serve as a model, offering important lessons to be learned by all countries in how to safely uphold the democratic right of their people, having a solidary response from all involved political actors and voters. The coronavirus pandemic is a reminder of the unexpected risks involved in running an election at the global scale. It is difficult but not impossible to run an election at a time like during COVID-19 pandemic, and contingency planning is the best hope of keeping the electoral "show" on the road.

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READY TO LEARN ONLINE? LESSONS FROM THE COVID-19 PANDEMIC IN TURKEY

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Abstract
This paper deals with the impact of Turkey's shift to remote learning after being hit by the Covid-19 crisis. It focuses on Turkey's official digital education platform, namely the Education Information Network (EBA), which is used to continue primary, secondary and high school education uninterruptedly during the lockdowns.

The paper investigates the impact of online learning by looking at the issue from the perspective of the government as well as the perspective of the stakeholders, which are directly or indirectly affected by the change from face-to-face to online learning. It asks to what extent the government could pursue an inclusive education policy during the crisis.

As for the methodology, the paper employs document analysis and qualitative interviewing. The data are gathered from official state documents and a series of semi-structured interviews which were conducted with K-12 school teachers, students and parents in Turkey in January 2021.

The paper argues that Turkey could achieve the goal of maintaining the educational services during the crisis with its existing digital infrastructure. However, it is significant to overcome the digital divide for the empowerment of the ICT-based distance learning and the achievement of an egalitarian and inclusive education.

1. Introduction

In terms of its scale and scope the Covid-19 pandemic has become undoubtedly the most serious global crisis after the end of the World War II, having an impact on every aspect of human life. One of the most affected areas has been the national educational systems for it led country-wide school closures all around the world. As of 22 January 2021, there were 130 country-wide closures and 56.6 % of the total enrolled learners were affected by the pandemic [30]. Turkey has been one of those countries, where the primary, secondary and high school education went online.

Mapping out the opportunities and challenges of the instantaneous shift from classroom learning to online learning in pre-university, in other words, K-12 education during the Covid-19 pandemic, this paper attempts to display the impact of the advent of the ICTs on national education systems by focusing on the case of Turkey.

The paper asks to what extent the education policy of the Turkish government has been effective in responding to the coronavirus crisis. In this regard, it builds its theoretical framework on the concept of inclusive education in democratic societies. It argues that the pandemic has taught us the

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significance of developing robust national ICT policies for the proper functioning of online education policies and for equal opportunity in education in the Age of Information.

The method of the study is mainly based on qualitative content analysis of the official website of the Education Information Network, EBA, as well as the official reports of the Ministry of National Education (MoNE). In addition, eleven semi-structured in-depth interviews were conducted within the context of this study to gain the stakeholder insights, including the learners (students), teachers and supporters of learners (parents).

2. Theoretical Background

Children are the future of societies and states are as responsible as parents for their growing up as conscious citizens, since it is the task of states in democracies to provide every individual with basic education services. This makes inclusion in education not only a goal to achieve for states, but also a right to be demanded by its citizens. Each child matters in order to establish an education system involving equal opportunities.

Despite being accepted as one of the core elements of democracies, there is a lack of consensus on how to determine and measure "inclusive education" in the literature. Clough and Corbett identify five key perspectives on educational inclusion which emerged from the 1950s until the 2000s: The psycho-medical legacy, the sociological response, curricular approaches, school improvement strategies and disability studies critique [12]. Ainscow et al. argue that explicit definitions of inclusion in education are avoided in publications to leave some room for interpretation. They categorize the definitions as descriptive and prescriptive. A descriptive definition refers to "the variety of ways inclusion is used in practice, whereas a prescriptive definition indicates the way we intend to use the concept" [1]. UNICEF defines it in both ways as follows:

> Inclusive education is the most effective way to give all children a fair chance to go to school, learn and develop the skills they need to thrive. Inclusive education means all children in the same classrooms, in the same schools. It means real learning opportunities for groups who have traditionally been excluded – not only children with disabilities, but speakers of minority languages too. Inclusive systems value the unique contributions students of all backgrounds bring to the classroom and allow diverse groups to grow side by side, to the benefit of all [31].

Barton (1998) points out that inclusive education refers more than simply access for students into mainstream school. It refers to ensuring the participation of everyone by the removal of all forms of exclusionary practice. Thus, he defines the concept of inclusion in education as a process which necessitate a change in the existing education systems [3]. In his article which discusses "the main challenges in developing inclusive education" Haug argues that the goal of constructing an inclusive school system which fulfills the expectations of international organizations has not been achieved anywhere yet [18]. Cobigo et al. attempt to view social inclusion "from a developmental perspective". In this respect, the goal of social inclusion of individuals can be achieved through increased opportunities to interact with others and participate in activities, and therefore gaining sense of belonging and well-being [14].

Although there are diverse approaches to the concept of inclusive education, to have equal opportunities including the disadvantaged individuals in the society became one of the commonly accepted criteria to check the quality of any education system in the world. In this sense, the Covid-19 pandemic made it certain that the online education promises hope for removing physical barriers for equal opportunities in education as many countries continued their education online. However, it

brought about new kind of inequalities as well. Departing from the discussions of inclusive education in the literature this paper attempts to understand the opportunities and threats of online education in coping with inequalities and exclusion in school education in Turkey in the light of what we have learned from the pandemic so far.

3. The Evolution of Formal Online Education in Turkey

3.1. From Distance Learning to Online Learning

Online learning can be considered as the last link in the chain of developments in the evolution of the distance education over the past three centuries. In the literature, the concept of distance education is traced back so far as the year 1728, in which private correspondence courses to teach shorthand were offered. In the 1900s and 2000s, parallel to the technological developments, radio and TV broadcasting, telephone, computer and the Internet were used respectively as means of distance education [24]. With the widespread use of the Internet, online distance learning has become increasingly popular, particularly in higher and adult education. Internet platforms offering online courses as well as universities offering undergraduate and graduate level degrees online have been multiplied, which was reflected by the increase in the number of scholarly works dealing with the issue of online learning. Over the last two decades the trends in K-12 online learning have been examined in scholarly articles with a wide range of focus from policies enhancing or impeding online learning to practical issues such as the technical infrastructure and the costs [2].

In this sense, it is significant to note that online learning is a much broader concept than sole internet technology. Along with the internet and computer technology, other dimensions such as legislative and bureaucratical issues, methodological differences, learning environment, teaching and learning capacity etc. should be taken into account. The success of online education depends on the harmonious co-functioning of all those factors.

3.2. The Education Information Network (EBA) of Turkey

There is a long history of distance education in Turkey in accordance with the evolution of distance education in the world. Bozkurt divides the historical development of distance education in Turkey into four periods. Accordingly, in the first period (1923-1955), distance education was discussed on a theoretical level. The second period (1956-1975) witnessed the early attempts of distance education in secondary education by correspondence. In the third period (1976-1995), audio-visual tools, in other words, radio and TV started to be used and distance education was expanded to higher education by the establishment of Turkey's first distance education faculty (Anadolu Üniversitesi Açıköğretim Fakültesi) serving to broader masses. Finally, in the fourth period (1996-present), ICT-based distance education emerged and became widespread [8]. In the 2020 Performance Program, in line with the 2019-2023 Strategic Plan, the MoNE listed a series of digitalization projects as mid-term and long-term goals to be achieved such as the e-School Project, MoNE Information Systems (MEBBİS) Application, Electronic Exam (e-Exam) Project, Improvement of the network infrastructure of the Provincial National Education Directorates and e-Guidance Project [21].

The Education Information Network, or simply EBA, can be considered as the latest point reached in the ICT-based education in Turkey in terms of its scope. It was launched by the MoNE in 2012 as a national online education platform targeting the participants of the primary, secondary and high school education in Turkey, including students, teachers and parents. It was put into practice within

the context of Fatih Project, which laid out five principles for success: accessibility, productivity, equality (equal opportunities), measurability and quality [20]. The aim was to "provide equal opportunities, eliminate the digital gap and enhance the quality, thanks to the solution that covers all success factors." [20] On the EBA website the goals of Fatih Project are detailed and subcategorized as follows:

For every school:	VPN-Broadband Internet Access, Infrastructure, High Speed Access
For every classroom:	Interactive Board, Wired/Wireless Internet Access
For every teacher:	EBA Applications, EBA Market, Cloud Account, Sharing Course Notes
For every student:	EBA Market, Cloud Account, Digital Identity, Sharing Homework, Individual Learning Materials

Table 3.2: The Goals of Fatih Project
Source: [20]

The Fatih Project started as an ambitious project, which aimed to make a revolutionary change in education in the age of digital transformation. On the EBA website, Fatih Project is claimed to be "the greatest and the most comprehensive educational movement implemented for the use of educational technologies" [20]. Yet, the outbreak of the pandemic has prepared the necessary conditions to test the efficiency of the EBA.

4. Can Online Education Replace the Traditional One? An Experiment during the Covid-19 Crisis

When the pre-crisis conditions are to be examined, the OECD's country report[2] on the school education in Turkey prior to the pandemic gives an impression about the readiness of the country for online education. The report underlines that Turkey remains below the OECD average of 89 % with 67 % of students having a computer they could use for school work. This difference is even more prominent for socio-economically disadvantaged students. Only 36% of those students in Turkey reported having a computer they could use for school work, whereas the OECD average is 78 %. The report also points out that having a computer at home does not necessarily mean access if it has to be shared with other members of the household [26]. The OECD states that along with the access to the ICTs, an appropriate physical space for learning should be provided for an "adequate climate for home schooling" and reports that Turkey was below the OECD average (91 %) in terms of having a quiet place to study at home (87 %) [26][3]. The percentage of parental support and assistance (87 %) was also lower than the OECD average (89 %) [26]. Keeping those results in mind it is hard to talk about the existence of optimum conditions prior to the pandemic since the presence of the ICTs and the Internet connection are two indispensable conditions for a countrywide online education.

Nevertheless, urgent and courageous action is needed in times of crisis and the MoNE decided to respond the Covid-19 Crisis with the EBA in order for approximately 18 million K-12 students (see

[2] The data presented in this OECD report were mainly drawn from the TALIS 2018 Database and the PISA 2018 Database.
[3] This percentage was even lower (77 %) for the students coming from the bottom quartile of the socio-economic distribution, whereas the OECD average was 85 %.

Table 3.3.) to continue their education. Virtual education was the only possible way to bring teachers and students together avoiding physical contact at schools. Consequently, all this turned out to be a proficiency test for the EBA and online learning on a national level. The success of the EBA also determines to what extent online education can present an alternative for the face-to-face education.

As of March 12th, 2020, the MoNE announced the closure of the schools in Turkey due to the outbreak of the Covid-19 pandemic and the education was decided to be carried out remotely starting from March 16th, 2020 [28]. Following the shift to distance learning the EBA TV was launched (on 23 March 2020) under the national broadcaster of Turkey, TRT, in order to broadcast school lessons. This was practiced through three separate channels for primary, secondary and high schools[4] [29]. Along with the EBA TV, the digital EBA system enabled live classes, where teachers and students could meet online as well as access to curricular content of lessons for each class [22]. Table 3.2. shows the distribution of the numbers of schools, students and teachers whom the EBA served by the end of the educational year 2019-2020.

	School / Institution	Students	Teachers
Total of Formal education	68.589	18.241.881	1.117.686
Public	54.715	15.189.878	942.936
Private	13.870	1.468.198	174.750
Open education	4	1.583.805	-
Primary School	24.790	5.279.945	309.247
Public	22.808	5.005.927	275.733
Private	1.982	274.018	33.514
Secondary Education	6.925	3.412.564	186.914
Public	3.443	1.866.616	120.219
Private	3.481	448.554	66.695
Open education	1	1.097.394	-
Vocational and Technical Secondary Education	4.470	1.608.081	144.255
Public	4.068	1.342.550	135.374
Private	401	108.918	8.881
Open education	1	156.613	-
Religious Education (High School)	1.651	610.007	49.462
Public	1.650	502.847	49.462
Open Education	1	107.160	-

Table 3.3: Number of Schools, Students and Teachers in Education Institutions by Level of Education during the Educational Year 2019-2020
Source: [19]

Perhaps the most controversial issue discussed about the EBA in the media, which is also the main concern of this paper, is the problem of access. As marked in Eğitim Sen's report (January 2021), 6 million out of 18 million K-12 students did not have access to the EBA for different reasons. Most of those students live in rural or poor areas [17].

In order to evaluate the overall performance of the online education experience during the pandemic, the next two sections examine the issue from two perspectives: the state's perspective, that is to say, how the state presents the EBA and the ICT-based distance education in general and

[4] Two hours per day have been given for each of the twelve classes. Since the education reform made in 2012 the so-called 4+4+4 education model has been implemented in Turkey. Accordingly, mandatory education lasts twelve years including 4 years of each of the two levels of primary school followed by 4 years of middle school education.

the stakeholders' perspective, that is, the perceptions of the main participants of the K-12 education in Turkey.

4.1. The State's Perspective: The EBA as a Tool for Crisis Management

From the state's perspective, the EBA seems to meet the needs of the stakeholders in school education to a large extent. In general, an optimistic discourse is dominant in the official documents shared on the website of the MoNE and the statements of the Education Minister. Yet, a slight change in the discourse can be noticed when the three terms of distance education are compared.

In the first term, a more ambitious and success-oriented discourse, which tends to neglect the digitally haves and have-nots is prevalent. Many setbacks and inequalities stemming from the problem of digital divide are not emphasized in the state documents. The focus is rather on justifying what kind of policies have been implemented to maintain the educational services. This is also reflected in the statements of the Education Minister, Ziya Selçuk. In July 2020 in an open session on TV the Education Minister Selçuk responded to the criticisms by arguing that one should look on the bright side [13]. He maintained this attitude in the second term as well. After the EBA crashed on the second day of the 2020-2021 school year due to the density of concurrent users, Selçuk said "It is, in fact, good news for us because there is an incredible demand." [5] [25] [6] The MoNE's optimism was severely criticized by Eğitim Sen (Education and Science Workers' Union) for creating false perception in the society which gives the impression that everything is alright in education [16].

At the outset of the crisis in April 2020 Ziya Selçuk introduced the EBA as a "worldwide success" and stated that Turkey is, after China, the second country in the world which could provide nationwide remote education to all its people [11]. In his speech at the Turkish Grand National Assembly Ziya Selçuk presented the EBA as a success story underlining that with its capacity of hosting 3 million lessons (including live classes) per day the EBA was visited 12 billion 249 million times since March 23rd, 2020, being the most visited online education platform in the world. He pointed out that Turkey is one of the four countries in the world, which could succeed in broadcasting in three separate channels for primary, secondary and high school education. He also emphasized that the EBA's AI-based virtual assistant, namely the EBA Assistant, received the world's first prize by answering ten million questions posed by over 2,5 million EBA users within six weeks [23] [22] [10]. Moreover, he claimed that the EBA guarantees equal opportunities and fairness in education in all parts of Turkey as everyone can access it regardless of socio-economic inequalities [11].

Nevertheless, the findings of a survey conducted by the Educational Volunteers Foundation of Turkey (TEGV) approximately one month after this statement draw a different picture. Accordingly, only 69 % of the students could follow the EBA regularly.[5] 2% did not follow the EBA at all and 6 % could only follow one or two times within 1,5 months. 83% of those students who followed the EBA regularly could watch the EBA TV and 47 % could access the online contents, whereas only 11 % could participate in live classes [27].[6] This means only a very limited

[5] The report points out that the 66 % out of the 69 % spent only 1-2 hours per day.

[6] The survey was conducted with 368 children (80% of them 2nd to 5th graders) from 31 cities in Turkey. All of those children were at public schools and coming from socially and economically disadvantaged regions. Their distance learning experience were solely based on the EBA.

number of students could listen to their teachers and interact with their classmates after the lockdown in the first months of the pandemic.

Another significant outcome of the survey is the access to the ICTS and the Internet. 50 % of the students used a computer, 59 % a mobile phone, 28% a tablet to follow the EBA. 4 % of them had no ICTs to use. 21 % of the students had no Internet access at home. Furthermore, 18 % of the students stated that although they had Internet access, either their quota was limited or the speed of the connection was not sufficient to follow the EBA [27]. Apparently, a considerable number of students could not reach the EBA services due to the digital divide in Turkey.

Ironically, in the digital booklet entitled "This Year in Education. 2020", which presents the achievements of the MoNE from the beginning of the pandemic, Minister Selçuk states that the EBA is a great opportunity to achieve justice of opportunity in education as he introduces the updated version of the EBA with "Smart Suggestion System", which offers a personalized learning environment [22]. Some of the other achievements listed in the booklet concerning the online education are summarized below.

In February 2020, the "MEB Agenda" and "e-School Teacher" were launched to support teachers, students and school principals in carrying out their daily work quickly and easily dealing with less bureaucracy [22]. In March 2020, the EBA Control Center was opened to monitor the distance education continuously and solve the problems experienced due to the intensity of the simultaneous use of millions of students [22]. On March 30th, 2020 the live classroom application, which enables interactive lessons by bringing teachers and students together, was launched as a pilot project for 8th and 12th classes [22]. In September 2020, at the beginning of the first semester of the Education Year 2020-2021 the 1420 "EBA Support Points" in 81 provinces were established in schools and institutions to enable students who do not have the opportunity to participate in distance education from their homes to benefit from the EBA [22]. At the same time, increasing 27 steps compared to the previous month the EBA ranked first in the world among all sites in the field of education according to the amount of use and internet traffic criteria. This increase in the use of the EBA was attributed to the improvements and infrastructure investments made during the summer term [22]. Another success story mentioned was the "I am Special, I am in Education" mobile application developed in April 2020 for students with special needs to increase their participation in distance education [22]. The application received positive feedback from the OECD for its contribution to the inclusion in education "effectively increasing the equity gap" [32]. In December 2020 the "Digital Literacy Teacher's Guide" was launched for teachers to support the effective use of the ICTs in teaching [22]. In addition, the third phase of the distribution process of 500 thousand tablet computers, which were supplied by the MoNE started and contracts were made with the GSM operators in order to provide the students with a monthly quota of 25 GB Internet service along with those computers, which they need to access the EBA platform and live classes [22].

As seen in the chronology of developments, the MoNE takes more initiatives to cope with the inequalities in online education in the second half of 2020 and the issue is more visible on its agenda. It declares its commitment to increase the number of the EBA Support Points (to 5200) [22], distributes tablet computers to families which have no computer at home, attempts to solve problems regarding EBA's technical infrastructure through the EBA Control Center, makes deals with GSM operators to provide students with mobile Internet service and constantly launches new digital content.

The next section looks at the issue from the perspective of the stakeholders to be able to compare their expectations with the capabilities of the state.

4.2. The Stakeholders' Perspective: Qualitative Interviews with Stakeholders

In January 2021, within the context of this study eleven semi-structured qualitative interviews with three teachers (primary, secondary and high school teachers), four students (2^{nd}, 5^{th}, 8^{th} and 12^{th} grades) and four parents were conducted. The interviewees come from different provinces of Turkey with different socio-economic backgrounds. The half of the students and one teacher among them are at private schools.

The interviews aimed to gain insights about the overall performance of the online K-12 education after the outbreak of the pandemic. In order to evaluate the impact of moving to online education, the stakeholders were asked to compare face-to-face education with online education and describe, what has changed for them. The interviews took place on the phone and lasted between 30 and 60 minutes. The data collected were coded into five main categories and analyzed by using analytic induction [9]. The results are summarized below.

4.2.1. The Quality of the Digital Content

The majority of the interviewees were satisfied with the digital content of the EBA. Both the teachers and students stated that audio-visual materials on the EBA such as videos and games ease their teaching and learning process and make it more fun for everyone. The teachers were satisfied with the structure of the lessons which start with an introduction of the course subject and end with questions and answers allowing students to learn theory and practice together. The students stated that they find the EBA digital content particularly useful for repeating the lessons in which they have difficulties to learn quickly during the class. The teachers noted that the digital content saved them the time they spent in front of the photocopy machines for it is much easier and more environmentally friendly to upload and download course materials online.

Yet, the students also argued that keeping the course materials digitally sometimes prevented their freedom of learning since another family member used the device which they needed in order to reach those materials. All interviewees agreed on the fact that the content provided by the EBA should be supported by other materials and live lessons in order to gain deeper knowledge of the subjects. The most critical interviewee was a parent, who was concerned about the political motives embedded in the digital content. She argued that the pro-government ideology was trying to be imposed on students via the EBA contents. Thus, she was glad that her children went to a private school and did not use those contents there.

4.2.2. Learning Environment in the Live Classes

One of the issues which was criticized by all interviewees was the learning ambiance in the EBA live classes. Although the students stated that they liked the increased flexibility in comparison to the traditional education, they had difficulties to concentrate on the lesson. The outside noises and interruptions during the classes as well as sharing no physical space with other classmates in the sense of a classroom played a big role in it. They also complained about the pace of the live classes. A student stated that the teachers are usually too fast because they want to be sure that they cover all the subjects in the curriculum. He said that there is no time to digest the conveyed information during the class and that is why teachers try to compensate it with a lot of homework.

This was a problem for the teachers as well. They said that they had to teach faster because although the duration of the classes was shortened, the curricular content they had to cover remained unchanged. All three teachers complained that some students did not turn on their web cameras and microphones, and pretended as if they were participating in the class while they were playing or doing something else. Teaching without eye contact and not knowing if the students really listened to them were great challenges for the teachers. One of the teachers said "I felt like I had no authority in my class since I had no control mechanism. I never felt this way in my 33-year-career as a teacher".

The parents also confirmed that they often caught their kids playing computer games or chatting with their friends during the classes. A parent said "I have to admit that we, parents, also made mistakes. Once I let my son have his breakfast in the middle of his live class". She also said that online education caused screen addiction. She could not prevent her children from sitting in front of a computer, tablet or smart phone screen for hours because they used their classes and homework as an excuse to play more computer games. Another parent argued that not only students but also teachers had a problem of discipline in live classes. He said that he saw his son's teachers several times in jogging clothes while teaching and found it very distracting. He added that flexibility should not be confused with having no order. He observed that the teachers often changed the schedule of the classes spontaneously via WhatsApp which caused stress for the parents and students.

All of the interviewees agreed that lack of social interaction was one of the most significant disadvantages of the EBA live classes. The teachers explained that although they put lots of effort to increase the interactivity of their classes by teamwork, games, competitions etc., the students were reluctant to participate in the class voluntarily. Thus, the teachers had to ask questions to each student in order to find out how well the topic was understood.

4.2.3. The Use of the ICTs

There is a consensus among the interviewees on the significant contribution of the ICT use to their capacity of learning/teaching. The students mentioned several times that they learned much better from the audio-visual resources than textbooks. A student said that when she watched a video to learn a subject, she tended to remember it for a longer time.

The interviewees also emphasized the impact of the EBA experience on the improvement of their ICT skills. A teacher admitted that she was very nervous at the beginning when she learned that she had to teach online. She was not very familiar with computer programs and she thought she was too old to acquire the necessary ICT skills within a short time. However, at the end of the first term with the EBA, she came first in their school overtaking her young colleagues in terms of the frequency of activities she organized and information she shared on the EBA. She said that the EBA helped her gain the ICT skills, but above all, "digital self-confidence".

Similar to teachers, the parents stated that they improved, thanks to the EBA, their ICT skills while helping their children with their homework or preparing the setup of the live classes. They started to use the ICTs more often to communicate with the teachers and other parents. The interviews also revealed that there was a considerable difference between public and private schools in terms of the communication between teachers and parents. The parents, whose children were in public schools, told that they had limited contact to the teachers, whereas the ones, whose children went to private

schools, were regularly informed by the teachers about their children and received guidance for home schooling.

4.2.4. The Problem of Access and Attendance:

All interviewees mentioned the problem of access to the EBA and low attendance during the live classes. Although they all had an available computer and access to the Internet, they stated that it was not the case for everyone in their class. The access problems occurred for three reasons:

1- Lack of Internet connection
2- Lack of ICT devices (or problem of sharing them with others)
3- Problems with EBA's technical infrastructure

The student interviewees told that they never saw some of their classmates since the beginning of the pandemic and some of their classmates only showed up irregularly. One of the teachers working at a public school said that he had four group of students who did not attend his EBA classes: The ones who had no Internet access, the ones who had no device to connect or had to share them with their siblings, the foreign students who cannot speak Turkish very well and the ones who did not feel like attending at all. The first two groups, that is to say, the digitally have-nots were socio-economically disadvantaged students coming from poor families and districts or foreign students. The foreign students had to deal with language barriers in addition to the digital divide. Not surprisingly, the teacher and the student interviewees at private schools did not address the lack of access to the Internet and the ICTs as the reasons of low attendance in live classes. However, they highlighted the repeated problem of access to the EBA website as a reason why they did not use the EBA live classes, but instead other programs such as Microsoft Teams and Zoom to make live classes.

4.2.5. The Problem of Accountability and Fairness:

Examinations were what all interviewees were mostly concerned about in this system. They perceived it as a threat to the future of their educational life. The biggest reason for this concern was that everyone could profit from the EBA to a different extent, including the ones who did not use it at all, but they had to take the same exams to pass their classes and the marks they received from those exams would affect their whole life. They all argued that the EBA system lacked accountability since there is no efficient control mechanism which could check the real performance of the students. One of the students told that when they had an online exam, everyone in his class cheated, and therefore he cheated as well. On the other hand, he also found it unfair to learn online but having to take the exams physically at schools.

Shortly after the interviews were made, the MoNE declared that there will be no face-to-face exams in the new school term. Instead, the students will be graded depending on the frequency of logging into the EBA platform, the time they spent there and the performance of the homework they did in the system [7] [4]. However, this is also unfair for the six million students who did not have access to the EBA.

5. Conclusion

Thanks to the Covid-19 pandemic, it is no more science fiction to imagine that one day the mainstream education completely takes place virtually. This, of course, would not happen from one

day to the next, but the pandemic experience prominently accelerated the pace of digital transformation in education sector which has been taking place since decades.

In the case of Turkey, the online education through the EBA has served as a “one school for all” playing a central role in education during the pandemic. It would not have been possible to carry on education uninterruptedly without its assistance. Moreover, the EBA has changed the entire education landscape by presenting a potential education model which could be an alternative to the face-to-face education. It introduced the teachers and students with new teaching and learning methods and visibly improved their ICT skills.

Nevertheless, the pandemic has also taught us that the online education has not succeeded in realizing the ideal of equal opportunities in education. It has rather deepened the existing inequalities. Given that nearly one third of the students in Turkey had no access to the platform, the EBA seems to be no alternative to the traditional education at the moment. The results of a recent survey conducted by Eğitim Sen confirms that Turkey is not ready yet to learn online. 93,8 % of the respondents stated that distance education is not done in a qualified way and 62,5 % stated that the distance education should remain as an exception only for the pandemic period [15].

The issue of digital divide has to be tackled comprehensively in order to close the gap in education among the students with diverse economic and social backgrounds. Continuing education with the EBA in its current form can irreversibly harm the human capital in Turkey and lead to the emergence of a “lost generation” in terms of education.

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eGovernment III

RECOMMENDATIONS FOR A SUSTAINABLE PUBLIC ADMINISTRATION: TEAM-COOPERATION AND ORGANIZATIONAL SUSTAINABILITY THROUGH EMPATHY AND PROCEDURAL FAIRNESS IN TIMES OF COVID-19 DRIVEN DIGITIZATION

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Abstract
Social, political and economic crises are caused by a complex system of underlying factors. Among those, in many cases two problematic factors play a fatal role in damaging the sustainable outcome of work-processes and on the long run in even causing catastrophic events like the COVID-19 crisis: the lack of the ability to cooperate and egoistic thinking. As an important institutional actor, public administration is deeply involved in those interdependencies. The following article firstly focuses on the general conditions for cooperation among individuals and organizational sustainability. From an interdisciplinary point of view, it describes research approaches of psychology, economics and ethical leadership. And secondly it deals with the question what kind of options exist, to maintain and support intra-organizational and customer-oriented empathy and procedural fairness as cooperation's inevitable bases during this global crisis in which most interactions and administrative processes are limited to digitalized communication and meetings. The article combines the findings from the first part with new approaches from administrative practice, e-government and public administration theory. It tries to outline basic ideas to maintain a fair working culture and a professional service for citizens and to react to the risks of accelerated digitization.

Keywords*: public sector ethics, ethical leadership, team-cooperation, organizational sustainability, social psychology, behavioural economics, procedural fairness, digitization, COVID-19-crisis management*

1. Introduction

From an ethical point of view the developments of 2020 pose an enormous threat on the ideal of stable conditions in society, economy and public administration. As an important institutional stakeholder public administration is deeply involved in those interdependencies. Especially when digitization forces people to rely on technological communication channels, they should step back from time to time and be aware of the limits and risks of digitization. For example, they should still rely on the humane in humans and still take into consideration psychological aspects, especially when personal encounters and spontaneous creative processes are disturbed. Also, in times of accelerated digitization, especially cooperative working conditions und procedural fairness need to

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be fostered. And – what is more – for the perspective of public administration, both are particularly important during special projects and critical events like the COVID-19-crisis, when usual administrative routines are not always appropriate.

2. General conditions for cooperation among individuals

First of all, cooperation depends on successful communication, which is characterized by *mutual understanding* [ref. 3, p. 20] and *trust*. Secondly – as a higher form of cooperation – there can be observed an innate willingness to help in people. C. Daniel Batson has already described this in the early 1990s from the point of view of social psychology [ref. 1]. In his research he asked the question if "helping is always and exclusively motivated by the prospect of some benefit for ourselves, however subtle" or if there really exists the openness for altruistic helping in man [1, p. 1].

He coined the *"empathy-altruism-hypothesis"*: „that feeling for a person in need evokes altruistic motivation to help that person"[1, p. 177] if the conditions determine individuals that way. This underlines human empathy as an ability, which is deeply related to the *theory of mind*, regarding the other individual not only as an object, but to see the other as similar to oneself with an own view on reality [22, p. 136]. In Batson's view, substantiated by his empirical research, altruistic helping is not related to egoistic altruism, which certainly also exists [1, p. 2]. Batson assumes that empathy-based altruism is "a motivational state with the ultimate goal of increasing another's welfare" [1, p. 6] and that egoism is "a motivational state with the ultimate goal of increasing one's own welfare" [1, p. 7]. Also, from the point of view of social psychology, Jonathan Haidt engrosses this approach with a closer look at evolutionary origins. He regards selfishness as a part of human behaviour, but he stresses, that "human nature was also shaped as groups competed with other groups. As Darwin said long ago, the most cohesive and cooperative groups generally beat the groups of selfish individualists" [5, introduction]. In other words, human beings can cooperate and be good team players, even in correspondence with Darwin's evolutionary theory. For different scientific fields like ethical leadership and organizational psychology this argumentation is very supportive, but Haidt also ads that this positive tendency implies one problem: this "hivishness can blind us to other moral concerns" [5, introduction]. And this can lead to in-group vs. out-group-thinking, which then is the opposite of altruism and cooperation and with regard to politics leads to ideological thinking[5, introduction]. Haidt refers to research conducted by Michael Tomasello in developmental and comparative psychology. Tomasello regards man as a "*zoon politikon"*, a social being, strongly capable to cooperate in order to reach common goals [22, p. 136]. Human beings can only fully succeed, if they cooperate, but our coexistence is not necessarily stable.

Tomasello coined the term *"shared intentionality"* [23]: Humans and other great apes share social activities and cultivate social relationships "with others psychologically via social activities that create shared experiences" [25, p. 2]. For humans this might be making music together, dancing or team sports, but also conversing or gossiping might be part of that [ref. 25, p. 2]. In a new study the authors show that toddlers and great apes alike have a "propensity to feel closer to those with whom one has shared an experience" [25, p. 2]. But "given children's propensity to create common ground with others seemingly for its own sake in a way that apes do not – for example, in pointing things out to others via a pointing gesture just to share attention to it" can be interpreted a special human trait [25, p. 3]. For example, this common ground can be reached through exchanging eye contact while watching a video together and creating mutual understanding [ref. 25, p. 3]. The authors come to the conclusion that human beings need social activities "for creating shared common ground with

others, which serves to both create social closeness and support many further cooperative and cultural activities" [25, p. 10].
In a nutshell, sociobiological explanations and evolutionary psychology play an important role in explaining cooperation. In phylogeny and ontogeny cooperation is even older than language and not only human beings but also many other species are able to understand the intentions of other individuals to react correspondingly, they all have the ability to form a theory of mind [22, p. 136]. But what is so typical of humans, is the ability to interact with a shared intentionality [ref. 22, p. 136] and sensitivity towards common experiences which is strongly influenced for example by eye contact through social understanding and mutual closeness [ref. 25].

It can be reasoned that, with their research, Tomasello and Haidt add further ideas to Batson's empathy-altruism hypothesis from the early 1990's. What is more, directly shared personal experiences and goals are the fundament for mutual trust, solidarity and cooperation among individuals [ref. 7, p. 64] in groups but in whole societies as well.

3. Organizational sustainability through empathy and procedural fairness

With regard to organizational sustainability in public administration this means that mutual empathy-based cooperation among employees and between civil servants and their customers is dependent on establishing a shared intentionality. In this part I will shortly outline four different complementary theories:

In his *"x- and y-theory"* [14, p. 193ff] from the 1960s in which he identified two contrasting assumptions about human nature in a management system, Douglas McGregor rendered an important theoretical argument for the *human relations movement.* It focusses on the relations among employees and on employees and their managers from a psychological point of view and can be dated back until the 1930s. McGregor describes his theory as follows: Those who have internalised the x-theory believe that employees need to be directed, controlled and punished "to put forth adequate effort toward the achievement of organizational objectives" [14, p. 194]. It is achieved by the use of an oversimplifying combination of management by objectives, incentive systems and performance appraisal. Those assumptions undermine intrinsic motivation and cooperation among team members and even between principal and agent. McGregor contrasts this with the y-theory: Employees are used to "the expenditure to physical and mental effort", they have a high competence in self-control "in the service of objectives", they commit themselves to the objectives of the organization if they agree with them "under proper conditions", they seek responsibility and the capacity to exercise a relatively high degree of imagination, ingenuity and creativity in the solution of organizational problems is widely, not narrowly, distributed in the population" [14, p. 194]. So, he concludes, if the working conditions support the positive traits in employees, the organization benefits from human openness for performance, especially if the organization's objectives also support teamwork and cooperation.

Richard Sennett gives some further instructions from the point of view of sociology as to how procedural fairness can be reached in working practice with his description of the *"social triangle"* [21, p. 311ff]: In his view "cooperation oils the machinery of getting things done, and sharing with others can make up for what we may individually lack. Cooperation is embedded in our genes, but cannot remain stuck in routine behaviour; it needs to be developed and deepened. This is particularly true when dealing with people unlike ourselves; with them, cooperation becomes a demanding effort" [21, introduction]. In his research for this approach, he focuses on responsiveness [21, introduction], apparently very close to empathy and trustful communication.

His concept of the social triangle already has its roots in his observations of industrial work practice in Boston in the 1970s. First of all, he observed that workers grudgingly respected decent bosses and vice versa, secondly workers talked freely with one another about shared problems, and also covered for co-workers in trouble. And on the third side, when something went wrong in the shop and when necessary, they did extra hours or other people's jobs [ref. 21, p. 271]. He warns that, if informal channels of communication wither, people keep to themselves ideas about how the organization is really doing, or guard their own territory. Thus, weak social ties erode loyalty [ref. 21, p. 271f]. Only in working environments with a healthy informal communication culture and enough space for civility the social triangle can thrive.[2]

Apparently, for sustainable success of an organization, good leadership is necessary. Jonathan Haidt focusses on ethical leadership and the conditions for organizational sustainability. He emphasizes that cooperation also needs some *"intergroup competition"* [5, p. 235] to appeal to the self-interest of employees, but not to cultivate egoism. In his view on the one hand managers are able to model a "collective commitment, emphasizing the similarity of group members" [5, p. 235] and they reinforce the collective goals and the shared values [5, p. 234]. On the other hand, they "create competition among teams, not individuals" [5, p. 234] like in a sports team. "But pitting individuals against each other in a competition for scarce resources (such as bonuses) will destroy hivishness, trust, and morale" [5, p. 235]. In other words, in a healthy organization *procedural fairness* is practised and *cooperation must be worthwhile*. Managers make sound decisions and they do not praise cooperation and then reward the free riders in the teams [ref. 24, pp. 30f].

But what does this mean for the customers' satisfaction and support for sustainable organizational success – from the perspective of public administration for the citizens in a country feeling respected by the representatives of their state? First of all, if employees can trust their managers and colleagues, they also can fully concentrate on their customers' requests and wishes and also on the task of working in accordance with law and administrative routines. And if working for example with the *balanced scorecard* as a strategy performance management tool – as nowadays not only commercial enterprises but most public administrations do, too – managers should choose the objectives according to the idea of procedural fairness with a positive sense for ethical leadership and long-term orientation [ref. 15, p. 164]. For example, managers could focus on an open team-oriented communication for healthy intraorganizational processes among their employees on the one hand, on the other hand they could concentrate on their customers' perspective [ref.16, p. 1228f]. Engrossing this idea, intra-organizational procedural fairness supported by a *situational leadership style* can first of all enhance employees' commitment to the organisation and thus also support procedural fairness towards the citizens whenever they are in need for administrative services [ref. 18].

4. The challenges of COVID-19 crisis and digitization

As described in the previous parts, a lack of empathy and procedural fairness might lead to intra-organisational egoism and silo mentality. Cooperation and error reduction are neglected. During a time in which digitization is essential to save lives and thus is being pushed on as never before in all spheres of society, a closer look should be made on the consequences for the *human factor* in work processes within public administration and with regard to the citizens: Generally speaking, already before the COVID-19 crisis, digitization has reached a degree in our society as a whole, in politics,

[2] In the context of public administration, this is also the case, of course, but always under the condition of the rule of law and procedural fairness which are mirrored in the administrative routines.

economy, media – and in public administration – which promises a well-being and an optimisation of everyone [ref. 11, p. 20]. One dimension of this promise is the fact that people gradually become more and more independent from other individuals and they do not need to cooperate and to help each other in everyday live as they had to in the past [ref. 11, p. 20]. It is obvious that public administration has to regard this dehumanization as one of its most important challenges apart from other digitization-related topics like cyber security, digital services and data policy [ref. 13, p. 9]. But what does all this mean for the function of public administration during the pandemic and afterwards?

First of all, it should be mentioned, that especially when working with big data and artificial intelligence on a higher degree than usual, moral and judicial decision-making should still be in the hands of human beings [ref. 2, p. 39f]. Also, generally speaking, the higher the activity of people in the internet, the higher the risk of privacy violation and discrimination of minorities [ref. 2, p. 40f]. Of course, during the pandemic, digitization is crucial to keep up a stable executive, welfare and health care system: "health offices, retracing the chains of infection, and civil service still being accessible for the citizens in need for support despite the lockdown" is needed and only possible digitally [9, p. 7]. But with an empirical view of a survey study on the use of e-government in Switzerland, Austria and Germany in summer 2020, digital civil service then was not used more often in general, because most people were already used to e-government services before with growing openness for them during the crisis [ref. 9, p. 19]. Seven of ten of the respondents emphasized the positive opportunities e-government offered during the COVID-19-crisis [9, p. 35]. When the data was collected, the corona-tracing apps and digital school teaching were just newly introduced. The latter had a difficult start because of a lack of IT-infrastructure in schools and digital competence of teachers, but also because some households – luckily a minority – could not afford enough technical devices for their children [ref. 9, p. 10]. And altogether it was criticized that shared (and cooperative learning) in dynamic groups was not provided [ref. 9, p. 53]. In Germany, the corona-tracing apps on the other hand were firstly criticized for possible privacy-deficiencies [ref. 9, p. 10], but after some time, in October 2020, about 20 million people had already downloaded the application [ref. 19, 2020].

In Germany, the enhanced digitization is in accordance with the "Onlinezugangsgesetz" (OZG) of the year 2017, that obliges all administrative levels to offer extensive digital services for their citizens [ref. 3, p. 10]. This law makes administrations responsible for working with easily understandable digital communication standards on three levels: intra-organisationally, among different administrations and with the citizens. Generally speaking, one problem for beaurocratic communication is its legalistic administrative language, very often annoying people being in need for administrative services [ref. 3, p. 10]. For the process of digitization, Rudolf Fisch recommends firstly to work with already existing documents, to check whether they really are according to the legalistic standards and then to reformulate the texts in the language of everyday life. Only after this has been done, digitization into suitable text modules for the use in the internet can be started [ref. 3, p. 11f]. The understanding of the message of a text consists of the elements reading, realizing, remembering, understanding, interpreting, analysing and evaluating [3, p. 15]. In contrast to that spoken language needs different elements of understanding: nonverbal communication like the facial expression and gestures, supporting the spoken words, must be interpreted; also, the intonation is important [3, p. 15]. Nonverbal communication intuitively gives listeners much more information than the mere content of spoken words, like a positive or negative connotation [ref. 3, p. 15]. An administrative act, having been digitalized, challenges the receiver in three ways: First the direct contact to the sender is missing, so all the above-mentioned aspects of human communication, empathy and cooperation based on shared experiences, eye contact and mutual

closeness cannot be taken into consideration. Secondly most information is given in the form of text elements, having to be formulated in an understandable way. And finally, all digital information the receiver is confronted with, is based on algorithmized legal language [ref. 20, p. 164]. In this context, algorithms are program codes, being used to formalize and solve specific problems with arithmetic statements [ref. 20, p. 164]. Not all services public administrations need to offer simply base on easily programmable if-then-constructions or on the much more complicated *deep learning* for the work with alternatives [ref. 20, p. 166]. Instead, moral intuition, empathy and creativity are also necessary to be innovative and to find adequate, humane solutions for the citizens. E-government might make beaurocracies much more beaurocratic than wanted. So, to conclude, those who make the decisions still have to be the public servants and not the algorithms, even during COVID-19-crisis.

Another dimension of the challenges for public administration are the working conditions during the pandemic: With regard to the effects of increased digitization on employees in 2020, home office-work was discussed. While most people were content with the working conditions, some groups suffered from the negative psychological effects of social distancing [4, p. 9]. This corresponds to a general research on the effects of home office-work on employees: In a survey from 2019, on the one hand 67,3 percent of the respondents believe, that they are more productive if working at home, 73,7 percent also answer, that they can work with more concentration and in addition, 45,8 percent are content with the amount of their workload [26]. But on the other hand, at the same time 73,4 percent of the respondents, working in home office, had very often felt exhausted during the last four weeks, compared with employees exclusively working in an office (66 percent). What is striking is the fact that 69,8 percent of the home office-workers complain about negative emotions like anger and despair in comparison with the 58,6 percent of the office-workers. In addition, of those working from at home, 67,5 percent suffer from nervousness and irritability compared with 52,7 percent of the office-workers [26].

One reason for these problems might be a lack of the balance between private and working life. However, what is self-evident for wording a hypothesis, is the fact that the above-mentioned *"human side of enterprise"* [14] is missing. All its aspects of the need for direct meetings, spontaneous communication and shared experiences are missing. These problems go with the *"zoom-fatigue"*-syndrome[3] that was first discussed in the media in 2020 – when digital meetings had been in use to a much higher degree as ever before because of the pandemic [ref. 10]. Online meetings are experienced as very tiresome, because messages are left out: "While in the past, people had many meetings in their calendars, now there is only call after call. No breaks are necessary because people do not need to change the room. Two clicks, and the screen is filled with other people, arranged like ancient busts: Head and the upper part of the body is visible, nothing else. In the background: bookshelves, closets and kitchen interieur. Everyone observes everybody, but nobody really looks into the eyes of somebody else. In order to give another person a feeling of being looked at in the virtual room, everyone would have to directly look into the camera – and not at the screen. But as all the other people would only be visible from the corner of the eyes, this would cause such a strange feeling, that nobody really tries to do that" [10]. Another problem is that the users always see themselves on the screen, a really unnatural situation [ref. 10], making oneself much too self-referential. Employees in general – in this special context – the civil servants – undergo a lack of mutual responsiveness and people are simply worn out by the digitized conditions at work and in every-day life, because there is too much of it.

[3] The syndrome has been named after one of the providers of the software for online meetings, but of cause, also stands for other software products.

5. Recommendations for a fair working culture and a professional service

After one year of social distancing during the pandemic in Europe, but also in the globalised world society, many already existing – but in the past still hidden problems – become apparent. Hollstein and Rosa even interpret some of the outcome of the pandemic as a chance for a fundamental paradigm shift in society, not being often observed in history [ref. 6, p. 27]. So, to conclude for our context, this time of accelerated digitization and general challenges for society at least give us the chance to map recommendations for the functioning of public administration in the future; some will follow now:

Despite accelerated digitization, for a fair working culture, a professional service and sustainable organisational success, *mutual trust and understanding* must be supported, even in a higher degree than before 2020. Employees need a common goal to work with a *shared intentionality*, of which they are aware of and they need to have the chance to *cooperate but also to compete* [ref. 5, p. 235]. So *oral communication* in the classical form of a normal meeting, a conference or a phone call should be kept alive even during the pandemic whenever possible, because – from an evolutionary point of view – civil servants and citizens simply cannot communicate only on the basis of written communication or online-meetings [ref. 3, p. 15].

Also, future plans for further technological developments *should not include dehumanized information technologies like chatbots and virtual assistants*, based on artificial intelligence. They could harm intra-organisational processes but also the communication with the institutions' customers. Maybe someday the deep learning technology might have become so advanced that it could perfectly copy human thinking, but who wants to give moral and judicial decision-making out of the control of human individuals into the hands of machines [ref. 2, p. 39f]?

In addition, to some degree, online-meetings and technologies for *augmented und virtual reality* could help to support dynamic group work[4], but this is also dependent on the technical facilities of public administration and their users [9, p. 53]. Also, digitization's success depends on whether users had the chance to gain *digital competence and to keep themselves healthy*, which is highly based on self-discipline and the ability to keep a private distance to work even when working from at home [ref. 26].

With regard to *organization development* in public administration a human value-based ethical leadership-strategy based on the model of change of Kurt Lewin could be helpful [ref. 8, pp. 237-238 and ref. 12], if change management with regard to digitization is regarded to be necessary. The model consists of the three stages "unfreezing", "changing" and "refreezing". The *unfreezing*, now taking place everywhere during the last years and in times of the pandemic at an accelerated tempo, could be described the following way: for every organization the question should be asked how much further digitization is necessary, what would be possible advantages and disadvantages of further digitization, what kind of vision could be connected with it, and who could act as an expert for the process. From then on, a professional organization development process should be pushed on when the *changing* stage is being started: precise management objectives about digitization should be formulated, new structures and processes should be developed and also resources and conditions should be defined. Many organizations now have just already reached this stage because of the urgency of the situation. But this then must be conducted professionally and followed by the *refreezing* stage: the new IT processes and coordinated practices should be trained, new standards

[4] This also goes for home schooling, for example.

should be developed and should be integrated into everyday work. But most of all, there should prevail an openness for further change and new development cycles, also with an alternative perspective of a reduction of the proportion of digitized work when necessary. Digitization must not be an end in itself and be a burden for organizations, especially when the pandemic is over.

For the future, public administration and its employees and managers *should keep in balance the necessities of a digitized democratic society (then hopefully without the urgency of a pandemic) and of a fair working culture and professional service for their customers.* In addition, the influences of digitization on empathy among the members of public administration and the citizens and the effects on cooperation and organisational sustainability, could be a constant research topic in order to adequately react to further developments after the crisis year 2020.

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COHESION POLICY AS A DRIVER TO PROMOTE GOOD GOVERNANCE IN THE EU MEMBER STATES

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Abstract
The quality of public institutions has a major impact on the social and economic development within the EU member states. Regions with high government effectiveness, low corruption and high-quality public services tend to have higher outcomes in economic performance and social inclusion. In case of EU cohesion policy funding, the Seventh Cohesion Report published by the European Commission in 2017 demonstrates that regions with weak institutions have difficulties in absorbing regional development influences effectively and using the European structural funds properly in order to promote growth. The European Commission has recently set out several initiatives to strengthen good governance and administrative capacity building to improve the management of the European structural funds. This paper will scrutinize whether the cohesion policy implies proper instruments to promote good governance.

1. Introduction

The quality of public institutions has a major impact on the social and economic development within the member states of the European Union (EU). Regions with high government effectiveness, low corruption and high-quality public services have higher outcomes in economic performance and social inclusion. In case of EU cohesion policy funding, the seventh report on economic, social and territorial cohesion, the so-called Seventh Cohesion Report, published by the European Commission in 2017 demonstrates that regions with weak institutions have difficulties in absorbing regional development influences effectively and using the European structural funds properly in order to promote growth [11]. Especially in terms of preventing the economic and social aftermath of the Covid-19-pandemic, member states and regions must be able to absorb a high amount of the European structural funds. Consequently, it is essential to invest in good governance in order to build administrative capacities. Lately, the European Commission has taken several initiatives to strengthen good governance and administrative capacity building to improve the management of the European structural funds. Good governance concepts mainly deal with the effectiveness and efficiency of institutions and are therefore closely linked to output-legitimacy.

At first, this paper will give a definition of the good governance approach by the European Commission. After that, it will show the different levels of government effectiveness within the European regions. Subsequently, the European Quality of Government Index (EQI) will be used for a comparative approach. The EQI measures several indicators such as the quality of government, the impartiality and the control of corruption at the regional level. Moreover, a comparison of the EU member states in the Danube region will be provided. Finally, the main question will be

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discussed whether cohesion policy does have the potential to improve good governance and administrative capacity in the period 2021-2027.

2. Good governance - the approach by the European Commission

Having its origins primarily in development strategies of international organizations, the EU used good governance together with human rights, democracy, and the rule of law as a standard in agreements with external partners [3]. Good governance was closely linked to European foreign and enlargement policy. However, with the highly acclaimed white paper on European Governance published in the year 2001, the European Commission outlined a particular approach targeting at the quality and the effectiveness of the EU institutions as well as the EU European member states [13].

2.1. Defining good governance

There is a broad variety of defining governance causing criticism that an analytic concept of governance is still missing [7]. Several governance approaches have in common that they deviate from traditionally hierarchical forms of organization by putting the focus on the adaption of networks and more flexible forms of regulation and implementation [2]. This is mainly the case in the European multi-level-system where the formulation of policies and the implementation are interconnected among the supranational, national and regional level. Particularly in the fields of cohesion policy, the regional level is involved in the implementation of the European structural funds.

The term ‘good’ includes qualitative indicators such as effectiveness, efficiency, transparency, accountability, predictability, sound financial management, the fight against corruption, the respect of human rights, democracy and the rule of law [3]. Whereas the last three indicators are measuring the quality of state institutions in particular, the others are focusing public administration and management. So, these indicators are more related to output-legitimacy. That is why good governance in public authorities is obviously linked to ‘New Public Management’ till this day being the mainstream to make administrative processes more efficient, effective and transparent [16].

2.2. The approach by the European Commission

In 2001 the European Commission published a white paper on European Governance: It comprises rules, processes and behavior that affect the way in which powers are exercised at European level, particularly regarding openness, participation, accountability and coherence. The criteria can be assigned whether they are linked to input-legitimacy or output-legitimacy.

On the one hand, input-legitimacy involves political participation by and citizen representation of the people [19]. That is why the European Commission proposes that the citizens as well as the local actors shall be systematically involved in drafting and implementing European policies. To empower the civic society to participate in the decision-making, transparency and communication of the EU institutions have become crucial [13]. Furthermore, it should be clear which European institution (or institutions) is responsible during the decision-making process fulfilling the criterion of accountability.

Output-legitimacy, on the other hand, aims at the ability of the EU institutions to govern for the people effectively [19]. So, from the perspective of the European Commission, effectiveness is a

meaningful factor for output-legitimacy. A high effectiveness requires that a decision needs to be taken at the appropriate level and time, and deliver what is needed [13]. In case of the EU multi-level-system, it must be kept in mind that European directives and regulations have to be implemented into national law and executed by national, regional and local authorities. The European Commission defines high-quality institutions as those which feature an absence of corruption, a workable approach to competition and public procurement, an effective legal environment, an independent and efficient judicial system, and strong institutional and administrative capacities reducing the administrative burden and improving the quality of legislation [12]. Consequently, public administrations in the EU member states play a major role for the output-legitimacy [15].

Last but not least, effectiveness is closely linked to coherence and accountability. Coherence requires a strategic approach implying that policy actions shall contribute to common objectives which are formulated by the European Commission. So far, the European Commission has presented several strategies including the 'Europe 2020 Strategy' and the new 'European Green Deal', for instance, which will shape European policies for the next years.

3. The European Quality of Government Index (EQI) - an instrument to measure governance effectiveness

For a high quality of outputs of the EU multi-level-system, efficient public administrations and institutions are important to achieve the common objective of increasing cohesion and reducing disparities among the European regions [21]. Hence, the EQI was developed by the Quality of Government Institute at the University of Gothenburg in the year 2010 and has been funded by the European Commission since then. Till today three reports have been published. The latest report was composed in 2017.

3.1. Indicators

The quality of government and public service, impartiality as well as the control of corruption form the three pillars of the EQI. Regarding the quality of authorities and institutions, the use of e-Government can be beneficial for both people and governments provoking less administrative costs, citizen-friendly and business-friendly services and transparency [12]. Without doubt, e-Government has the potential to make services digital which is not necessarily equivalent to a higher quality of services. A low quality of government and impartiality and high corruption rates may have negative effects on business investment and economic growth. Corruption per se leads to a state losing its legitimacy and cause political and economic instability and reduces business investment [12].

The analytic approach of the EQI is based on the perceptions and experiences of the people in the 27 EU member states in the fields of policies which are governed or administrated by the subnational level. These are namely education, health care and law enforcement, and additionally fairness of tax authorities, social trust, and political values [21].

A methodological weakness of the index can be found in measuring the quality of governance based on the perception of the citizens which can vary from state to state. It can be assumed that the expectations of the people increase together with the quality of governance and the domestic attitude towards national institutions. Countries in which people believe in their regional and local authorities are also those in which people trust the authorities not to be corrupt [12]. A study of the World Bank demonstrates that the citizen's confidence in public institutions is less present in

Bulgaria, Croatia, Hungary, and Romania [12]. However, surveys among EU member states show that corruption and fraud are not accepted by the broad majority of citizens, regardless of whether they live in Bulgaria or in Germany [6]. It can be assumed that inhabitants from countries with higher corruption rates tend to be more sensitive to this topic.

3.2. Performance of Danube regions

Regarding the latest EQI from 2017, it is difficult to draw lines between the Northern and Southern or the Western and Eastern European member states [4]. Over the years regions in Scandinavian states have undisputedly established on the top of the list with high performances. However, when we take a closer look at the Danube regions, the German regions (Baden-Württemberg: 1.07, Bavaria: 1.34) have a score far above the EU average. The performance of the Austrian regions varies from 0.66 (Carinthia) to 1.09 (Vorarlberg). The Central and Eastern European states have in common that they perform under the EU average varying from -0.29 (Slovenia) to -2.27 (Severozapaden). The score of the Hungarian regions is between -0.75 (Dél-Alföld) and -1.45 (Közép-Magyarország). In the following section an in-depth comparison of the Danube regions will be drawn by examining the performances within the indicators.

3.3. Comparison of Danube regions

The EQI offers an interactive web tool to compare the performances of the regions considering the quality, impartiality and corruption pillar.[2] The EQI does not only imply an individual score within each of these pillars, but also a comparative analysis in reference to 15 regions with the most similar Gross Development Product (GDP) per capita. It takes into account that the quality of governance highly depends on the economic performance and the national budgets. The GDP is also the main indicator to classify the European regions into more developed and less developed regions. The higher amount of the European structural funds is naturally allocated to less developed regions.

The following table illustrates the score of selected regions in the Danube area. The scores vary from 100 (top performance) to 0 (less performance). The second column indicates the total EQI score for a region whereas the following columns show the performances regarding the quality of government, the impartiality and the corruption in detail. In case of Austria, Bulgaria, Hungary and Romania only the regions with the highest and the lowest score within the member states are included. The performances of the other regions within these countries are located between the scores of the top and less performing regions of these countries.

[2] For further information see https://ec.europa.eu/regional_policy/en/information/maps/quality_of_governance#2

	Total EQI score	EQI score in the quality pillar	EQI score in the impartiality pillar	EQI score in the corruption score
Bavaria (DE)	**78.6**	97.7	72.4	73.2
Vorarlberg (AT)	**73.0**	74.9	83.8	68.6
Baden-Württemberg (DE)	**72.8**	83.2	72.9	71.0
Carinthia (AT)	**63.6**	64.5	76.1	61.2
Slovenija (SLO)	**43.0**	50.8	50.2	45.4
Dél-Alföld (HU)	**33.0**	40.8	41.6	37.1
Severen Tsentralen (BG)	**27.6**	23,6	36.8	43.6
Sud - Muntenia	**25.3**	24.6	34.3	39.1
Jadranska Hrvatska (HR)	**24.2**	31.2	30.2	33.9
Kontinentalna Hrvatska (HR)	**22.3**	31.2	27.2	32.2
Közép-Magyarország (HU)	**17.6**	26.0	29.6	22.4
Sud-Est (RO)	**6.3**	17.0	12.9	17.6
Severozapaden (BG)	**0.0**	12.4	0.0	17.9
	Strength relative to the 15 regions with most similar GDP per capita			
	Neither strength nor weakness relative to the 15 regions with most similar GDP per capita			
	Weakness relative to the 15 regions with most similar GDP per capita			

Table 1: EQI score of selected regions [4]

As already mentioned above, Baden-Württemberg and Bavaria rank above the EU average in absolute numbers. In general, German citizens are more positive about the quality of government and impartiality while people living in Romania and Bulgaria are the least positive. Especially in these countries the low quality of government and institutions appears to be a major obstacle to economic growth. Corruption is a drag on economic growth leading to the misallocation of public funding, resources, distortion of incentives and other inefficiencies that it causes [12].

Considering e-Government, the performances of most EU member states in the fields of online availability and usability are higher than in indicators relating to the ease and speed of online services. The e-Government benchmark published by DG REGIO demonstrates that Bulgaria, Croatia, Hungary, Romania and Slovenia are considered as moderate performers in the delivery of digital services whereas Germany and Austria score above the European average [12]. However, the recent Digital Economy and Society Index (DESI) from 2020 only rank Austria above average regarding digital services and e-Government.[3]

4. Cohesion policy as a driver for good governance

EU funding is distributed to all European regions. However, a higher amount of European structural funds is directed to the less developed regions. These are regions where the GDP per inhabitant is beneath 75 per cent of the EU average. Especially in these regions cohesion policy is the main source of public funding. That is the reason why the cohesion policy is one of the EU's central policies, but also one of the most complex and difficult [1].

Irrespective of whether a region is a high or a less developed region, cohesion policy is an elemental pillar of the output-legitimacy enabling the EU to be visible in all regions of the member states. The performance of regional and local authorities plays a key role in the management and implementing of the European structural funds [20]. Otherwise European funding cannot be allocated to proper projects which in turn shortens the output legitimacy of the EU's objective to promote economic, social and territorial cohesion within the European regions (see Article 174 Treaty of the Functioning of the European Union (TFEU)).

The Seventh Cohesion Report from the year 2017 demonstrates that regions with weak institutions and slight performance of public administrations have difficulties using the European structural funds effectively [12]. From all the EQI indicators corruption may have the most negative effects on the allocation for the European structural funds. Consequently, good governance and capacity building of regional and local administrations have recently become a major goal to improve the effectiveness of European funding [21]. Before examining whether and to what extent regional and local authorities can improve their institutions by managing the European structural funds, the following section outlines the objectives of the future funding period.

4.1. Objectives of the funding period 2021-2027

According to Article 174 TFEU, the EU shall aim at reducing disparities between the level of development of the various regions and the backwardness of the least favoured regions. Several funds, namely the European Regional Development Fund (ERDF), the European Social Fund plus (ESF+) and the Cohesion Fund (CF) are the major instruments to strengthen the economic, social and territorial cohesion of the European regions. Whereas funding from the ERDF and the ESF+ is directed to all European regions, the CF only aims at member states with a Gross National Income (GNI) per inhabitant less than 90 per cent of the EU average. This means that the CF provides financial support to all European member states of the Danube region except Germany and Austria.

For the period 2021-2027 the European Commission published a draft for a common provisions regulation in May 2018 which defines general objectives and management principles for all

[3] For further information see https://ec.europa.eu/digital-single-market/en/digital-public-services

European structural funds. These objectives are earmarked to supporting economic growth and a high level of employment. In addition, particular regulations include special requirements for the European structural funds such as ERDF and ESF+. The legislative package is expected to be adopted later this year. However, a consensus on the framework for the period 2021-2027 was achieved by the Council of the European Union and the European Parliament in late 2020. So, there will be no crucial changes regarding the funding priorities [9]. In accordance with the Commission's proposal, the following policy objectives will be applied [10]:

(a) a smarter Europe by promoting innovative and smart economic transformation;
(b) a greener, low-carbon Europe by promoting clean and fair energy transition, green investment, the circular economy, climate adaptation and risk prevention and management;
(c) a more connected Europe by enhancing mobility and regional information and communication technologies (ICT) connectivity;
(d) a more social Europe implementing the European Pillar of Social Rights;
(e) a Europe closer to citizens by fostering the sustainable and integrated development of urban, rural and coastal areas and local initiatives.

The CF, the ERDF and the ESF+ can be used by the member states and regions to contribute to different objectives. Totally 30 per cent of CF funding and 37 per cent of ERDF are supposed to meet the specific climate targets of the European Green Deal [8]. The CF which will be stocked with €42.5 billion aims at the environmental infrastructure in the EU member states [8]. The ERDF is designed to address economic, environmental and social problems in urban areas, with a special focus on sustainable urban development. It will be supported with €200.3 billion. By paying attention to the objectives a, b, c and e, the key priorities are innovation and research, the digital agenda, support for small and medium-sized enterprises (SMEs), environment and the net-zero-carbon economy.

While the CF and the ERDF are mainly directed to infrastructure, environment and innovation, the ESF+ is the most important instrument to financially support employment measures, better education and social inclusion, especially to prepare the work forces for the digital transformation [22]. The ESF+ will be stocked with totally €87.9 billion.

Without doubt, the Central and Eastern European regions have accomplished an extensive improvement of the quality of governance since 2010. Some authors point out the positive influence of the EU administrative capacity requirements for the use of the European structural funds [21]. In the following sections the paper will scrutinize whether the management of the European structural funds directly requires good governance and indirectly has the potential to promote it. The investment in public administration will also be considered.

4.2. Increasing good governance by implementing the European structural funds

The ambitious objectives for the funding period 2021-2027 will only be achieved if the regional and local authorities are able to absorb the funding and manage projects in an effective and efficient way. However, insufficient capacity and efficiency of public administration in some EU member states and regions have negative effects on the implementation of the European structural funds [9]. Regarding the shared management of the European structural funds between the EU national and regional levels, we have to distinguish between the implementation of the European structural funds by regional governments and the absorbing of funding by regional and local authorities which is based on the Operational Programmes (OP).

The preparation of the OP is the first step of implementing the European structural funds. They are the key documents to achieve the objectives of each European structural fund within a region in a seven-year-period. By introducing a code of conduct on partnership during the period 2014-2020, partnership has been considered as an elemental principle of the implementation of cohesion policy [18]. The code of conduct is still valid during the funding period starting from 2021. This means that regional and local governments as well as the civil society are intensely involved in the preparation of the programmes and are also part in the monitoring committees [8]. So, the implementation complies with the participation criterion for good governance (see section 2.2).

Referring to the OP, potential beneficiaries such as local authorities, educational, social or cultural facilities or even private companies are able to apply for the European structural funds. Good governance and capacity building in regional and local administrations are necessary to manage the funds properly to promote economic growth [21]. Poor governance in lagging areas of the EU, however, is still a significant obstacle to regional competitiveness. Nevertheless, what the financial instruments have in common is that they have been criticized by local actors for their high complexity and administrative workload [23]. In order to ease the management of the European structural funds, the European Commission proposed around 80 simplification measures for the period 2021-2027.

Therefore, efficient public administrations on a regional and local level are a condition for European investment including elements of strategic planning, quality management, simplification of administrative procedures, development of human resources and procedures and tools for monitoring and evaluation [21]. We have to consider that in Central and Eastern European member states the programming process is still top-down organized. The range of action for regional and local actors is rather limited compared to federal or decentralized member states [20]. For instance, the Operational Programmes for the Hungarian regions are formulated by central government bodies. Regional and local actors are only able to articulate their interests and needs during the consultation processes. In the period 2014-2020, however, they were given an increased competence concerning the selection of projects [14]. Such measures to incorporate regional and local actors are necessary to prevent any challenges or bottlenecks in executing projects financed by the European structural fund. These states are able to contribute to output-legitimacy [12]. So, managing the European structural funds has the potential to increase the quality of government and public services.

ICT can improve the management, monitoring and evaluation of the European structural funds. Consequently, a system of electronic data exchange between beneficiaries and managing authorities and among different authorities of the management and control system was launched during the period 2014-2020 [10]. Furthermore, ICT may make the allocation of funding by public and private actors more efficient and transparent. In Hungary, for instance, the projects financed by the European structural funds as well as their funding amount can be found on a well-arranged website.[4] Such platforms provide an insight in the European funding for possible applicants and thereby make the outcome of cohesion policy visible.

[4] For further information see terkep.fair.gov.hu

4.3. The potential of ex-ante-conditionalities

A major influence on increasing good governance are the ex-ante-conditionalities which were introduced with the beginning of the last period 2014-2020. These mean that the EU member states have to fulfil several conditions in advance to guarantee the most efficient use of the European structural funds [1]. Referring to Annex III and IV of the draft for a common provisions regulation, they can be divided into the categories of horizontal and thematic conditionalities.

The horizontal conditionalities deal with administrative tools and capacities in the fields of the effective monitoring of public procurement, the effective application of state aid rules as well as anti-discrimination [10]. So, their goal is to improve the capacity and efficiency of public administration in the EU member states and regions indirectly, enabling economic growth and preventing corruption.

Besides the horizontal conditionalities, the thematic ones require the deployment of national and regional strategies in the fields of transport, health, digitalization, waste management, climate change, and vocational education and training systems [5]. Consequently, both types of conditionalities have the potential to promote good governance in the member states, especially by increasing the quality of government and fighting corruption.

4.4. Funding of public administrative capacities

In order to identify best practices, a closer look on the data base which was established by the European Commission to compile genuine projects could be useful.[5] In the period 2014-2020 the transnational project 'ERUDITE' with participating regions from Finland, France, Hungary, Ireland, Italy, Sweden and Slovenia is an excellent example how funding by the ERDF could contribute to promote digital services combining competences and innovations from business, public authorities and citizens.[6]

As mentioned above, the ERDF is linked to the strategic priorities of the European Commission which is besides the European Green Deal the digital strategy of the EU. In contrast to the period 2014-2020, a specific objective dealing with administrative capacity building is missing. In the period 2021-2027 the European Commission follows a different approach: Henceforth, support actions within each of the five policy objectives (see section 4.1) will be possible leading to improving institutions and governance as well as the cooperation with partners [20].

On these grounds, ERDF investments will focus on digitalization of services for businesses and citizens [10]. Digital technologies in the public sector have the potential to increase the quality of public services. The less developed countries such as the Central and Eastern European member states can also use the CF and the ERDF to improve the capacity of programme authorities linked to the implementation of the funds [11]. Such technical assistance would help regional and local authorities to achieve the tasks assigned under the common provisions regulation [21]. In contrast to the ERDF, funding from the ESF+ can be used for capacity building of human resources in the public sector and by that enhancing the efficiency of public administrations [21]. So, the CF and the

[5] For further information see https://ec.europa.eu/regional_policy/en/projects

[6] For further information see https://ec.europa.eu/regional_policy/en/projects/France/transnational-cooperation-for-a-new-energy-model-in-southwestern-europe

European structural funds play a major role in promoting good governance, especially in the less developed member states.

In addition, the pilot action 'Frontloading administrative capacity building for post-2020' was launched together with the Organisation for Economic Cooperation and Development (OECD) in the year 2018 to improve good governance and administrative capacity for cohesion policy [21]. Besides national and regional authorities in Greece, Poland and Spain, the European Commission selected Croatia and Bulgaria as parts of the Danube regions. The goal of the pilot action is to identify key finding and recommendations for managing authorities and the European Commission to improve the provisions to implement the European structural funds.[7]

4.5. New financial support by the Recovery and Resilience Facility

In order to overcome the economic and social crisis caused by the coronavirus pandemic, the member states agreed on the recovery instrument 'NextGenerationEU' in late 2020. Its centerpiece is the so-called Recovery and Resilience Facility (RRF) which entered into force in February 2021. With €672.5 billion in total (€312.5 billion in grants; €360 billion in loans) it supports public investment and reforms in the EU member states. Like the structural funds, the RRF is closely linked to the strategic agenda of the European Commission putting focus on the investment in green and digital transition [17]. So, the RRF supports national efforts to promote digital services. Germany, for instance, is planning to invest in digital services and e-Government.[8] Therefore, the RRF is a chance for more developed regions to improve the quality of government.

When looking at the governance of the RRF, however, it lacks a multi-level-approach as we know from cohesion policy. According to Article 18 of the regulation (EU) 2021/241 establishing the RRF is up to the EU member states to outline their reform and investment priorities in national recovery and resilience plans without a compulsive participation of the regional and local authorities [17]. In fact, the governance of the RRF contravenes the good governance principle of participation. This could possibly lead to a less performance of RRF investments when the needs of the regional and local level are not sufficiently incorporated in the programming by the EU member states.

5. Conclusion

The question of the paper has been whether the cohesion policy implies proper instruments to promote good governance within the EU member states. A comparative analysis of the Danube regions revealed differences in the criteria of the EQI which are the quality of government and public services, impartiality and the control of corruption. As the data demonstrated, the quality of governance decreases the farer the Danube river flows in the southeast direction. While relatively more financial support is distributed to the Central and Eastern European member states belonging to the category of less developed regions, the cohesion policy, in particular, has the potential to promote good governance. The following results of the paper lead to this assumption: First of all, the implementation of cohesion policy requires a decentralized approach delegating responsibility and competences to the regional and local level. By participating in the implementation process, regional and local authorities would also be able to increase the effectiveness of structural funding because they dispose of a greater insight in the needs of several regions. In general, multi-level-

[7] For further information see https://ec.europa.eu/regional_policy/en/policy/how/improving-investment/frontload/#1
[8] For further information see https://www.bundesregierung.de/breg-de/aktuelles/eu-aufbaufonds-1853940

governance is a convenient tool to promote good governance. Secondly, the ex-ante-conditionalities contribute to capacity building and to the effectiveness and efficiency of public administration within the EU member states. Finally, funding from the ERDF and the ESF+ can be allocated to digitalize service. Digitalization and e-Government have been established as key factors to rise the quality of government and institutions. The allocation of the European structural funds to the appropriate projects could thus be extremely beneficial for good governance.

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APPLICATION OF BLOCKCHAIN TECHNOLOGY TO THE INTERNATIONAL TRADE AND CUSTOM REGULATIONS

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Abstract
Blockchain is a technology, which has several advantages to be used in quite wide areas such as payment solutions to transportation. Using blockchain technology in international trade may have impressive promises and potentials.

In our research, we aim to discuss the potential and existing implementation of blockchain technology into international trade and customs practices. It is important to make comprehensive due diligence of the blockchain technology to determine which functions of the blockchain technology can be implemented in the international trade environment.

In this paper, we put forward to claim that blockchain can be implemented into customs procedures for faster and more secure trade. To understand underlying concept, first we will summary existing regulative framework of the international trade and customs and then the following of blockchain in brief, we illustrate potential ways to implement blockchain into custom procedures. We will use literature review and quantitative research in order to support our claim and analyse relevant international practice of using blockchain on customs.

Keywords: *Blockchain, Trade, Custom Procedures, Supply Chain,*

1. Existing Regulative Framework of the International Trade and Customs

To better understanding the potential implementation of blockchain into global trade, it is important to see the regulative structure of global trade and custom. The process of international customs compliance process takes the attention of several stakeholders of international trade in recent years. The consensus view seems to be that compliance procedures should be transparent, simple, and predictable. International trade regulations have been testing especially in terms of health conditions during the recent Covid Pandemic.

World Customs Organization (WCO) is one of the most important organizations for global trade bodies. It has been founded in 1952 as an intergovernmental organization. WCO has prepared WCO Kyoto Convention and it was adopted in 1973 as the International Convention on the Simplification

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and Harmonisation of Customs Procedures, which is entered into force in 1974 with 63 contracting parties. It was a quite important step to support the trade and simplify the customs procedures. The same logic is underlined by the Revised Kyoto Convention (RKC) (as full name: Protocol of Amendment to the International Convention on the Simplification and Harmonisation of Customs Procedures), which came into force in 2006. The new amendment on the protocol contains improving efficiency, harmonization, and simplification of customs procedures, and aims to foster international trade.

WTO Trade Facilitation Agreement (TFA) is one of the recent agreements on international trade. It came into force in 2017 after the ratification of the majority of Word Trade Organization Members.

The TFA contains provisions for expediting the movement, release, and clearance of goods, including goods in transit, and sets out measures for effective cooperation between customs and other appropriate authorities on trade facilitation and customs compliance issues and additionally contains provisions for technical assistance and capacity building in this area.[2]

UNCITRAL has several regulations and studies in terms of electronic transferable records. The central issue addressed here is the relationship between blockchain records and UNCITRAL regulations. Convention on the Use of Electronic Communications in International Contracts, Model Law on Electronic Transferable Records (ETR), Model Law on Electronic Commerce, the Model Law on Secured Transactions, the Model Law on Electronic Transferable Records, the Model Law on Electronic Signatures, United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (Also known as Rotterdam Rules) are regulations in force, have connections with blockchain promises on custom procedures discussed below sections.

The growing complexity of trade rules, free trade agreements, and audit initiatives create burdens for companies. The recent trade war between China and the USA shows that political decisions may create new burdens for custom procedures. It is estimated that the tariffs impose an additional burden of between 500 million to 1 billion US dollars on US, the EU, Canada and Mexico, which are the countries hit hardest by increased US tariffs on Chinese imports. [3]

Border security concerns about international terrorism-monitoring or health concerns with the recent covid-19 pandemic showed that global trade could be fragile and its importance for the supply chain. Increasing bureaucracy on custom procedures may cause economic loss. Blockchain has the potential to minimize bureaucracy.

2. Blockchain in a Nutshell

Blockchain is a technology behind the most famous cryptocurrency, Bitcoin. It is a software-based, open-source, peer-to-peer technology, which has been launched by the unidentified programmer under the name of Satoshi Nakamoto in 2009. Since then the system itself claims that it is unhackable and it seems that it has been proved until today. The most promising feature of blockchain is any data on the blockchain cannot be changed or deleted on the system as long as the majority of the whole blockchain network confirms it. Through the growing popularity of

[2] Accessed on: December 21, 2020. [Online]. Available: https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm

[3] Mao Haiou, Görg Holger, Friends like this: The Impact of the US – China Trade War on Global Value Chains, 2019, KCG Working Paper [Online]. Available: https://www.kcg-kiel.org/wp-content/uploads/2019/07/KCG-Working-Paper-No.17.pdf

cryptocurrencies (8.172 Cryptocurrency, more than 825B $ Market Cap[4]), every day more people become part of the blockchain database. Hence the system itself increases its safety with increasing hashes and chains.

There has been an inconclusive debate about whether Blockchain technology is trustable or not, by today it has been proved that data is secure and immutable (as long as there is no consensus of the whole blockchain network to change). Hence the main theoretical premise behind blockchain is that without the need of any 3rd party either governmental or institutional, the system itself provides more trust than anybody else. The central issue addressed here is the relationship between trust and blockchain.

Additionally, several features and products have been improved on the blockchain technology such as time stamping, tracking of all records from beginning to end, and smart contracts (which is the software version of vending machines, self-execute when certain conditions are met). In this paper, the discussion centers on how blockchain technology can be used in international trade and custom. Blockchain can be used for international trade with the features of shared ledger, smart contract, data privacy, and consensus.

Categories of blockchain are public blockchains as no specific entity manages the platform, private, the platform is controlled by a single entity or consortium of companies. Another commonly used classification is permission-less blockchain, which is open to everyone as Bitcoin, or permissioned blockchain, which has restrictions for participants.[5]

3. Potential Implementations of Blockchain on Customs

3.1. Clearance of Custom Documentation

Main parties of international trade are traders, governments, business consortiums, insurance companies, financial bodies as banks or creditors. Custom procedures are one of the most bureaucratic steps of international trade. The problem that both sides of the import and export customs should check the documentation of shipping, country of origin proofs, the validity of the whole documents from beginning to end. For instance, manual cross valuation of the customs declarations takes plenty of time and human force during international trade transactions. Blockchain can automate these procedures.

In the international trade process, there are several documents, which will be checked and confirmed by the authorities. These are packing list, bill of landing, export documentation, advance declaration, pre-paid invoice, certificate of origin, shipping introductions, ISF (Importer Security Filing), geography-specific certificate, dangerous goods declaration, cargo-specific certificate, customs clearance, and commercial invoice.

Blockchain platforms can globally manage records, import-export declarations, bills of lading, invoices and certificates of origin, and any sort of documents. Customs documents can be processed and tracked through blockchain solutions. Hence it provides better audibility and expedites the processing of international trade.

[4] Accessed on: January 5, 2021. [Online]. Available: https://coinmarketcap.com/
[5] G. Emmanuelle, Can Blockchain revolutionize international trade? World Trade Organization, 2018

The biggest motivations to use blockchain technology in custom procedures are cost reduction, faster and safer trade. Blockchain's decentralized and transparent features can be used against fraudulent documents and fake signature submissions. Utilizing the immutability of the blockchain, pre-approval can be facilitated and it optimizes the risk, request for advance rulings can be submitted.

In recent years, paperless trade becomes a purpose by several international trade stakeholders and there are a few examples to be reached out by 90% paperless trade. However, the rest 1 to 10% is the most difficult to implement. Blockchain may be the solution for the rest. For instance, the International Port Community Systems Association has been working on blockchain pilots and trials relating to bills of lading. IPCSA Blockchain BoL project aims to convert processes from paper to paperless by transforming from paper form to digital file and transfers the process to a common ledger – a distributed database that all authorized players see at the same time.[6] Hence cargo can be released earlier and save the storage costs, reduce paper chase, increase the security to avoid risks of delay, loss, or forgery, and has the potential to add other documentation as insurance and phytosanitary

Bill of Landing (BoL) can be used multible times with copy and paste method. Using smart contract and workflow will reduce handling time, when changes are made in a BoL.[7]

It is important to comply with existing regulations before implement blockchain. For instance, to use blockchain on the bill of landing, Rotterdam Rules must be checked, which cover the electronic bill of landings as negotiable electronic transport records.

One another potential to use blockchain is free trade agreements (FTA). FTA verification process remains paper-heavy, inefficient, and ridden with errors, which may cause penalties. Blockchain-based FTA verification has the potential to eliminate cargo delays, penalties, fraudulent or incorrect document filings.[8]

3.2. Tracking of Operations

One of the features of blockchain is traceability, which enables parties to record a chain of transactions and the movement of goods internationally with instant and accurate information. The multiple players of the international trade claim huge paperwork load either for traders or government agencies and 3rd parties as banks and carriers. There are middlemen to check and record payments, movements, details of the good. Blockchain has the potential to solve these complexities of the procedures simultaneously.

Recent Covid Pandemic showed that traceability of goods plays a significant role in health safety. At the beginning of the pandemic, few questions have been raised about whether the virus is infectious through products or not. It accentuates the realization that tracking any product coming from Wuhan Food Market or China might have a significant risk to spread the virus across the world.

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[6] IPCSA Bill of Lading Project, Accessed on: December 30, 2020. [Online]. Available: https://ipcsa.international/initiatives/ipcsa-bill-of-lading/

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[8] Angert, Svetlana, Blockchain Technology Implementation in The Us Custom Environment, Naval Postgraduate School (U.S.), 2019, Available at https://www.hsdl.org/?view&did=831027

Blockchain has the potential to provide significant tracking options as a solution to the growing concern of product quality and safety. The advantage of blockchain here is whole data on the blockchain can be tracked by whole stakeholders simultaneously in real-time. In the case of a public blockchain, anyone can track whole chains from beginning to end. The difference between any tracking software and blockchain is trustable and irreversible data on the blockchain without interference by any 3rd party. However, on normal software, the data chain may be interfered with by a 3rd party for commercial concerns. In this respect, transparency of Blockchain can play a significant role to fight against bribery on custom procedures especially on the trade between most corrupt countries.

There are several pioneers to implement blockchain into traceability platforms. VeChain has developed a food traceability platform based on the blockchain for Walmart China and launched in 2019. Traceability system based on the blockchain enables to product information across the food supply chain, such as producing and processing, transportation, warehousing, retailing and shares data ports with stakeholders on the supply chain, and encrypts and stores data and uses blockchain (distributed ledgers) synchronously and records on the chain with timestamps.[9] The Department of Homeland Security has been testing blockchain to use for security cameras and other devices at United States' ports of entry with the aim of detection and stopping intruders who try to impede the devices or manipulate the data they collect.[10]

3.3. Acceleration of Whole Procedures of Trade and Customs

Globalization and the extremely growing value of e-commerce make foreign origin products easier to access to end customers and attract big players to enter the market. Companies are forced to deliver their products quite fast due to increased competition and the expectation of costumers to get their products in hours sometimes. On this side, blockchain has the potential to accelerate whole chains of international trade, especially for the transactions, which has parties who have no trust each other as different governments, instructions, and providers.

The basic premises of the blockchain technology for international trade are simplified business processes, secure by design, transparency, and immutable audit trails and workflows across organizations of the trade. It is important to bear in mind that blockchain can track and guarantee that uploaded data is not tampered with, nevertheless does not guarantee that the recorded data is accurate.

Private permissioned blockchains managed by parties of international trade has the potential to create business-friendly, fast, accurate, and low-cost international trade procedures. It is important to standardize the infrastructure and make authorities to accept to use of these platforms.

Blockchain implementation on the letter of credit and origin procedures is possible to avoid bureaucracy and speeding up the documentation. Cloud-based permissioned blockchain can be utilized allowing to control the identifies of involved stakeholders and blockchain performs very efficiently to store and tracking different information and regarding the processing and origin of goods and items in general. Electronic certificate of origin initiatives has started to develop

[9] Walmart China Blockchain Traceability Platform, European Chamber, 2020, Available: https://www.europeanchamber.com.cn/en/members-news/3303/walmart_china_blockchain_traceability_platform

[10] Nash K. Sam, Homeland Security Looks To Blockchain To Track People, Goods Across Borders, 2017, Available: https://www.wsj.com/articles/BL-CIOB-11267

streamline the transferring electronic certificate for goods exchanged internationally and make processes simpler, transparent, and secure by reducing the risk forged declarations.[11]

One another benefit of blockchain may play a significant role to support small-medium enterprises. Self-executing contracts (Smart Contracts) enables small-medium enterprises to join international trade using low cost and less bureaucratic barriers of the trade. It may reduce the legal and procedural costs of the process and secure against the risk of non-payment while the procedures are shortened. Custom procedures are sometimes so complex and need expertise on custom, tax and legal side while required expertise. Main reason behind all these complexity is bureaucratic system, which is designed to secure system and have several control mechanisms. If blockchain manage to avoid this control mechanism with its secure immutable system, costs and numbers of this steps will be lower. Hence small-medium enterprises can join the international trade easier and cheaper. Blockchain-based custom practice can provide access to trade finance and facilitating trade procedures for small-medium enterprises.

4. Other Potential Implementations

Blockchain-based on the Bitcoin platform while smart contracts based on the Etherium platform and such examples working on distributed ledger technology are still relatively new technologies and studies on these technologies examine new ways to implement blockchain into international trade.

Transparency on Blockchain as noted earlier has the potential to track transactions from beginning to end. However financial technology behind Blockchain, Bitcoin represents anonymity and flexibility, which make it vulnerable to money launderers.[12] But in terms of tax frauds on custom, it is possible to use blockchain technology to prevent tax frauds. With new emerged solutions, money laundering and international money transfer would be more transparent than existing solutions. In this respect, Combat Trade-Based Money Laundering (TBML) and Financial Action Task Force (FATF) would be fields to use blockchain. The most frequent Trade-Based Money Laundering methods are over-under-multiple invoicing, over/under shipment, and quality misrepresentation. With using of Blockchain, all transactions on the trade procedures can be transparent, secure, and immutable. Hence the data on the whole procedure after hashing on the blockchain, corruption would be prevented. These arguments suggest that transparent data on the blockchain and using cryptocurrency for payments rather than cash, blockchain would promise to fight money laundering. Blockchain increases the visibility of transactions and accuracy through automation, especially tax administration.[13]

One another field to use blockchain would be trade finance. Trade finance, and its instruments, have become a high-risk business over the past years because it may be used in certain financial crimes, as 21% of respondents reported increasing requirements for their bank guarantees and standby letter of credits, 15% of banks reported an increase in injunctions, and 13% of respondents reported an increase in charges of fraud according to the survey conducted by the International Chamber of

[11] Blockchain for supply chains and international trade, Panel for the future of science and technology, May 2020.
[12] Bryans, Danton, Bitcoin, and Money Laundering: Mining for an Effective Solution. 89 Ind. L.J. 441 (2014), Available at SSRN: https://ssrn.com/abstract=2317990
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Commerce in 2016.[14] Trade financing forms, which financial intermediaries are providing working capital, lending, or liquidity have changed in the past couple of decades, in particular to accommodate the expansion of international supply chains.[15] Trading of finance on supply chain covers lending, the issues of letter of credit, cargo insurance, and factoring. Blockchain can increase transparency in the trade finance process. Hence it would decrease the risk and in turn, expand the supply of credit available.[16] The way of using blockchain to increase transparency is public and trackable data on the chains.

Smart contracts can be used for commercial contracts of international trade. It can automate and authenticate the processes where the participants in a process need to be able to rely on and trust exchange or supply chain.[17]

5. Conclusion

Supply chains have three core modern era challenges, namely data visibility, process optimization, and demand management.[18] As an answer to these challenges Blockchain technology's promises are transparency, audibility, automation of the paper-based process, efficiency, immutability.

Government to government relationships is the most challenging part of blockchain-based solutions since both party acceptance is significantly important to have full functionality.

The underlying argument against using blockchain technology in the customs procedure is the interoperability of standardization. It is important to have standardized software to be accessed and accepted by international traders and by both sides of custom bodies. For instance, the International Organization for Standardization (ISO) published a Blockchain and distributed ledger technologies report in 2016 to describe functions of the smart contracts as a basis for technical specification.[19]

There has been an inconclusive debate about whether blockchain technology is reliable or not. Interoperability and scalability of early-stage technology have been discussing by relevant authorities. Hence, regulatory and legal acceptance is still a big question. A major threat to the whole blockchain infrastructure is the 51% attack, which happens in the case of the majority of the whole network taken over by hackers or private groups. Cost efficiency and not commonly using blockchain remains questionable. Notwithstanding I am not alone in my view that blockchain promises technology-driven solutions to speed up customs procedures while providing a more secure trade environment. Speeding up money transactions, reducing time losses, and bureaucracy

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would increase the liquidity of the companies rather than wait for payment on the corresponded bank and support small-medium enterprises to enter the international custom market. Paperless and without 3rd party necessity, the trade would be safer and faster while costs, risks, frauds are lower.

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eVoting and eParticipation

SOFTWARE SECURITY EVALUATION FOR EVOTING SYSTEMS

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Abstract
This paper follows on from Recommendation CM/Rec(2017)5 of the Council of Europe on eVoting in defining the basic principles and requirements of a software security evaluation according to Common Criteria that distinguishes the main differences in the two recommendations, namely verifiability and voter secrecy. It proposes a definition for assets, threats and objectives and discusses the differences between the current Recommendation CM/Rec(2017)5 and its predecessor, Rec(2004)11.

1. Introduction

Any eVoting protocol and its implementation has to be verified in a formal procedure as is customary with security sensitive software. The de facto standard for software security evaluation is Common Criteria (CC) [1]. CC is available on several "evaluation assurance levels, EAL" of increasing stringency, starting from Level 1, which basically only assures the functioning of the software, to Level 7, which typically applies to military-grade systems. Each level defines a set of formal requirements for, most importantly, defining the threats and measures used to protect the software from the threats. Some examples of EAL certifications may be Microsoft SQL Server 2019 (EAL 2+), IBM z/OS Version 2 (EAL 4+) or the Malayan digital ID (EAL 3+) [2]. The symbol, "+", in this context means that requirements from higher levels are included in the main level ("augmented"). For example, EAL 2+ may mean that the software includes assurance level 2 and some parts from Levels 3 and 4.

The general procedure is to define a Protection Profile for a class of products and then certify a product against the Protection Profile (PP) [3]. The PP is therefore the blueprint which the product itself is certified against. The EAL of the PP therefore also determines the EAL of the certified product. Rec(2004)11 on eVoting [4] was an attempt at providing a set of standards for eVoting systems, whereby "eVoting" was understood in its broadest form and also encompassed on-site voting machines, kiosks and other systems. In this paper, the term eVoting will only refer to Internet-based remote voting. Where other forms of electronic vote casting are meant, special reference will be made. Rec(2004)11, however, did not just contend itself with defining security and quality standards of eVoting systems. In Appendix III, Section F, it details the certification requirements and deals with the topic in a terminology very close to the methodology of CC. In particular,

(i) It defines the assets to be protected;
(ii) the threats to be countered; and
(iii) the objectives to counter the threats.

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This description would have readily lent itself to the definition of a CC PP, which could have then been certified and used as a yardstick for product certification. Unfortunately, such a profile never materialised and therefore "recommendation-compliance" as maintained by some vendors remains a loose term, which is regrettable in a field where trust is of upmost importance. [5, 6]

Rec(2004)11 contained shortcomings, which became clear in the following years as a result of a number of eVoting applications [7]. The main shortcomings manifested themselves in the protection of voting secrecy and auditability. This led to the vastly improved Recommendation CM/Rec(2017)5, which defines very stringent requirements in terms of voting secrecy and reproducibility/audit[2]. CM/Rec(2017)5 made significant progress in terms of the requirements but was a step back in terms of defining a certification process for it abandoned the approach shown in Rec(2004)11, Annex II, Section F and does not include any steps towards establishing a security evaluation. This may be due to the fact that the initial move towards establishing such a security profile as incorporated in Rec(2004)11, II.F never came to fruition. However, in the absence of such a formal profile incorporating the Standards listed in the Recommendation, any independent evaluation would be ad-hoc and cannot be based on a formal and standardised framework, which implements the intent of the Recommendation. The result is that there is no comparable and standard, formalised method of assessing eVoting systems.

Hence, it has to be noted that content-wise CM/Rec(2017)5 [9] provides a considerable improvement in the standard definition of a much tighter framework for what an eVoting protocol, and implementation, must provide, but unfortunately, it is also less stringent in its formal path towards evaluation than Rec(2004)11.

This paper provides steps towards defining the Assets and Threats according to CM/Rec (2017)5 and discusses security objectives to achieve them. The special focus will be on Internet-based eVoting and the additional Standards (=requirements) of the upgraded Recommendation. Before that, let us briefly look at the main improvements incorporated in CM/Rec(2017)5 as compared to its predecessor.

2. The Decisive Improvements in CM/Rec(2017)5

CM/Rec(2017)5 provides two main improvements, namely: (i) a better and more explicit protection of voter secrecy; and (ii) verification. The latter is subsumed under Section "Free Suffrage", but in fact provides for strict verifiability of the vote. The Recommendation works with "Standards" that are required to be fulfilled, and the standards listed below are the main standards pertaining to these two improvements (the standard number is included at the beginning, my emphasis added).

Verification (free suffrage) [9, Section III]

11. It shall be ensured that the e-voting system presents an ***authentic ballot*** *and authentic information to the voter.*

15. The voter shall be able to ***verify that his or her intention is accurately represented*** *in the vote and that the* ***sealed vote has entered the electronic ballot box without being altered****. Any undue influence that has modified the vote shall be detectable.*

[2] For details see [8].

*16. The voter shall receive **confirmation** by the system that the **vote has been cast** successfully and that the whole voting procedure has been completed.*

*17. The e-voting system shall provide sound evidence that **each authentic vote is accurately included in the respective election results**. The evidence should be verifiable by means that are **independent** from the e-voting system.*

*18. The system shall provide sound evidence that **only eligible voters' votes** have been **included** in the respective final **result**. The evidence should be verifiable by means that are independent from the e-voting system.*

The key Standards here are clearly 15 (individual verifiability) and 17 (general verifiability). Please note that individual verifiability as defined in Standard 15 only reaches to the ballot box[3], however general verifiability in Standard 17 reaches to the election result.

Note that standards 17 and 18 require independent means of verification. The verification requirements are largely new to CM/Rec(2017)5 and go well beyond the general auditability requirements in Rec(2004)11.

Voting Secrecy [9, Section IV]

*21. The e-voting system and any authorised party shall **protect authentication data** so that unauthorised parties cannot misuse, intercept, modify, or otherwise gain knowledge of this data.*

*23. An e-voting system **shall not provide the voter with proof of the content of the vote** cast for use by third parties.*

*24. The e-voting system **shall not allow the disclosure** to anyone of the number of votes cast for any voting option **until after the closure of the electronic ballot box**. This information shall not be disclosed to the public until after the end of the voting period.*

*25. E-voting shall ensure that the **secrecy of previous choices** recorded and erased by the voter before issuing his or her final vote is respected.*

*26. The e-voting process, in particular the counting stage, shall be organised in such a way that it is **not possible to reconstruct a link between the unsealed vote and the voter.** Votes are, and remain, anonymous.*

Standard 21 is mainly a standard provision of protecting authentication data, however it is certainly a crucial property of any eVoting system.

Standard 23 is the real (hidden) challenge in CM/Rec(2017)5 in remote eVoting. It needs to be understood in context of individual, and to some extent general, verifiability and at the same of time strict protection of voting secrecy (see Standard 26 below).[4] The implementation guidelines of the Recommendation [11] provide some rather detailed information for onsite electronic voting, for

[3] This need not necessarily be so, for a voting system where individual verifiability reaches to the election result without compromising voting secrecy, cf [8].
[4] For more discussion on these limitations, cf [8]

remote eVoting they limit themselves to such remarks as "*the voter should be informed of possible risks to voting secrecy*" (Remark c) and "*how to delete, where it is possible, traces of the vote from the device used to cast the vote."* (Remark d). The essential friction between no-proof verifiability and voting secrecy is not addressed. However, depending on the eVoting protocol used, in remote eVoting it may turn out to be *the* challenge to eVoting in many respects in addressing the core of the eVoting issue in general that is how to be verifiable and protect secrecy at the same time.

Standard 24 protects from manipulative premature disclosures of election results during an ongoing election to achieve (de)mobilisation effects.

The core here is clearly Standard 26, which is worded in much stronger terms than the corresponding standard in Rec(2004)11. Standard 25 applies to voting regimes, where multiple replacement votes are possible, such as in Estonia. [12]

In the opinion of the author these points represent the core improvements of the new Recommendation as compared to Rec(2004)11. The remaining sections of the paper will propose a representation and inclusion in a CC-oriented style following Rec(2004)11, Annex III, Section F that will hopefully trigger a discussion in this direction. Generally speaking, the paper advances the hypothesis that only a certified PP incorporating those points will enable eVoting system verification and lead to credible and trusted systems. The following proposal could be a first step in this direction.

A CC Protection Profile must inherently be product- and system-independent, however, in some cases, reference will be made to the two main eVoting protocol families today, the Envelope and the Token protocol family that show vastly different security properties in key areas discussed in this paper. For more details, see [8].

3. Assets

The representation below follows the same logic as Rec(2004)11, Annex III, Section F in distinguishing between assets pertaining to the different stages of eVoting (pre-voting, vote casting and post voting stages).

3.1. Assets Pertaining to Verification

The following table lists the Protection Profile Assets resulting from the above standards with the standard number added to the asset description (SDxx). Multiple assignments are possible.

		Stage		
Asset ID	**Asset**	**Pre**	**Cast**	**Post**
A.AuthBallot	*Authentic ballot is presented to the voter (SD11)*		*x*	
A.AuthClient	Authenticity of the voting client (SD11)	x	x	x
A.IndivVerify	Individual verifiability reaching to the ballot box (SD15, 16)	x	x	x
A.ResultVerify	Verifiability of the end result (SD17, 18)	x	x	x

Table 1: Assets in verification (Pre-voting only applies to the token protocol family)

The A.AuthBallot asset in table 1 is a subset of the A.AuthClient asset, which encompasses all information created by the eVoting system including the operational parameters and specifically the voting period (Envelope protocol) or registration and voting period (token protocol) in the two-stage protocols (cf. [13]). However, it is best to use the generalised A.AuthClient and not the

A.AuthBallot so as to eliminate redundancy. From the explanatory memorandum it is not quite clear, whether it encompasses the audit data produced by the eVoting system and if so, to what extent. We will assume that this asset does not include them to avoid duplication with A.ResultVerify (see below).

As for A.IndivVerify, Standards 15 and 16 arguably aim to assure the voter that he/she actually cast the vote that was intended. In this context, Standard 15 can be seen as a superset of Standard 16. It should be noted that ex post verification starts in the registration phase or voting phase depending on the protocol, but definitely not in the post voting stage. This applies to digital signatures or other authentication information provided in casting a vote in the Envelope protocol system [14] or the issue of a token in the pre-voting stage for a Token protocol system [15]. In any case, it should be understood, that verification is not something added right at the end of the voting process.

Furthermore, Standards 17 and 18 combined represent A.ResultVerify that is the general verification of the result, with Standard 18 being the subset of Standard 17. If the result is independently verified in its entirety, that necessarily includes verification that each vote cast and counted is submitted by an eligible voter, who also voted only once. This also includes all audit trails and logging.

3.2. Assets Pertaining to Voter Secrecy

Table 2 lists the relevant Assets.

		Stage		
Asset ID	**Asset**	**Pre**	**Cast**	**Post**
A.AuthData	Protect authentication data (SD21)	x	x	
A.NoProof	Voter not provided with a proof of how he/she voted (SD23)		x	x
A.NoPremature	No premature disclosure of election results (SD24)			x
A.Secrecy	Voting secrecy including replaced choices (SD25, 26)		x	x

Table 2: Assets in voting secrecy

As for A.AuthData, the stage assignment heavily depends on the type of protocol. Token protocols would have to protect it in the pre-voting phase only, unless the token is considered authentication data in the vote casting stage. We will operate under this assumption. In an Envelope protocol, the authentication data, including the digital signature on the sealed vote envelope, is needed in the vote casting stage. We will hence generally assume that A.AuthData needs to be protected in both stages, understanding that for the Token protocol, the authentication data in the vote casting stage is the token.

A.NoProof in itself is rather straightforward. It gains its consequences from the linkage to A.Secrecy and A.IndivVerify (and to some extent A.ResultVerify). A.NoPremature has to be qualified for practical reasons. There is a coalition of actors, such as the election committee in its entirety, that can actually violate this asset. That is where technical safeguards end and organisational precautions must start.

Standards 25 and 26 ensure voting secrecy, with 25 being applicable to electoral systems with replacement votes. In addition, here, there is a factual difference between Envelope and Token protocols in that the former stores digital voter signature and sealed vote together, whereas the latter stores the vote together with the authenticated token. The further discussion of threats and objectives must take that difference into account.

4. Threats

Table 3 below maps the Threats identified to the Assets above. We will discuss each of the Threats below.

Threat / Asset	A.Auth Client	A.Indiv Verify	A.Result Verify	A.Auth Data	A.No Proof	A.No Premature	A. Secrecy
T.ClientForgery	x						
T.BallotForgery	x						
T.AuditForgery			x	x		x	
T.AuthentDataForgery		x	x			x	x
T.OwnVoteMisrepresent		x	x				
T.VoteModify			x				
T.VoteMultiple			x	x			
T.PhantomVoters			x	x			
T.InsertPhantomVotes			x				
T.UnlawfulResultAccess						x	
T.Miscount			x				
T.NoIndependentRecount			x				
T.LinkVoterVote							x
T.TimeManipulation	x					x	

Table 3: Threats

T.ClientForgery involves the forgery of the entire voting/registration client, in most cases a Java applet. T.BallotForgery involves presentation of a manipulated list of candidates including their order, or the wrong assignment of preferential votes to the main voting options.

T.AuditForgery either involves manipulated new log entries, manipulation of existing entries or no entry in cases, where there should be a log entry. As can be seen from Table 3, it can be directed against a number of Assets. A premature disclosure of results, for instance, would also require to "switch off" the relevant logging for the disclosure to go permanently undetected.

T.AuthentDataForgery covers the forgery of any means of voter ID and authentication used including voting tokens in a Token protocol. It constitutes a massive attack on general verification and sometimes would go undetected in maintaining the secrecy of the vote. For example, an individual may request individual vote verification of another voter using fabricated authentication data.

T.OwnVoteMisrepresent concerns the presentation of the original choice to the voter even though the true vote, stored in the system, has been modified. This then of course also entails an attack on the general verification. T.VoteModify refers to the modification of the vote after it was cast (and verified by the voter). Both need to be conceptually distinguished. It is possible to represent the correct vote (as cast) to the verification-seeking voter and yet misrepresent it in the general tally.

T.VoteMultiple represents the cast of multiple votes by the voter him/herself, where this is not part of the election procedure (and the old votes are invalidated). This of course corrupts general verifiability, but also constitutes an attack on the authentication process, which should ensure uniqueness.

T.PhantomVoters constitutes the insertion of bogus voters in the roll, for whom one may then cast - formally correct - votes. It therefore primarily attacks authentication. T.InsertPhantomVotes means

to insert votes that were never cast by somebody who as such is a real and valid voter. T.OwnVoteMisrepresent to T.InsertPhantomVotes form a bundle of threats that also require similar countermeasures in the objectives.

T.UnlawfulResultAccess constitutes the unlawful access to the election result with two caveats: (i) the threat attacks Asset A.NoPremature, however it goes well beyond this; (ii) the technical barriers must be overridable by a decision of the election committee and the technical safeguards cannot possibly counteract a combined collusive act by the election committee.

T.Miscount involves a number of possibilities. To see them, the term "vote counting" needs to be understood. The counting process does not encompass merely a simple vote count, eg, number of votes per party. The threat therefore involves the following elements:

(i) No safeguards against votes that are not authentic and unchanged;
(ii) No safeguards against voters casting multiple votes (replaced votes notwithstanding)

This goes well beyond counting how many votes were cast for option "X".

T.NoIndependentRecount covers the threat that no independent recount outside the eVoting system is possible or that the recount is reduced to a simple vote count without the authenticity checks in the original count (see T.Miscount).

T.LinkVoterVote covers the threat that a link may be provided between the filled-in ballot and the authentication data of the voter. Of course, this is diametrically opposed to the verification requirements, where it must be established that the vote was cast by an (any) authentic voter (and just once). This goal antinomy is the real crunch of eVoting protocol and system design and it was accentuated by the revised CM/Rec(2017)5.

T.TimeManipulation covers the threat that the time perceived by the voting client or server is wrong and this impairs voting integrity. The main issue here, not covered by the focus of this paper, is of course to prevent vote casting in providing an incorrect time, after voting closed, to the voting client that consequently rejects vote casting, or registration in a Token protocol. Additionally, within the focus of this paper, system time manipulation plays a role in attacking Asset A.NoPremature enabling unlawful access to the interim results.

5. Security Objectives

Following CC procedure, a clear mapping of Threats and Objectives would be necessary and a description of the means of assurance required. However, this would go beyond the scope of this paper and hence an overview of the Objectives that would be needed to achieve protection from the Threats for each of the Threats listed above is given.

T.ClientForgery/T.BallotForgery would be easy to counteract by using a signed client environment, such as a digitally signed Java applet, which can be verified by the browser. If the ballot is created dynamically in the applet, which would be the case in most election environments with different constituencies, the messages from the election server containing the ballot data (eg as XML structures) need to be signed as well, with the public key being hard-coded in the applet. The hard-coded public key would then be subject to applet verification.

T.AuditForgery involves a large number of secure logging mechanisms. The best way would probably be to organise it in a Blockchain-style way.

T.AuthentDataForgery covers two distinct topics: (i) the ID and authentication of the voter when registering as a voter. This would best be achieved with digital signatures and an eID, which offers a high level of assurance in itself; and (ii) the authenticity of a token used in a Token protocol, which would be achieved by applying blind digital signatures on the token including one by an independent election observer (cf. [8] and [13]) as well as a secure symmetric encryption of the voting token, when stored locally.[5]

T.OwnVoteMisrepresent protection shall ensure that the vote is presented to the voter requesting individual verifiability as it actually is stored in the ballot box. This requires a cryptographic concatenation between the vote and the authentication data, whereby the latter depends on the protocol family chosen.

T.VoteModify protection shall enable to detect the "swap" of a vote that was submitted on a set of authenticated data. Furthermore, this is best prevented by a cryptographic concatenation between authentication data and vote.

T.VoteMultiple firstly requires a strict voter authentication process and the concatenation of whatever means of authentication needed for the vote, depending on the protocol. Should multiple replacement votes be possible, the old votes must clearly and irrevocably be invalidated and the invalidation flag be part of the concatenation information.

T.PhantomVoters requires a voter roll that is cryptographically secured, not just by way of data encryption, but also by a Blockchain-like concatenation of voters to immediately detect fraudulently, or erroneously, inserted voters.

T.InsertPhantomVotes requires a strong cryptographic link between authentication data and the vote to detect such votes in a counting process that follows the guidelines outlined in Section 4 with T.Miscount.

T.UnlawfulResultAccess shall be prevented by encrypting the votes with the public key of an asymmetric key pair when the vote is cast and by splitting the private key part needed to open the ballot among the election committee members.[6]

T.Miscount shall require for the original counting process and T.NoIndependentRecount shall require for the recount independent of the eVoting system itself:

(i) A strong link between authentication data and the vote implemented by a cryptographic concatenation;
(ii) Verification that the vote has not been manipulated;
(iii) Verification that the votes have not been added or multiple votes cast by the same voter;
(iv) In both cases the votes of course also have to be counted.

5 Such as AES in FIPS 197, cf. [17]
6 For an overview, cf. [16]

Arguably, the best way to ensure an uncorrupted vote count is to combine general verification of the result and individual verification of the result. In many cases, this clearly implies violation of voter secrecy. However, Token protocols may provide this ability without compromising voter secrecy, thereby strengthening general verification by individual verifiability of the end result.[7] In such cases, any forger would always run the risk of being discovered by some voters individually checking whether their vote correctly entered the tally.

T.LinkVoterVote protection shall prevent the disclosure as to which voter a vote belongs. In this context, it is immaterial, when the breach occurs. It may occur before vote counting has even started or it may occur sometime after the election closed, possibly even based on backup data. The implementation of this requirement shall, on a protocol and a system level, not interfere with general and individual auditability of the vote.

T.TimeManipulation shall be prevented by a set of multiple secure and synchronised time sources for the eVoting system.

6. Conclusion and Further Work

This paper attempts to start a discussion process towards the establishment of a Common Criteria Protection Profile that can be used as a basis for system certification focusing on the two main areas of progress between of CM/Rec(2017)5 compared to Rec(2004)11, namely verification and voter secrecy. The discussion of course needs to be expanded by mapping Objectives and Threats more closely and by including non-Target-of-Evaluation-relevant objectives. Also, the entire area of assurance requirements needs to be discussed. For sheer space constraints, this paper cannot be more than a first step, however it appears to be worthwhile to make the effort in order to achieve more reliable and trusted eVoting solutions.

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FACILITATING CIVIC PARTICIPATION IN THE PUBLIC SECTOR THROUGH EDUCATION: A CASE STUDY OF TEACHING CIVIC PARTICIPATION TO FUTURE CIVIL SERVANTS IN GERMANY

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Abstract
To counter current political trust and legitimacy crises, political actors in western democracies are introducing participatory involvement measures. For these measures to be effective, certain prerequisites are necessary. Firstly, civil servants' attitude to public engagement must be positive, they need to appreciate and be willing to encourage deliberation processes and inclusion (willingness). Secondly, public sector officials need to be appropriately equipped with practical skills to know how to introduce and manage civic participation (skills). This paper argues that afore mentioned prerequisites are not sufficiently present, and that education of future civil servants needs to be adjusted in order to qualify graduates of public administration adequately. The paper outlines the structure and methods employed in a practice-oriented course at a German school of public administration.

1. Introduction

"In an age that is often defined by 'polarisation, populism, and pessimism' [1], the future of public governance and – more broadly – of democracy are prominent concerns. Books about democracy's end, death or crisis have proliferated in the past few years." [2] In fact, the trust citizens have in institutions, and also their degree of formal participation – such as voter turnout or membership in political parties – has been decreasing in Germany since the mid-1980s [3–6]. But legitimacy is one of the most crucial factors for stable institutions [7, 8]. To recover from legitimacy crisis and regain trust, "[a]cross the globe, public authorities are increasingly using representative deliberative processes to involve citizens more directly in solving some of the most pressing policy challenges." [2]

Deliberative processes nowadays take place in differentiated public spheres through various communication channels within a virtual political system [9, 10]. Participatory initiatives by authorities and by citizens are embedded in the digital systems that impacts power and influence. Hence, a democratic divide between "those who do and do not use the multiple political resources available on the internet for civic engagement" [10: 12]. This leads to the question of how digital technologies impact the public sphere.

In line with Kneuer [11], we adopt the view that digital transformation and the change of political communication do not operate in a social vacuum, and the impact of digital media depends on the actor´s motives for its use and therefore needs a frame in which e-democracy tools can be effective. Consequently, democratic processes can be either undermined or supported through online-interactions. The crucial factor here is not (only) the technology itself, but the qualities and capacities of political institutions and public administration, as well as the citizens´ expectations and

capacities. On this basis, the public sector can contribute to institutional stability by implementing civic engagement and participation, and thereby improve both public service itself, as well as the quality of public discourse contributing to the responsiveness of a democratic system.

Implementing (digital) participatory measures requires civil servants who hold favorable opinions on public engagement, and who appreciate and encourage deliberation processes and inclusion (*willingness*). Furthermore, public sector officials must be appropriately equipped to introduce and manage civic participation (*skill*). To implement and diffuse participatory measures in public administration, university curricula must be adapted in order to qualify graduates adequately. The paper outlines the structure and methods employed in a practice-oriented course at a German university of applied sciences of public administration in the federal state of Baden-Württemberg focusing on students´ willingness to implement citizen participation in their future professional occupation. The preliminary evidence shows that the course is successful among students and practice-partners alike. Overall, the paper illustrates how universities of public administration can contribute to (digital) civic participation by collaborating with municipalities and empowering students to manage and drive civic participation in the public sector.

Firstly, we describe what politicians, in this case the regional government of Baden-Württemberg, expects from public administration and public administration universities as regards to citizen participation. Secondly, we show that public administration education does not meet these political expectations yet: future civil servants are not prepared well enough to apply and diffuse sustainable citizen participation. Thirdly, we give an example of how a practice-oriented course in civic participation can improve education curricula and facilitate civic participation in the public sector.[1]

2. Political setting: Public governance in Baden-Württemberg

As pointed out in the introduction the promotion of public involvement and with it the introduction of participatory democratic elements ranks high on the political agenda. By upgrading participation measures and new democratic innovation forms, citizens become structurally involved in the political process as regards to the preparation and the taking of decisions [13]. The state of Baden-Württemberg serves as an instructive example here, as in recent years it has intensified public involvement.

Baden-Württemberg, a regional state in South-West Germany, has been headed by the Minister-President Winfried Kretschmann (Green Party) since 2011. Kretschmann led the coalition between the Green Party (Bündnis 90/ Die Grünen) and the social democratic party (SPD) from 2011 to 2016 and since 2016 the coalition between the Greens and the Christian Democratic Union (CDU).[2] After the German regional state elections in 2011, the government set out four central goals. One of the goals was that Baden-Württemberg should become a model regional state of democratic participation and appointed Gisela Erler as State Counsellor[3] for Civil Society and Civic Participation in the State Ministry of Baden-Württemberg – a function that had not existed before 2011. Her unit developed a lot of starting points and measures for more citizen participation [14].

[1] This leans on another study that deals with the facilitation of digital transformation through education [12].
[2] Elections will be held in March 2021.
[3] With the appointment of State Counsellor, Minister-Presidents can underline political domains where they consider the matter to be important.

In order to build the setting for cutting-edge models for participatory and digital democratic initiatives, Baden-Württemberg introduced several legal norms and regulations to enforce citizen participation, for example the regional government authority procedure law (Landesverwaltungsverfahrensgesetz LVwVfG), the local government law (Gemeindeordnung GemO), the law for freedom of information (Informationsfreiheitsgesetz) or the administration regulation for public participation in the planning and admission process (Verwaltungsvorschrift VwV) [13: 11] [15].

To achieve this, the government of Baden-Württemberg believes that education and training in connection with citizen participation is important for professionals in public administration. Its aim is to build capacities and participation competence at the staff college (Führungsakademie) as well as the two (regional) universities of applied sciences of public administration in Kehl and Ludwigsburg. The goal is to improve education to achieve transparency, citizen-friendliness and administrative efficiency [16]. While the underlying rationale is comprehensible, it assumes that public administration schools currently provide education programs that prepare (future) professionals in public administration sufficiently to be able to organize and implement sustainable and innovative citizen participation – a claim that must be substantiated, by taking a closer look at the current teaching practice and curricula.

3. Fitness for purpose or fitness for transformation?

The following section will show that public administration education does not yet live up to the political expectations. Future civil servants are not prepared sufficiently to apply and diffuse sustainable citizen participation, as curricula – content and didactics – change slowly in universities of applied sciences for public administration. Such organizational inertia has interested many researchers – among the best known are Hannan and Freeman. In their article “Structural Inertia and Organizational Change” (1984) the authors mention the difficult change of a university's curriculum as an example of structural inertia [17]. This also holds true in the case under review, the curricula of universities of applied sciences of public administration: despite political and societal expectations to upgrade citizen participation in public administration they are slow to adapt.

In the last decades, a first change of expectations in Germany took place from a professional rule- and hierarchy orientation to a managerial market and competition orientation (new public management). The second change was to shift towards community and participation orientation (public governance). Hence, there is a growing chasm between the expectations (societal expectations fueled by new management models) and administrative personnel’s established values and patterns of attitude. As described, it can occur in the state-administration-society triangle that the state has different expectations than the citizens towards (new) public administration employees (and their education). Especially academic institutions that are attached to state institutions where historical traditions and hierarchical structures are deeply rooted, are changing the curriculum more slowly. Interestingly, in the here studied case of a university of applied sciences, the academic institution is subordinated to a ministry of the regional state of Baden-Württemberg. Schröter and Röber (2015) point out that one of the most crucial reasons for the gap lay in the socialization processes which are the *education for public sector employment* and can be analyzed on the basis of three dimensions in education programs – the key for the professional socialization: 1. institutional characteristics and status; 2. course content; 3. teaching and education didactics [18].

Nevertheless, the public sector and its institutions in Baden-Württemberg are aware of these shifts and have therefore started to implement new teaching and education impulses promoting an open,

transparent administration with innovative citizen participation. Despite the strong focus on judicial content in the curricula of universities of applied sciences on a federal level in Germany, desk research on existing trainings and education forms on citizen participation education illustrates a certain level of change. On the one hand many trainings for public servants for citizen participation[4] in Germany and hence Baden-Württemberg exist.[5] This "secondary" socialization is important as public services face aging workforce challenges in order to catch up with new methods of participation. On the other hand, public administration universities of applied sciences/ polytechnique universities are preparing students dual system educational programs in Germany, to join the civil service at senior level.[6]

Drawing on the sample of public administration universities of applied sciences [20] that are a member of the so-called rector conference, an umbrella institution for 37 universities and academies[7], respective curricula available online were evaluated regarding the availability of citizen participatory courses.[8]

Among the 37 members 14 offer public administration B.A. programs whereas the other universities offer mostly financial, police, archive or judicature programs, 3 universities do not have self-contained websites. The desk research shows that 10 universities include courses on citizen participation, but only 7 universities offer entire modules.[9] We are aware that not every course or event on the topic of citizen participation might be published on the website of each university. Nevertheless, this explorative desk research shows that citizen participation is integrated in several public administration universities of applied sciences in Germany (see figure 1 below) – even in some universities with special orientations as for example police or archive colleges.

[4] To look further: W. Jann and S. Veit, 2015 [19].

[5] I.e. Führungsakademie or Digitalakademie in Baden-Württemberg

[6] There are 5 levels (or grades) in the German civil service. For the three lowest levels students are prepared by academies, the second highest by public administration universities of applied sciences and for the highest degree in Universities (minimum: Master degree)

[7] 38 are mentioned on the website, but one university is listed twice (Hochschule Harz, Hochschule für Angewandte Wissenschaften), http://www.rkhoed.de/hochschulen/

[8] In our desk research, we compare not only universities of applied sciences in Baden-Württemberg, but universities of applied sciences throughout Germany as the implementation of citizen participation in public administration is a nationwide objective.

[9] Apart from curricula in the member universities of the rector conference, a well-documented example for citizen participation in curriculum can be found at the Hochschule Darmstadt, https://creativebureaucracy.org/program/ festival-2020/innovative-ausbildung-fur-die-verwaltung-am-beispiel-des-grosten-stadtentwicklungsprojektes-aller-zeiten-in-pfungstadt-hessen/; Besides, only one Master of participation exists in Germany (Master´s study program Public Planning and Participation at the University of Stuttgart, Baden-Württemberg).

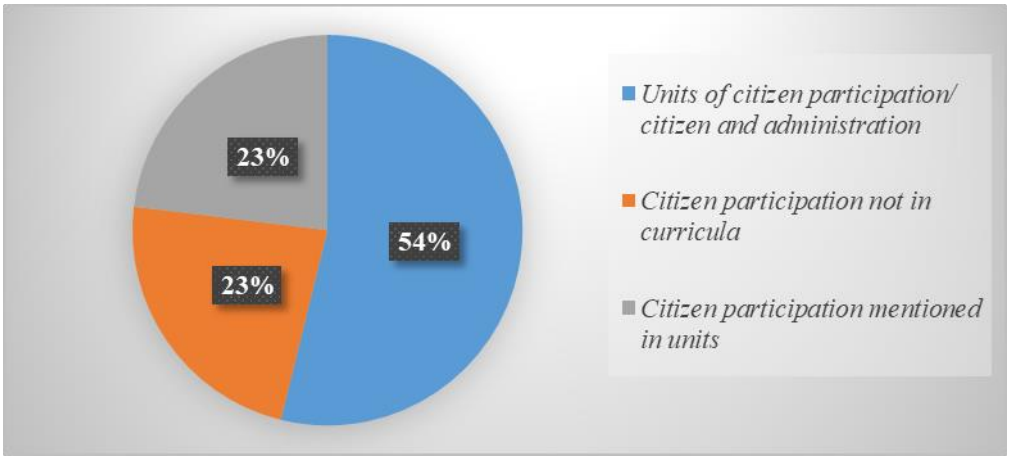

Figure 4: Citizen participation in curricula of B.A. public administration programs at universities of applied sciences for public administration

We conclude from this desk research that the universities of applied sciences which offer B.A. programs of public administration preparing for the second most senior public service grade have already adapted to the demands to include citizen participation in their curricula.

Teaching the content of citizen participation is an important prerequisite to introduce participatory involvement measures in public administration effectively. Apart from this prior condition, civil servants' attitude on public engagement must be positive, they need to appreciate and want to encourage deliberation processes and inclusion. Consequently, we studied patterns of attitude regarding (digital) citizen participation among students. Insights of the survey are presented in the next section.

4. Patterns of attitude

The survey was addressed to students in the Bachelor study program in Public Administration graduating in spring 2021 and looks at patterns of attitude concerning citizen participation – especially digital citizen participation. The dual program includes compulsory practical work experience in traineeships combined with vocational education. The program provides salaried education and a secure job as students often become civil servants after signing the study-and-employment contract [21]. Consequently, the scientific profile of the University of Applied Sciences Ludwigsburg is practice-oriented research. Moreover, as students are aspiring to have a career in the civil service, their role-identification is marked by their future professional status.

We therefore chose items to gather insights concerning the student´s state of knowledge about – mainly digital – citizen participation and their attitude to (digital) citizen participation and their change of attitude concerning citizen participation. As the students´ future positions are very often in municipal administrations, the study is focused on experiences on a local level. We asked students graduating their B.A. in spring 2021. The survey's response rate was about 30 percent of a statistical population of 300 graduating students (n=85). The questions focus on local citizen participation as graduates mostly work in decentralized administration units.

The first question addressed the educational experience of students. While one out of five students had never taken a course on citizen participation (21%), 36 % had singular courses and 42 % completed a learning course module. For one, this finding seems to support the claim that universities of applied science have started to alter their curricula in line with political expectations.

Secondly, it also reflects a certain level of willingness among students to reflect on the issue of citizen participation. It does however not tell, if students "believe" in citizen participation.
The belief in the power of citizen participation could be "sparked" during the practical training that future bureaucrats have to go through. However, the practical experience of citizen participation seems to be limited in the case of the students participating in our survey: more than two thirds had no or little experience in public participation during their studies and one third did not encounter the use of public participation tools during their on-the-job trainings. Another possibility to engage students may be their own active experience in citizen's digital participation, but as the survey shows, personal experience seems to be rather limited. Students have marginally experienced digital citizen participation practically (except online surveys) – concerning online citizen dialogue with the mayor they have almost no experience at all.

	Never used the tools	Little experience	Sum (no or little experience)
(Official) municipal Facebook pages (1)	51%	27%	78%
Signed an online-petition (2)	56%	28%	84%
Online tools for complaints (3)	74%	10%	84%
Online Survey (4)	2 %	12 %	14%
(Official) municipal or regional Online participation Platforms (5)	54%	28%	82%
Online citizen dialogue with the mayor (6)	88%	1%	89%

Figure 5*:* Percentage of students´ who never or rarely used the following tools to participate politically[10]

In contrast to digital, informal citizen participation, almost all students vote always at municipal elections. But when it comes to the engagement in political parties, a small minority of the students are active members. Interestingly, 45 percent of the surveyed students[11] cannot in any way picture themselves participating in a political party in the future.[12]

[10] Answer categories: (1) I have been on an official municipal Facebook page. a) No, never b) I have already liked something or added an emoji c) I comment or post sometimes d) I am regularly active on one or several official municipal Facebook page(s) e) I comment, post, and I am administrator of one or several official municipal Facebook page(s); (2) I participate actively via online petitions. a) I cannot picture myself participating via online petitions b) No, not yet c) I wanted to, but have not had the time yet d) Yes, at least once e) Yes, signed, administrated or initiated (3) I have used only tools for complaints. a) No, not at all b) No, not yet, but I would be interested in c) I already have visited an online tool for complaints, but have not communicated any complaint d) I have at least once communicated a complaint e) I already have practical experience as administrator of online tools for complaints (4) I am versed with online surveys. a) strongly agree e) strongly disagree (5) I use (official) municipal or regional online participation platforms to participate. a) never e) often (6) I have already been involved in online citizen dialogues with the mayor a) Not at all b) I have been on platforms on which it is possible to exchange with the mayor c) I have already been observer of online citizen dialogues with a mayor d) I discussed in an online citizen dialogue e) I gained experience in organizing an online citizen dialogue

[11] 95 percent of the surveyed students are between 20 and 30 years old. 79% of the students´ home municipality has less than 30.000 inhabitants.

[12] Possible explanations for this result: 1. Public service employees are required to be politically neutral in their professional role; 2. Reflects the general tendency in the total population.

	No engagement	High engagement
Engaged in a political party	87%	6%
Vote at local elections	0% (vote never)	96% (vote always)

Figure 6: Traditional political participation among graduating students

These results show that interviewed students mainly participate in classic participation formats of representative democracies (elections). Approximately half of the surveyed students gained practical experience in on-the-job trainings. Multiple responses concerning the formats in on-the-job trainings were surveys, participation for planned construction projects[13], information events for citizens, question times and public petitions.

Concerning the attitude, only few respondents think that citizen participation incurs high costs and the administration hardly benefits, but the majority agrees that local participation can strengthen the citizen´s confidence toward public administration and that it is a municipality's duty that all citizens can use offered participation tools.

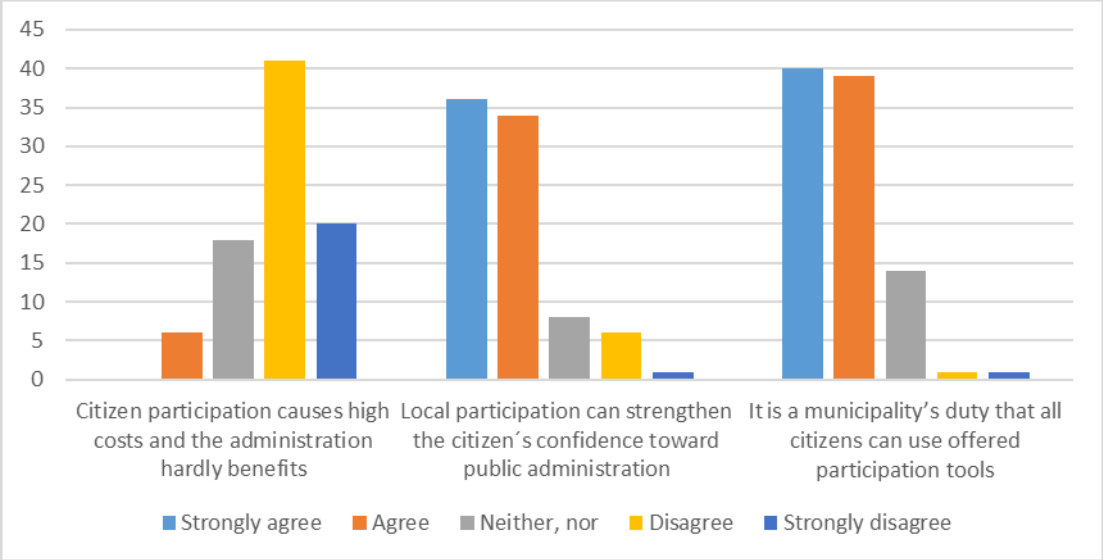

Figure 4: Potential advantages and disadvantages of citizen participation in administrations

And whereas most of the respondents agree that digital participatory tools are a valuable completion to classic participatory tools and that they can activate targeted population groups more than through the use of classic participation instruments, the minority of the respondents think that local civil servants support digital participation. This contrast is very interesting. Confirming this contrast, students "would actively implement citizen participation in their future workplace if their professional environment is not against it" only with a very slight majority. And despite the mostly positive, not enthusiastic, but rather positive, opinion on advantages of citizen participation, only a minority of the respondents "would actively implement digital citizen participation in their future workplace if their professional environment is not against it". Furthermore, over half of the students assume that citizen participation prolongs procedures.

[13] Obligatory in public work

To sum up the empirical insights, most of the students attended at least one course of citizen participation during their studies. At the same time, their practical experience with and willingness to implement measures of citizen participation is rather limited. Hence, applying more knowledge and practical experience is important to gain confidence to initiate and implement innovative participation.

To support transformation towards good citizen participation in administrations, courses on citizen participation need to offer practical knowledge as it increases the probability and the willingness to apply knowledge (on participatory methods). Especially positive experiences with innovative citizen participation motivates individuals to share their knowledge with their environment and to act as multiplicators. The next section lines out how such education courses could be conceptualized.

5. The course module: Municipality, Administration, Citizen

Managing real-world problems needs both theoretical and practical competencies. Since graduates have problems transferring theoretical knowledge to the reality of daily work [22] we chose the method of problem-based learning. Additionally, the students have to manage time and resources, as well as their task and role differentiation. They work in small teams with teachers as advisers [23].

The starting point of the course always focuses on a real case. In 2020 this case was an ideas competition funded by the regional state of Baden-Württemberg to finance local online marketplaces in municipalities [24]. 7 municipalities won the competition. Hereafter, in a practice-oriented way, the students were split into groups and one municipality was assigned to each group. The aim was that at the end of the course the student groups develop a local participation concept for the municipal stakeholders to accompany the development of an online market place as part of a local way of becoming a smart city.

The setting of the module is based on applying what has been heard in small groups in parallel to the competencies developed in the face-to-face classes.

This method allowed students to apply the theoretical knowledge, they were taught in accompanying courses. At the end of the module, students present their communication and participation concept (3 to 4 pages per student) including drafts for advertisements, mock-ups etc. for the online market place to the mayor of “their” city.

To identify the course content, we worked through different concepts of participation and identified key components of the module, which are compiled in the following figure:

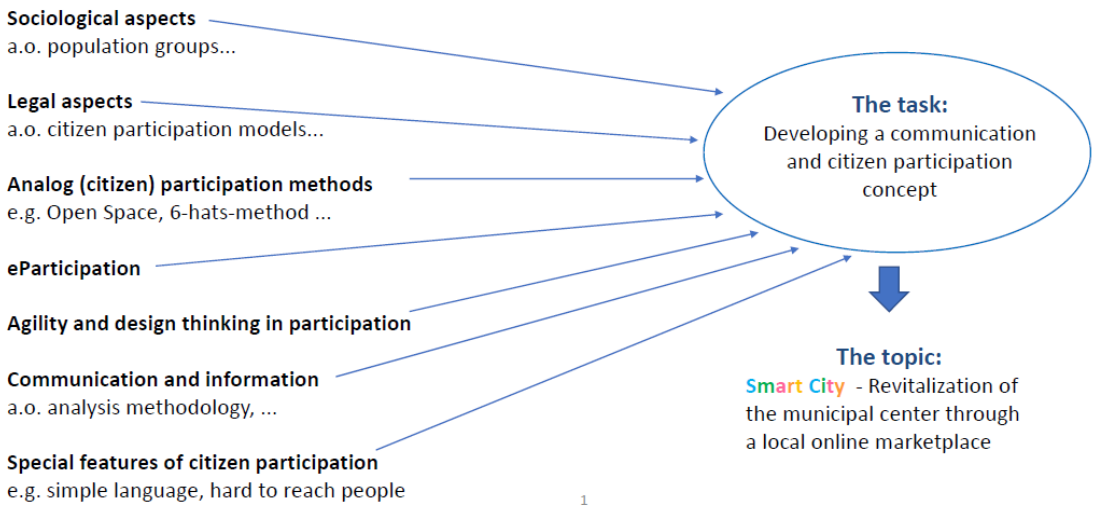

Figure 5: Content of the course module "Municipality, Administration, Citizen"

To learn to minimize risks of participation projects students simultaneously need to learn to minimize them by using agile methods of project management. Therefore, the whole group of students (up to 50 people) should be split into teams e.g. maximum five people. They then work as a project team and enhance their abilities of collaboration and team-work as well. Each team must use a collaboration platform of their choice and a learning platform [1], giving them the additional possibility of extending their competences in digital literacy, interaction and learning. Each team has to solve the task for one special city.[14]

6. Discussion

Implementing citizen participation and therefore strengthening transparent administration can be considered an uncontested political goal. In order to obtain it, the educational content and didactics for future civil servants need to be realigned. Moreover, we found in our survey that graduating students have little practical competence of online participation tools. So more practical courses are needed as they can offer positive experiences concerning citizen participation and foster students´ willingness and skills to implement more and better citizen participation in administrations.

Courses teaching practical know-how on innovative citizen participation are not yet standard in B.A. programs of public administration in universities of applied sciences in Germany, and few education best practices have been published. The survey results show that despite a relatively positive attitude towards citizen participation, the will to implement – especially online citizen participation – in future workplaces is rather low. In order to increase practical competencies, we presented a practice-oriented course in which 50 students could prepare and experience the development of a citizen participation concept for a local online marketplace in 7 municipalities.

In light of the empirical limitations of the results presented in this paper, we believe that carrying out a long-term survey of students who have participated in courses on citizen participation would be very useful and show which didactics and contents are effective. In addition, an international

[14] Unfortunately, we did not test the impact of the new course design on the willingness of students to implement measures of citizens' participation, which would have been possible by administering the survey before and after course participation to relevant students. The authors will pursue such an "impact assessment" in the upcoming teaching cycle.

comparative study would help to find out where citizen participation is already well integrated in educational programs of civil servants and how historical patterns influence the capacity for transformation in connection with citizen participation in public sector education.

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RANDOMLY SELECTED CITIZENS – THE SORCERER'S STONE OF E-PARTICIPATION?

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Abstract
e-Participation has one commonly acknowledged major weakness: The people actually participating often do not represent the whole population of the respective political entity, severe biases can be observed with respect to overrepresentation of some groups and underrepresentation of other. Unfortunately, there is, according to our knowledge, no much systematic empirical evidence of citizen participation processes available; at least in Baden-Württemberg. Participation is still, like in ancient democracies, restricted to those who can afford the time budget necessary. In ancient Athens merchants, craftsmen etc. had only little time for politics whilst others, especially landlords, heirs and noblemen had the necessary resources to devote more time to politics, so both a regular compensation and a random selection for mandatory political duty were introduced. Such a random selection is still established in our contemporary societies, above all regarding jury duty. The paper analyzes the strength and weaknesses of such a random selection and whether it contributes to the functioning of e-participation. Finally, it gives some advice in order to improve e-participation and, in general, all participation processes.

1. Issues of (e-)Participation Processes in Baden-Württemberg

In Germany, the public understanding of democracy has changed significantly over the past two decades. Representative democracy procedures have not longer a monopoly. The public wants more participation in important political decisions and demand more direct and deliberative democracy (cf. [1], p. 9). The cause of this difficult situation, in which many democracies are, lies probably in social change and the resulting expectations. These have developed from increased opportunities for self-development, the general upswing in education and the intellectualization of the world of work and leisure (cf. [2], p. 1). Against this background, it is hardly surprising that politics and public administration are increasingly offering participation.

The word participation has its origin in the Latin "particepes", which can be translated as "involved" or "participating in something" (cf. [3], pp. 13). In everyday language, participation is often equated with the term “citizen participation”. The term is controversial as the “citizen” is usually subject to a specific legal definition. However, the term has been softened in the last few decades and is now commonly used for the general public (cf. [4], p. 400). We will use the term participation in this paper.

When calling for more participation, three central justification approaches are repeatedly cited [5], [6], [7]:

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1. increasing legitimacy
2. increasing acceptance
3. improving the quality of political decisions within society.

These advantages can be achieved for the society through participation in decision-making and access to political discussions. In practice, however, the picture is different. Opportunities for participation are distributed unequally in terms of social structure. Highly educated people, members of the middle class with good professional positions, men in middle and senior years and the public service dominate. Representatives of well-organized bodies like political parties, associations, clubs and churches are also overrepresented. On the other hand, people with a migration background, young people, women, older workers, as well as lower income groups and people with subsistence issues are underrepresented [8]. Civil inequality has been identified as the cause of this situation. To address this problem, random selection is used more and more frequently in participatory processes. This is intended to really represent the whole society in participation processes.

The new importance of participation was emphasized by the Federal State of Baden-Württemberg appointing Germany's first and only State Councilor for Civil Society and Citizens' Participation in 2011.[3]

The participation offers are intended to counterbalance the dissatisfaction of society with the political elite (cf. [10], p. 2). But after a decade of experience it seems doubtful whether participation can help to overcome the difficult situation of representative democracy that some people see.

In addition, e-participation is used more often. The new situation caused by the corona pandemic has provided another convincing argument for expanding such online offers: No physical meetings can take place, hence participation formats in presence are also affected (cf. [9], p. 1).

2. Randomly selected Citizens on Participation Duty – A historical review

This problem is well known in politics, administration and in the scientific debate. Since the core problem for the crisis situation of democracy is commonly assumed to be the feeling of social, political and economic inequality, the random selection shall solve this problem.

This idea is based on the ancient Greek polis democracy, which is often used as a role model for today's participation efforts.[4] Regardless of whether it is a direct or a representative democracy, every form of democracy depends on the commitment and interest in the community of as many people as possible (cf. [3], pp. 13).

A direct form of democracy prevailed in Athens from 508/07 to 322 BC. Every citizen was entitled to take part in the peoples' assembly, in which "ta politika", that is, "what concerns the city", was negotiated. In addition, every citizen could take on a public office (cf. [11], p. 9).

[3] https://stm.baden-wuerttemberg.de/de/ministerium/staatsraetin-fuer-zivilgesellschaft-und-buergerbeteiligung/ (as per 12 March 2021).
[4] Cf. https://www.bundestag.de/services/glossar/glossar/R/repraes_demo-247326 (as per 5 December 2020).

The rule of the people went much further than today's ideas of direct democracy, such including also the executive and juridical branch. Politics was not a profession, as it is mostly the case today. Participation in the people's assembly was decided by a stochastic element: Who had spare time and hence actually participated? Of the approximately 30,000 to 35,000 adult citizens in the times of Pericles, approximately 6,000 people were necessary for the people's assembly to have a quorum. The percentage participation in relation to the total number of citizens was extremely high at around 20 percent. This was mainly due to the fact that politics was seen as a social duty. In addition, a lottery procedure was used to fill political positions with citizens drawn randomly. This procedure made no distinction between poor, rich or social status and was therefore a symbol of civic equality. But the polis democracy was also confronted with problems. As in modern participation formats, experienced speakers can then as now have a decisive influence on the results. The regular draw of the participants should counteract this influence and the assertion of particular interests. The origin of the model character of the Athenian polis democracy lies in the direct participation of the citizens in decisions of the community, the jurisprudence as well as their equality in the appointment of offices. Therefore, the lottery procedure is seen as a prerequisite for the ideal of civil equality and thus also for a functioning democracy (cf. [11], p. 9). It is notable that according to Thucydides, the oligarchs, when gaining power, reduced the number of citizens to 5,000 but also said that such a number never ever participated in the peoples' assembly before (cf. [31], p. 149).

Accordingly, the lottery procedure has been used in the judicial system for several centuries (cf. [12], p. 469). One of the best-known systems is the selection of a jury in the United States. In the USA and Austria, the opinion of the population is supposed to flow into the judicial system via a lottery procedure (cf. [13], p. 5). The judicial branch should be as close to the people as possible and counteract a certain "professional blindness" of the judiciary (cf. [14], p. 69 and [15], p. 216). It is also intended to minimize the possibility of political influence on the judiciary (cf. [16], pp. 31). The goal of involving the people in court proceedings is comparable to involving them in legislative decisions as intended in Germany. Among other things, the random selection is intended to incorporate the opinions and ideas of the population into the political decision-making processes (cf. [17], p. 22).

3. Are e-Panels an appropriate remedy for e-participation?

Subsequently to the digitalization of society, digital formats are used more and more frequently for participation purposes. In order to combine the advantages of random selection with the advantages of the digital world, e-panels seem to be the tool of choice. E-panels are digital platforms where a randomly selected group of citizens can take part in surveys on various topics online.[5] Ideally, they are used for information, communication and networking between administration, society and politicians in order to make politic processes transparent and accessible (cf. [18], p. 2). The focus is on developing the will of the people with the help of the Internet, which gives the people the chance to shape democracy and enables cooperation between the government and civil society.[6]

However, decision-makers in politics and administration often have reservations about e-participation formats in general (cf. [19], p. 9). It is often criticized that e-participation does not manage to activate underrepresented population groups more strongly (cf. [10], p. 2). In addition, the expected increase in participation numbers through e-participation did not occur. The

[5] https://www.beteiligungskompass.org/article/show/181 ass (as per11 March 2021).
[6] Cf. Heinrich-Böll-Stiftung e.V., URL: https://kommunalwiki.boell.de/index.php/E-Partizipation (as per 09 November 2020).

participation of people depends on their basic attitude and degree of politicization. The fact that participation is now also possible online seems not to change that much (cf. [20], p.1). Note that the empirical evidence has, according to our knowledge, not been systematically analyzed. Data on individual participations is difficult to obtain as Geldmacher et al. have pointed out [17].

E-participation offers are not very productive when it comes to new ideas and high-quality input. The results are considered superficial (cf. [21], p. 39, [22], pp. 32 and [23], pp. 35). In addition, the lack of binding nature of online offers and the lack of personal ties are criticized. These make it difficult to find a compromise. In addition, e-participation offers unwanted participants free access to decision-making processes (cf. [24], p. 131). Especially when it comes to controversial issues such as climate issues or infrastructure projects, interest groups that are well networked online can influence the digital discussion according to their wishes (cf. [25], pp. 2). These groups go through opinion-forming processes more often in so-called digital filter bubbles. Thereby a decline of the political public is criticized (cf. [20], p.1). Against the desired goal of civil equality, the intensification of the digital divide through e-participation is also criticized (cf. [26], pp. 210).

If the results of such an e-participation influence political decisions, then a severe legitimation problem arises, because the participants in a participation offer neither represent the composition of society nor were they legitimized through elections.

There are also still many unanswered questions in the context of e-participation. These include, among others, the prevention of multiple participation, the access barriers through identification mechanisms, their verifiability, questions of data protection and IT security and the anonymity of votes [27]. With a high level of anonymity, for example, multiple participation can hardly be prevented. In turn, a high level of commitment discourages many potential participants. These considerations have to be repeated with each participation process (cf. [28], pp. 27 and pp. 154, [19], p. 14 and [29], p. 17).

In this context, politics and public administration expect the advantages of random selection to compensate the deficits of e-participation in the form of e-panels to generate far-reaching synergy effects (cf. [17], pp. 76).

In view of the difficulty in finding compromises, an e-panel can be structured in such a way that topics with a particularly high need for discussion are brought into the group of random citizens. The topics can, for example, originate from an upstream online participation and serve as the basis for the further participation steps [27]. Randomly selected citizens reduce automatically the influence of undesired participants including organized claque and mob. A major strength of randomly selected groups is the contribution of technical expertise, personal experience and common sense (cf. [22], p. 11). In addition, the results are considered empathetic, far-sighted and valuable for society as a whole (cf. [30], p. 6). Given this high quality of results, it can be assumed that even if a strong influence of undesirable participants can be seen in the results generated online, the subsequent random citizen process embeds them again in a balanced overall result. Therefore, an increased access barrier is not necessary with these e-panels. This also puts the problem with the handling of personal data on the Internet into perspective. Without access barriers, such as personal information or registration requirements, these do not have to be protected in a complex manner. Nevertheless, this positive effect of the random selection does not exempt from dealing with the secure handling of personal data and aspects of IT security (cf. [17], p. 73).

Each random selection process chosen must of course avoid both excluding people from the other side of the Digital Divide and not including them in an appropriate way, e.g. with guidance facilities offered.
A working random selection process counteracts the increased formation of political opinion in digital "filter bubbles" through e-participation by virtue of its property that constructive discussion, tolerance towards discussion partners and mutual appreciative listening are encouraged (cf. [30], p. 6). As a result, random selection processes *may* have a positive influence on the civic education of society. Due to the strength of the random selection of activating and integrating groups that are not involved, a combination of both formats also compensates for the deficit in e-participation by not doing this (cf. [17], p. 74). Again, we have to stress that a systematic analysis of participation processes is not available and, more than that, not even a complete overview of participation processes is available.

4. Summary and Recommendation

E-panels are just as little a magic potion as all other participation formats. The focus must be on the goals to be achieved in the specific situation and the participation processes designed based on this (cf. [10], pp. 38). Even modern technologies cannot work miracles without planning and concepts, because: “A fool with a tool is still a fool” ([25], p. 1) is always applicable. But: It opens up new opportunities for politics and administration to increase the transparency and comprehensibility of decisions, which is one of the central requirements for a functioning democracy (cf. [20], p.1).

The Internet has become an integral part of daily, social, political, economic and ecological life. E-participation thus represents surely one part of the answer to the changed world of life and work in society. The desire for more participation in an ever faster world combined with challenges such as demographic change and the growing diversity of society asks for a redesign of political processes. In order to win people to devote time to politics, there is no way around the Internet. But, and this is often neglected, the internet works totally different than what used to be the real world: Astroturfing, claques and mobs and faked “followers” are the new normal [17].

So combining the good experience and extensive knowledge gained from random selection with the advantages and new possibilities of e-participation is a development that should not be ignored, especially in times of pandemic. But participation in all forms and formats must be embedded in a meaningful overall concept. As a tool, e-panels offer interesting application options and the potential to positively change the participation landscape. Whether they actually deserve the title of “Sorcerer‘s Stone”, we will have to figure out. However, there is definitely potential for this.

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DO ELECTIONS INFLUENCE HOW CITY HALLS COMMUNICATE ON SOCIAL NETWORKS? ROMANIAN EXAMPLE

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Abstract
Online communication, and especially messages transmitted through social networks, are now an essential tool for local public institutions. The current pandemic increased the reliance of citizens on messages posted online by their representatives and public servants.

Our interest in this research is to see if, in election times, their messages differ somehow from the usual pattern. This is interesting for us because, in the case of Romania, the local elected representatives are in most cases the best electoral agents of the political parties.

In Romania mayors are elected, and are some of the most visible political figures, both al local and at national level. We are interested to see how local elections influence the social media activity of the institutions they nominally lead. For this, we have analyzed the official Facebook pages of city halls around Romania, with mayors that took part in elections and mayors who did not, from all relevant political parties.

Keywords: *social media, local sector, Romania*

1. Introduction

To say that the internet changed the way in which we communicate would be an understatement. This is true for interpersonal communication (we see each other on zoom, we send birthday cards on Instagram, we make fool of ourselves on TikTok). Online communications fills more and more of our social interaction space and this trend is now supercharged by the current pandemic.

Public institutions and politicians have not escaped this colonization of the digital space. Increasingly, information is first released online, public services are created or modified following a ”digital first” doctrine, citizens expect round the clock updates or service availability, and politicians crave the direct connection with voters offered by the different internet platforms, that eschews the sometimes bothersome mediation by traditional media organizations (newspapers, TV channels).

Election campaigns follow the same pattern. Maybe the first time that social media played a central role in a high profile election race was during the 2008 Presidential election in the United States. Barack Obama employed these new tools and, with the help of an organized grassroots movement, showed to the world what social networks could achieve, besides bombarding us with cat videos.

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Obama's example was soon followed all around the world, with politicians and political parties using digital tools to reach their intended audience, with varying degrees of success. Of course, the tools used in that campaign are now much more refined and the number of social media users and level of activity on social networks is very different from 2008.

Romania is no different in this regard. The internet and social media are part of the election toolbox for a decade, and more and more financial resources are reserved for this purpose, as opposed to traditional media and old-school in-person campaigning. For the last Romanian parliamentarian election, in 2020, the parties have spent around 33 million euro, a 400% increase over the previous elections in 2016 (the number does not include the sums spent at local level, for which there is no definitive tally). Of these, around 12 million € were spent on online advertising, and almost 7 million € on traditional media (mainly TV channels and newspapers). This is a reversal from previous campaigns, when TV was king, and it is more surprising still when we think that 2020 was a pandemic year, with citizens more inclined to stay in their homes and watch television; most commentators expected TV to stay king of the pack.

Also in 2020, Romania had another round of elections, for mayors, local and county councils. They were loosely coordinated by parties from a central level, but local organizations had a lot of latitude on the way in which they conducted the local campaign. As such, we were curious to see if incumbent mayors (which usually also control the local party apparatus) will use for political campaigning the social media accounts of their city halls, which, by definition, should avoid electioneering.

2. Literature review

It is already a cliché to say that the Internet changed the way in which public institutions communicate. The reality is that, at first, public authorities used on their new websites the same communication paradigm as for the other channels (TV, print, outdoor). They colonized the new medium fast enough, but they saw their newly created websites as little more than digital billboards.

Web 2.0 (the social web) changed that. The concept describes a world wide web that is dominated by platforms that use the power of the masses to create, curate or distribute content at scale. In the case of public institutions, the rationale for embracing this new web iteration is threefold: the public sector is responsible for, if not leading, keeping up with the society. The society is changing, driven by technological development. If the social institution do not embrace this change, they face reputational risks. Secondly, the results of public institutions are increasingly visible and are judged not only by what they do, but also by what people think of what they do. Perception is now as important as facts. Thirdly, the web 2.0 applications have the potential to greatly improve the service offered by the public sector and generate more efficient way of doing things inside institutions.

Among the tools that web 2.0 offers, social networks are among the most visible and widely used by both citizens and organizations [15]. The differences in the digital architecture frameworks, data collection tools, ad targeting possibilities, and content types available for different social networks mean that messages are different (even if they are based on the same original footage or text) [3].

Hisham et all. find that there are a number of factors that influence social media adoption in public organizations. These pressures come from the inside (organizational pressure), form comparison

with other institutions (environmental pressures) and the process of adoption is influenced by the technology availability and compatibility with the organization (see Figure 1) [7].

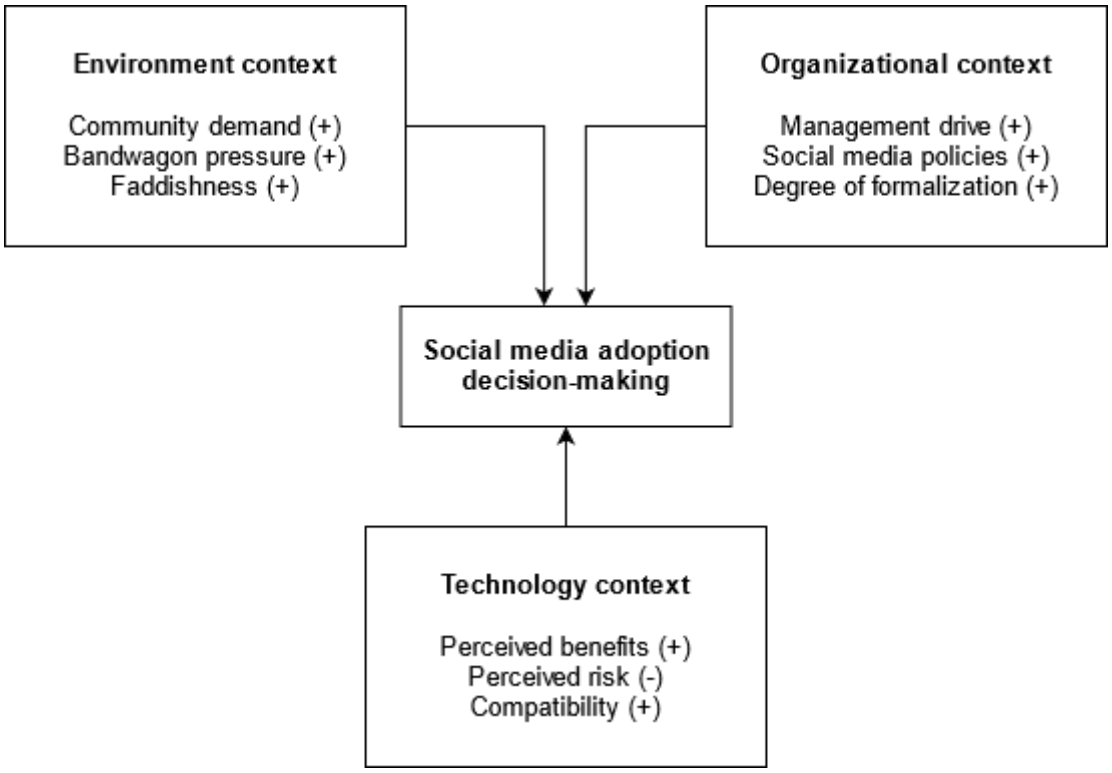

Figure 7: Social media adoption factors. Taken from Hisham et all.

Using social networks comes with problems for public institutions. They do not have control over the platform; there have been some initiatives to create social networks for content distribution by government agencies, but they did not have much success [10]. Disinformation can spread rapidly; during crises, they do not have time to formulate a response. On the other hand, it is where the users are. If they want to be part of the conversation, it is imperative to be there or cede the battlefield to other actors.

Social networks are not neutral channels for transmitting information. They act as an intermediary, that have a determinant – and secretive – say in which messages reach individual users [12]. Because the institutions do not control this platform, the goals of governmental organizations that use them can clash with the goals of the networks themselves. This is evident in the current pandemic: fake news about vaccine are more viral than scientific information, and the networks have been slow to reign in the disinformation partially because more engagement means more revenue for them. There are risks that public sector organizations face when using social networks. Are they trustworthy enough to be used for civic engagement, for example, when organizations have so little control over the way in which their messages reach the intended audience? Are social networks, in a way, privatizing a public space, becoming, in a way an Antigora? [11]. Thirdly, the medium-term interest of the two actors diverge: while governments try to increase public value, social networks' goal is to increase shareholder value [12].

Social media can act not only in support of political actors, but, increasingly, we see them as political actors. Decision taken by these social networks, with little oversight, can influence electoral campaigns: are political ads allowed or not? If yes, are they labeled as such or not? Are

demonstrably false assertions allowed to stay on the platform or not? Who decides, what are the rules? What is the weight (which loosely equates with how many people can see the content) of partisan messages? These questions and many other will only grow in importance, as more and more people take their media diet mainly from online and social media sources [4].

Adopting social media in the public sector was a slow process. Sometimes it was deliberate, based on a coherent plan. Sometimes it was the result of a pilot process of sorts [13]. Other times it was the result of politicians seeing the power of social media during election campaigns and continuing to use it after winning elections. This happened in Romania in a number of cases, when elected mayors continue to use their campaign accounts as semi-official pages for the city halls they lead.

There is a temptation to use, as a tool in an electoral battle, the official social media accounts of the institutions they lead. These pages usually have more followers than a campaign account. This is also because, in Romania, as in other countries, elections are increasingly fought online, and the current pandemic only boosted this trend. During elections campaigns, the communication rhythm is accelerating, and having a beefy online presence is seen as essential, even for mayoral races in small cities.

Although social media is not the principal reason for winning or losing an election (as it is sometimes presented), its use in elections is on an upward trend [2]. Politicians use different social media tools (for example twitter and Facebook) for different purposes that derive from the idiosyncrasies of those platforms. Twitter is used mainly for ”masspersonal” communication (Wu, S., Hofman, J. M), and not for conversations with their supporters. These discussions take place between supporters or, more seldom, between devotees and critics. Facebook, on the other hand, is more often used for direct communication, for organizing and mobilizing the supporters, helped by the more sophisticated targeting tools that Facebook offers [16].

Political actors have gradually increased the resources devoted to social media in their overall strategy, helped by the increasingly granular tools for message targeting offered by the big social platforms. One example is the Brexit Campaign, in which the Leave campaign has used social networks to reach users with arguably better skill and focus than the Remain supporters [9].

Using social networks can also increase funding for political campaigns. Studies show that opening social media accounts correlates with an increase in donations, especially for new politicians [14].

Social networks also leads to a more pronounced personalization of politics. Former president Donald Trump, Benjamin Netanyahu, Emmanuel Macron, are all examples of the benefits that expert social media use can bring to gifted politicians. In Romania too, political figures can build an army of followers that amplify the politician’s message at no cost. This is helped by the fact that, on social media, the virality of a message is more important that its truth or production values. This virality depends on the reaction of the supporters. If they are a tightly bound group that acts in concert, they can greatly intensify a message, even if they are a minority.

Social media is usually seen as the domain of up-and-coming politicians, used to a digital world and leveraging their knowledge to bypass the retrograde establishment. That view is contradicted by established politicians all around the world, who learned how to use the new shiny tools of our digital era and employ them for their electoral goals (Benjamin Netanyahu is a case in point) [8]. Despite the often touted idea that social media is a space more suited to left-leaning politicians, both

anecdotal evidence (Donald Trump in United States,Narendra Modi in India, for example) and academic research dismantle this myth [6].

Experimental work, admittedly in simplified settings, showed the power of social networks in influencing electoral choices. Even if in the real world these influences will be necessarily less powerful, there is no denying that social media can be used to influence voters [1]. Research shows that social media campaigning has a small but measurable effect in winning votes. It also shows that, in the case of Twitter, at least, the best approach is using the Twitter account as a megaphone, and not for interactive campaigning (discussion, answering to questions, retweeting). This result is at the moment contrary to common sense and some specialists (which says that these tools are important in fostering connections between candidates and voters) and the topic requires more study, but a tentatively reason may be that those interactive tools baked in the social network page are necessarily small scale, and as such, cannot influence the result in any significant way [5].

3. Research

The main goal of this research was to establish a connection, if any, between the social media activity of public institutions, i.e. town hall official Facebook pages, and the local election campaign of September 2020, Romania. Our goals were: to identify any change in the number of posts the account published during the campaign; to identify any change in the content of the posts the account published during the campaign; to identify any change in the way the content was engaged with by the consumers; to see if the participation in the electoral race of the incumbent mayor had an effect on the overall activity or the engagement rate.

The social media platform chosen for this research was Facebook. The reasoning behind this is strongly connected with the online consumption behavior of the Romanian people and how they perceive Facebook as the unofficial communication channel for public and private institutions. This, in turn, forces these institutions to allocate specific resources to this platform. Also, as of February 2021 there are over 10.5 million Facebook accounts in Romania (according to its own advertising platform), with 12 million possible targeted accounts (around 1.5 million are multiple and/or fake accounts). This makes Facebook the second largest social media platform in Romania, surpassed only by Youtube (total accounts), but surpassing Youtube in terms of DAU (daily active users). Given the limited capabilities of Youtube and the diverse target audience found on Facebook, most public and private institutions chose the latter for their online communication.

To achieve the goal of this research, we analyzed 321 town and city hall accounts spread over the entire territory of Romania. We split the accounts into three categories: accounts that belonged to cities with under 40.000 citizens; accounts that belonged to cities with between 40.000 and 100.000 citizens and accounts that belonged to cities with over 100.000 citizens. We set up objective filtering criteria in order to retain only those accounts that could yield relevant results. The criteria were: 1. Only use town hall accounts that were official ones and tied to the public institution. 2. Only use town hall accounts that had at least 30 posts over the course of the analyzed time period. By applying the filters, we were left with 39 town hall accounts to analyze, as follows: 10 accounts for the bellow 40.000 category, 16 accounts for the between 40.000 and 100.000 category and 13 accounts for the over 100.000 category.

In order to observe a change, if any, in the online behavior of these accounts we needed to compare two different time periods in the activity of the public institutions. Thus, we decided to analyze the last 2 months before the election campaign and to compare the results with the 1-month period of

the election campaign. We analyzed content posted between the 27th of June and 27th of August and compared it with the content posted between the 28th of August and 26th of September. The election was held on the 27th of September 2020.
The data crawling, mining and extracting was done by using the online analytics platform SocialInsider (socialinsider.io). Once the data was received, we proceeded to manually analyze it using Microsoft Excel and Apple Numbers, and to visualize it using Tableau.

4. Findings

Due to the filters implemented we were left with a total of 4094 published posts to analyze. The distribution of these posts was directly proportional to the size of the city category, with the smaller cities having the smaller dataset available to analyze, whilst the larger cities having the largest dataset.

The following chart shows the number of published posts on the three different account types.

<40.000 citizens	**40.000-100.000 citizens**	**>100.000 citizens**
475 posts	**1193 posts**	**2426 posts**
11.4% of total posts	29.1% of total posts	59.2% of total posts

Given the total amount of published content, we were able to analyze the "before and during campaign" content in order to establish if the accounts had any change in the posting pattern. We found that all of the three categories had a larger than the accepted average change in account activity during the month of the election campaign.

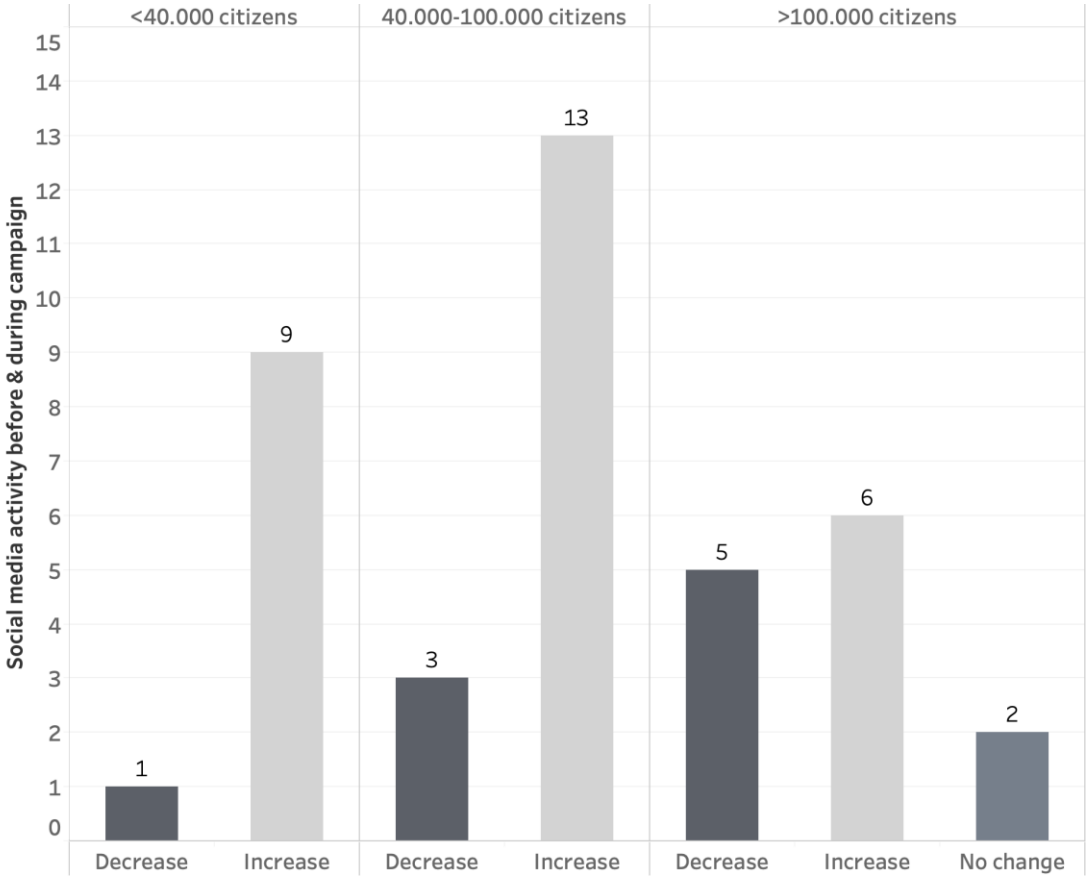

Figure 2: Social media activity from before & during the election campaign

The success of a Facebook business account is strongly related to its AER (Average Engagement Rate). This is a metric composed of 4 different items: the number of reactions, the number of comments, the number of shares and the number of clicks. All of them relative to the total number of people following the said page. There is a general consensus within the online marketing research community that an AER of 0.5 is decent, whilst a score of 1is considered good.

Despite having the lowest number of posts, the CAT1 (category 1, <40.000 citizens) cities tend to have the highest individual AER out of the accounts analyzed, with some CAT3 (category 3, >100.000 citizens) cities having a low AER.

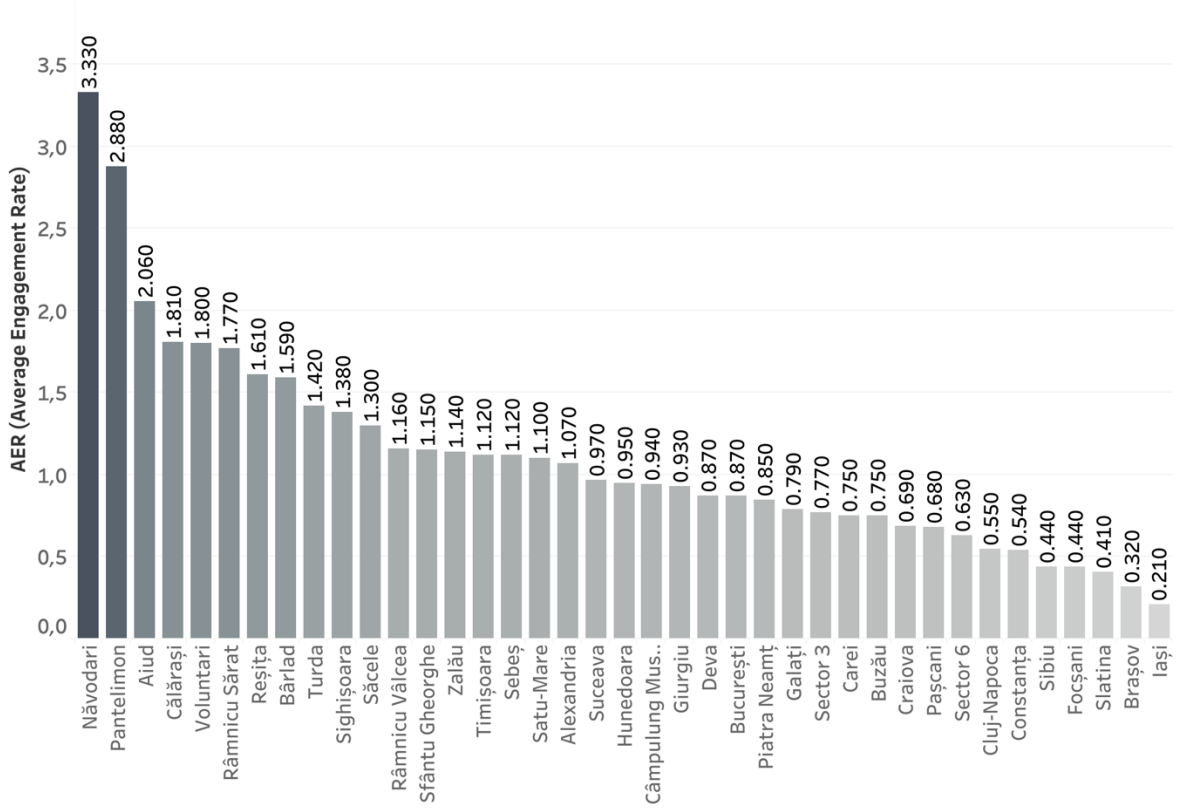

Figure 3: Average Engagement Rate (AER) for the last 90 days before Election Day.

For the overall period of 90 days analyzed more than 12% of account received a rate lower than decent, 41% received a rate between decent and good, and 47% received a rate higher than good. However, the AER doesn't take into account the fact that Facebooks reach algorithm doesn't generate linear result, but more of a downwards curve, proportional to the number of followers that a page has. The more the followers, the lower the reach. The lower the reach, the lower the AER.

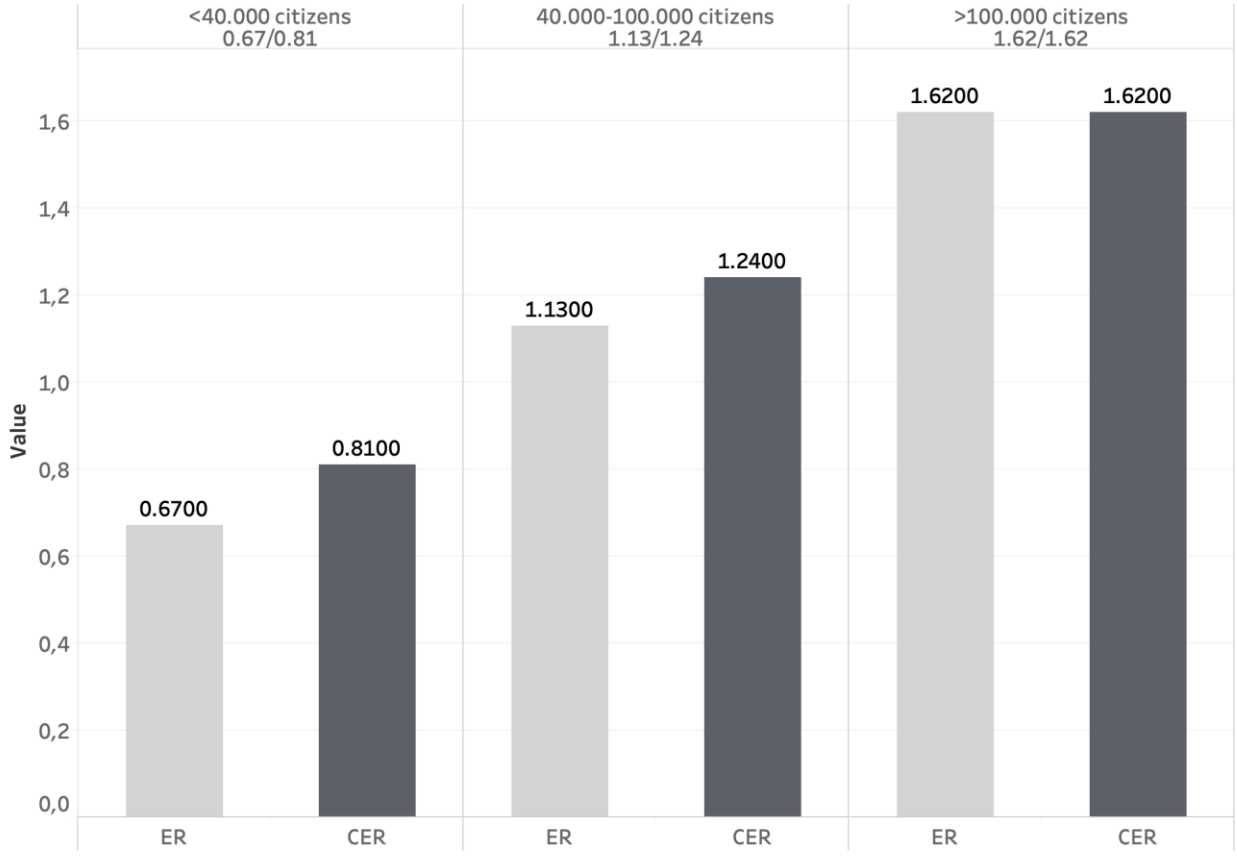

Figure 4: Engagement Rate (ER) and Compensated Engagement Rate (CER)

Researchers have tried compensating this metric by taking into account the way Facebooks algorithm works, eliminating the penalty "awarded" to successful accounts. This compensating metric is marked as CES (Compensated Engagement Score) in our research.

Even with the CES applied, there is a clear pattern in how the consumers engage with the content depending on the site of the city. CAT1 cities have the lowest average, CAT3 cities have the highest average. The cause of this behavior is to be studied at a later date.

In order to establish if the business institutional accounts had any change in the CES during the election campaign compared to the previous 2 months before the campaign, we analyzed the ΔCES for these two periods. We calculated ΔCES as CES2-CES1, where CES2 is the compensated engagement score from the 1-month period of the election campaign and CES1 as the 2 months prior. The results showed that almost 60% of the cities had seen a decrease in CES during the 1-month period of the election campaign compared to the 2 months period before. This is indicative of a lack of interest of the consumer in regard to the content being published in the campaign. It can be interpreted as a disconnect between what the consumers are expecting to receive and what the decision makers behind the strategy of the social media account are offering.

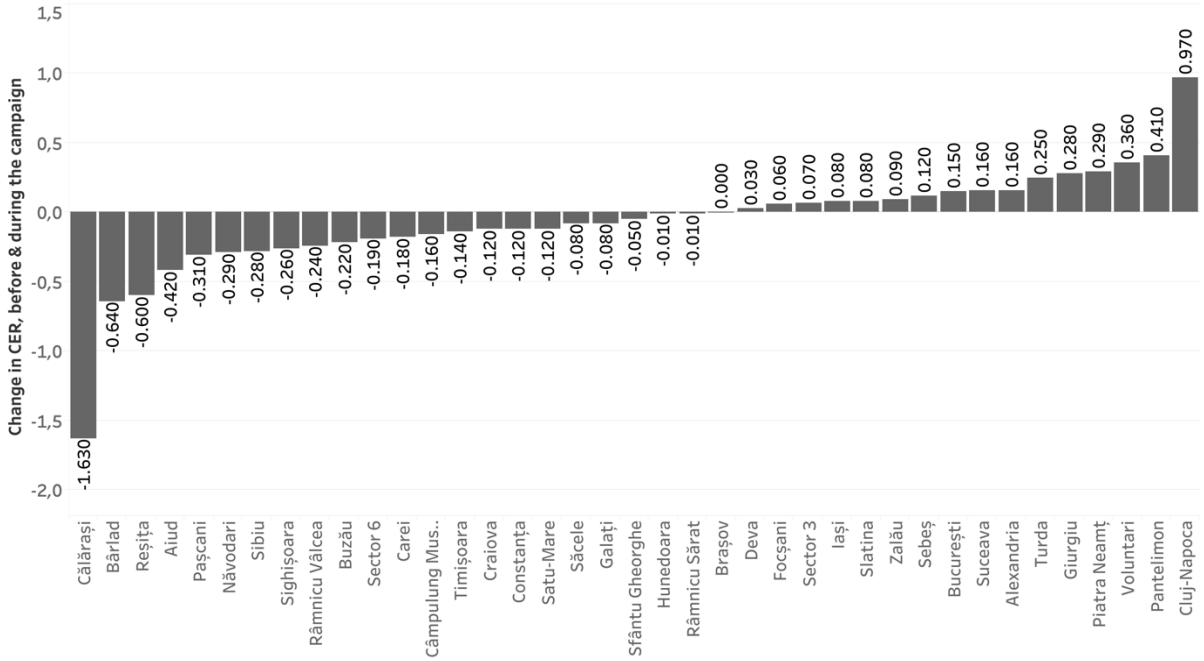

Figure 5: Change in CES, before and during the campaign

Out of the 39 accounts analyzed, 19 had changes in mayorships and in 20 cases the incumbent won the election. In some cases where the incumbent won the election, he did so for a different political party than the one he was initially elected for.

For the 9 city accounts that had a decrease of social media activity (ΔSMA) during the election campaign, 7 (78%) ended up electing the same mayors after Election Day (Δm) For the 28 cities that had an increase in social media activity, 12 (42%) ended up with the same mayors after the election. There were two recorded cases of accounts that had no changes between the before and during stage of the campaign. In their cases the results were split, 50%-50%, with one changing the mayor and the other one voting for the incumbent.

It is worth mentioning that out of the 39 accounts analyzed, all 39 had incumbent mayors. In all of the 39 cases the seated mayor run for reelection. This is why our research didn't focus on comparing the "pre campaign" with the "during campaign" period, but rather the results generated after the Election Day.

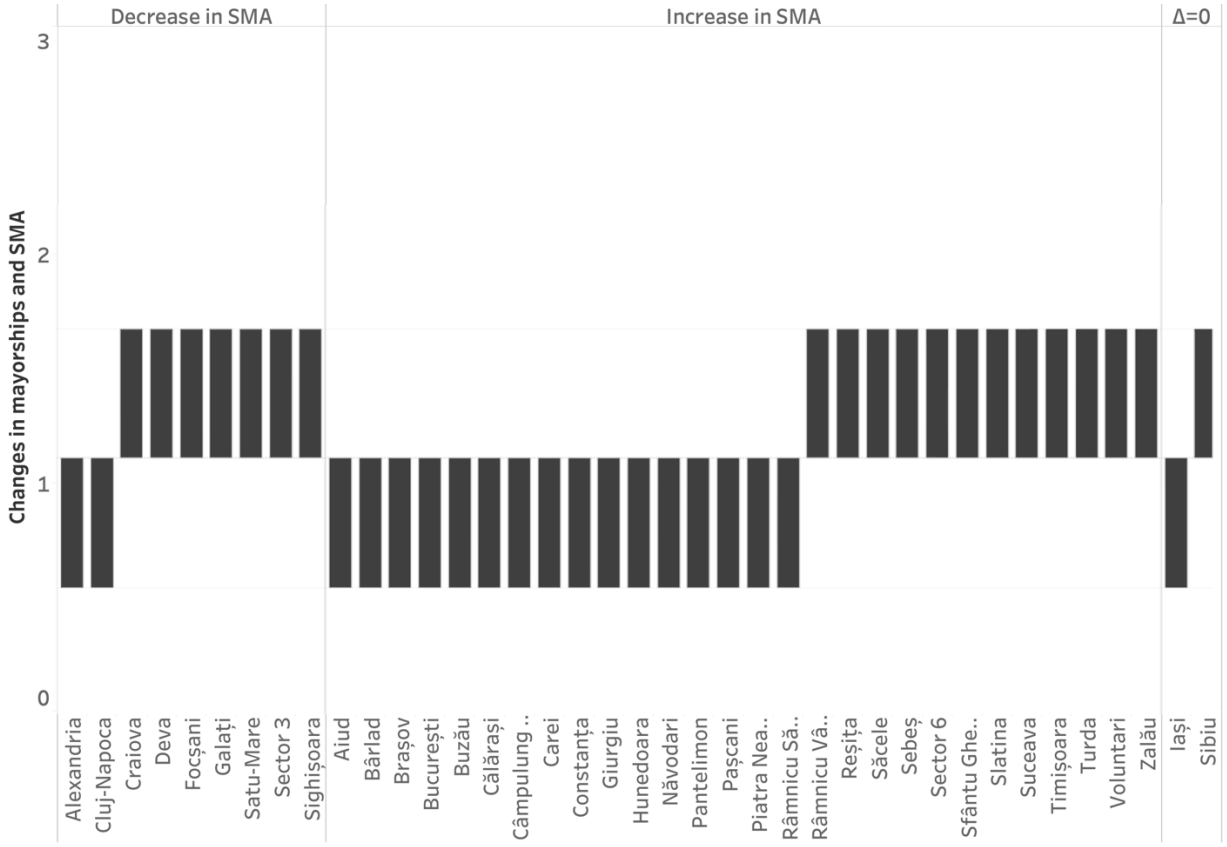

Figure 6: Changes in mayorships and social media activity, before and during campaign.

We also calculated the Reaction Score for each of the account, however the resulting data had a Standard Deviation sd<0.09 and it was considered irrelevant towards the purposes of this research.

5. Conclusions

Facebook is a must have social media platform. It is not only recommended, but necessary for public institutions to have a presence on it. It can generate the highest organic reach out of all of the communication channels available to a public institution in Romania at the moment and it has the most diverse audience possible. These, however, shouldn't be the only arguments in favor of using it as an official or unofficial channel. Given the fact that it is a bi-directional communication channel, thus allowing real-time feedback, it is necessary for a public institution to follow a set of self-imposed rules and/or a strategy in regard to what is being communicated, when, how and how much.

Our research wanted to analyze this communication from the public institutions' perspective, but at the same time from the consumers perspective. We set out with three main goals: to identify any change in the number of posts the account published during the campaign; to identify any change in the content of the posts the account published during the campaign; to identify any change in the way the content was engaged with by the consumer. Two of these goals are independent from each other, whilst the third one can be drawn from the other two.

We found that some of the public institutions analyzed communicate more during the election campaign period. This is indicative of an artificial increase in activity, based solely on the perceived interest generated by the campaign. We also found out that the targeted audience is highly involved

in engaging with the content that the public institutions publish on Facebook. This, however, changes during the campaign, either because it is not interested in the campaign *per-se*, or because the content published during the campaign is irrelevant towards their needs. Another independent result was that of the higher engagement rate of the higher tier category. CAT3 cities (largest cities) had a higher CES than CAT2 (medium sized cities), which in turn has a higher CES than CAT1 (small sized cities). This is indicative of a wider range of topics published by larger city accounts, which increases the potential for targeting the right people interested. Which, in turn, increases the probability of that persons' engagement with the content. And, at the end of the analysis we discovered that there is a higher chance of re-election for an incumbent if the social media activity during the campaign stays the same or even decreases than if you increase it artificially (maybe because they were heavily favorites to win anyway). A clearer correlation and/or causation should be determined.

The entirety of this paper is a one-sided, limited view of online behaviors from both the creators of content (public institutions) and the consumers of content (the people). A more comprehensive analysis, planned in a future article, will try to answer the questions raised by our research. However, as a first step in determining if there is potential for relevant data analysis in the online medium, we believe that it allows us to foresee certain behavioral changes in the future of online and or social media institutional communication.

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