

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

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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 execution¹. 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 conducted 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 model. 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 & Joseph [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 Assumptions	Internet-based Work Perspective 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 Assumptions	E-government Maturity Model Perspective 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.

Steps	Operations in a Reference Procedure	Contradictions from the	
		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		
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.	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.
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 cease 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 inadequately, 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) disruption³. 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.

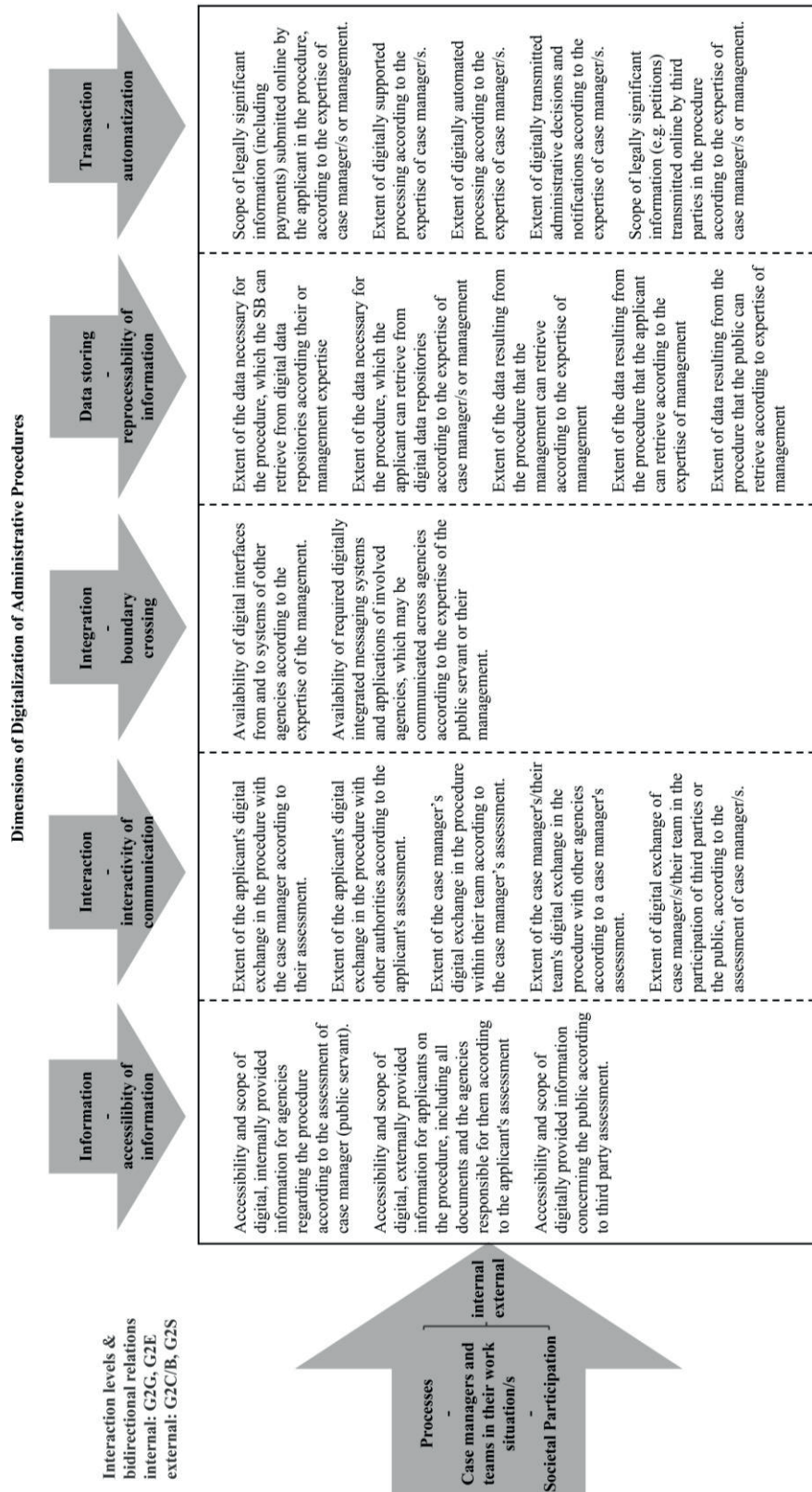


Figure 1: Model for Capturing the degree of Digitalization in Public Administrations (CDPA)

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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