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How to Foster e-Competence in the Public Sector? A Mixed-Method Study Using the Case of BPM

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Abstract: To meet the rising demand for e-government, the so-called e-competences are a crucial building block, enabling public officials to push digitalization efforts forward. One exemplary, highly relevant competence is BPM. It is yet unclear to which degree such competences are already available and which adjustments to the educational settings have to be implemented to ensure their proper distribution. To gain insights into this highly relevant topic, we conducted a large-scale survey with 713 respondents, complemented by five in-depth interviews with public officials. In line with previous research, we found that e-competences, especially in BPM, are still scarce despite the widely acknowledged need. Based on our data sample, both traditional offline and online teaching provide many beneficial aspects. However, each mode alone does not fully cater to the needs outlined by our respondents. Hence, we argue for putting more focus on the establishment of blended learning scenarios.

Keywords: Digital competences, BPM competence, vocational training, digital government

1. Motivation and Introduction

While the ongoing COVID-19 pandemic certainly has few positive effects, at least two are worth mentioning: It gives countries a plain view of their current digitalization state and brings attention to the educational systems. Many researchers currently focus on school and university education (Crawford et al., 2020; Viner et al., 2020); however, digitalization and vocational training are also highly relevant topics in the public sector.

To successfully manage the transition to a digitalized government, employees and public officials need additional competences beyond the traditionally trained ones: so-called e-competences (Distel et al., 2019). With rising pressure to drive digitalization efforts, be it through international comparison (e.g., the highly digital and integrated Estonian government (United Nations, 2020)) or through national legislation (e.g., the German Online Access Act (Federal Ministry of the Interior, 2021)), there is an increasing need to go beyond assessing competence requirements but towards establishing adequate educational and training setups. As the educational sector is vast and even e-

competences are complex, getting a holistic picture is challenging. Hence, we focus on BPM (business process management) competences as a specific but highly important subset (Niehaves & Plattfaut, 2010). While business process management might not be the first thing that comes to mind thinking of public sector digitalization, a good understanding of current processes is crucial to optimizing existing practices and to meaningfully digitize parts of them. The need for BPM competences in the public sector is also visible in recurring studies striving to understand the current level of such competences in administrative settings (Detemple et al., 2014; Freitag et al., 2018). As the last iteration is already three years old, we first set forth to assess the status quo and give a stronger focus on competence. Hence, our first research question is:

RQ 1: How is the current status of public officials' BPM competence?

However, we are not only interested in updating the status quo. We further seek to gain insights on how to advance the spread of these competences. To achieve this, we pursue the following second research question:

RQ 2: How can educational settings be designed to train BPM competences?

The paper is structured as follows: In Section 2, we briefly introduce the central topics of our study, ranging from competences to public sector digitalization. Our research design is outlined in Section 3, followed by a presentation of our (preliminary) findings in Section 4. The paper is closed with a conclusion and an outlook to the next steps of our research.

2. Research Background

2.1 Public Sector Digitalization and the Role of Process Management

The digitalization of public administration and respective services can be summarized under the umbrella term e-government, which essentially means using information and communication technologies and the internet as tools to achieve better government (OECD, 2003). The term e-government was established in the 1990s, so this year marks the third decade of systematically using IT and IS to digitize government services (Ogonek, 2017; Weerakkody, 2015). Nowadays, there is a wide range of different labels, such as e-government, e-governance, one-stop government, digital government, and more, that describe the phenomenon of transforming the public administration sphere into part of the information society (Andersen et al., 2010). In the past years, an increasing number of municipalities worldwide have attempted to introduce e-government strategies, wildly successful in Denmark, The Republic of Korea, Estonia, and Finland (United Nations, 2020).

However, not only practitioners show growing interest, but also scholars focus amply on e-government as an area of attention: only in the past 12 months, there has been an increase of approximately 15% in total contributions, mounting in more than 14.500 references towards e-government (Scholl, 2021). In general, scholars agree for e-government to offer continuously growing opportunities to improve public services and increase government efficiency. Therefore, it is deemed to be a field of extremely high relevance for practitioners (Bélanger & Carter, 2012; Lee et al., 2005; Wallis & Zhao, 2017). When it comes to the transformation from "analog" government to

e-government, one inseparably needs to address business process management (BPM) as well, as process design competences are considered to play an essential role in implementing e-government (Hunnius & Schuppan, 2013). Therefore, radical re-evaluation and re-design of existing processes on all governmental levels are required (Weerakkody et al., 2006).

In recent years, public organizations have started a great variety of e-government initiatives. However, even though especially entirely transactional services contribute to e-government, most of the administration focuses on enhanced information quality and availability without considering reorganization potentials (Becker et al., 2004). The process nowadays is considered a core element of business operations, which results in organizations striving towards the establishment of a process-focused (enterprise) structure due to its massive impact on process time, cost, and quality and therefore overall (enterprise) performance (Han & Kang, 2007; Han & Park, 2009; Münstermann et al., 2010). It is essential to recognize that BPM principles can be applied to public administration agencies but require domain-specific adaption as administration's primary objective is not to generate profits, but to serve public interest, administrations are more bureaucratic and the staff structure is different from their private sector equivalents (Boyne, 2002; Tregear & Jenkins, 2007). Nevertheless, even though scholars agree that despite the adaption efforts the public sector would dramatically benefit from BPM, it has not yet received great maturity in all governmental entities (Niehaves et al., 2013; Niehaves & Plattfaut, 2010; Sarantis et al., 2011). One of the main reasons for that is the lack of education opportunities for administrative staff, concerning both systems and available content (Lönn & Uppström, 2013).

2.2 e-Competence and Teaching e-Government

During the ongoing digitalization of the public sector, the importance of digital skills or capabilities is simultaneously and constantly increasing for public officials (Distel et al., 2019; Hunnius et al., 2015). Those e-competences refer to the employees' abilities to cope with digitalization and its specifics within the public sector domain. In the area of e-government, these abilities comprise the categories technical, socio-technical, organizational, managerial, and political-administrative (Hunnius et al., 2015). Each category summarizes competences of the respective field, e.g. competence for information technology, IS design, and information systems in the technical sphere, or competence regarding e-government structures, organizational design, and process management in the organizational sphere (Hunnius et al., 2015). As there is a broad consensus on the relevance of this set of competences (Distel et al., 2019; Ogonek et al., 2016), they provide a baseline for the education of (future) public officials in vocational training and study programs. Especially process management is an essential pillar for public sector digitalization and has been identified as the second most relevant competence to be trained (on the job) in the public sector (Ogonek et al., 2016).

As e-competence has already been identified as a success factor for e-government endeavors (Müller & Skau, 2015; Stefanovic et al., 2016), it has also become a bottleneck to public sector digitalization. Reasons for this shortage are manifold. In Germany, for instance, there is a slow uptake in adapting curricula to address newly identified competence requirements. Also, there is no clear image of which roles with which competences the public sector seeks for its digitalization (Ogonek & Becker, 2018). However, other reasons lead back to the complexity of the public sector

domain itself. Many curricula for educating future public officials have a strong domain focus since federalism laws or interaction mechanisms are prioritized. Another issue is the high competition for skilled workers with IT competence, and public agencies often do not have the possibility to pay comparable salaries as in private sectors. Consequently, teaching formats need to be expanded not only for academic teaching but especially for training on the job and vocational training to skill up the existing staff with e-competences. The necessity goes beyond the daily routines as e-competence is vital for the further development and change of a digitalized public sector—public officials need to be capable of shaping digital encounters (Lindgren et al., 2019). Although first attempts exist to solve this issue via, e.g., simulation games tailored to the public sector (Halsbenning et al., 2021), no general requirements for e-competence training in general or BPM competence, in particular, have been identified (Ogonek & Hofmann, 2018).

3. Research Design

During the research process, we first identified and shaped the research problem based on existing literature. Second, to answer our research questions, we set up a mixed-methods study design. Given our research questions' distinct scope, we selected a sequential explanatory design for our mixed-methods study (Creswell et al., 2003). The first step of this design comprises gathering quantitative data. Based on these initial results, the second round of data collection is initiated to investigate the research problem further and understand the preliminary results. Therefore, qualitative data is collected and analyzed (Creswell et al., 2003).

Hence, we commenced the data collection phase with a survey on business process management and e-competences among public officials. A link to the online survey was sent via email to different public administrations in Germany. The survey was accessible for four weeks in October and November 2020. In total, 713 civil servants from administrations of all federal levels and higher education organizations (e.g., universities) completed the questionnaire. The online survey was optimized to be quickly executable so that the participants needed, on average, about nine minutes to fill out the questionnaire. Contentwise, the survey asked for general information about the participants' administration and moved then to the topic of process management in the public sector. Here, the questions focused on general perceptions of process management's application and importance for public sector digitalization, followed by the essential part on BPM competence. In the first part, the participants were given statements regarding the relevance of process management competence to be rated within a five-point Likert-scale (see Table 1). The second part was about teaching formats and asked the participants to select formats they prefer for process management education (see Table 2).

After that, we used the preliminary insights to design an interview guide, that aims at concretizing the survey results and receiving further insights into general conditions in public agencies that support the participation in (part-time) education programs. The gathering and analysis of the qualitative data are still ongoing. Up to now, we have conducted five interviews with public officials from different federal levels, which lasted 43 minutes on average. We interviewed two persons from local administrations and three from tax offices (state level) in Germany The intention of conducting the interviews is twofold: First, gaining more detailed insight on the three

highest-rated aspects of public officials' teaching and learning preferences and, second, eliciting factors promoting motivation to partake in educational offers in the area of BPM. The already conducted interviews were recorded and transcribed. Within the next step, we will analyze the interviews based on a list of codes. Finally, we will synthesize the results of the survey and the interviews for interpretation and the formulation of design recommendations for educational settings to train BPM competences.

4. Preliminary Results

4.1 Survey

The survey results highlight the importance of process management competence for public officials (see Table 1). Although the survey indicates that especially executives need to be equipped with strong BPM competence (84%), it is not neglected that this must also be the case for the whole workforce in public agencies. However, the participants rated the quality of necessary BPM knowledge differently for executives compared to employees as a whole. Whereas BPM competence is rated as crucial for executives, the perception that all public officials also require high BPM competence is seen as very mixed. Notwithstanding, one third of the respondents also agreed to this position. More suitable to all public officials is more basic knowledge about BPM since 64% rated a basic understanding of process management as essential. These results correspond to the fact that BPM is considered an important means for the management, digitalization, and control of public organizations. The results also underline the relevance of process management competence for the daily routine in public administrations.

Table 5: Survey results: public officials' perceptions on the relevance of BPM competence (n=713)

Item	*(completely) agree*	*indifferent*	*(completely) disagree*
Leading executives need high process management competence	84%	11%	5%
All public officials need high process management competence	33%	35%	31%
All public officials need a basic understanding of process management	64%	24%	13%
In the public sector, good knowledge about process management is widely spread	4%	12%	84%
In the public sector, building process management competence has a high priority	13%	29%	58%
Many opportunities for process management education exist	36%	35%	29%
More opportunities for process management education should be available	59%	24%	17%

The consensus on the importance of BPM competence is contrasted by a limited actual existence of this competence within the public sector. Only a minority of 4% stated that good knowledge about process management is widely spread within the public sector. This finding—underlined by 84% (complete) disagreement—indicates a massive gap between the desired capacities of BPM competence and its actual presence in public administration. Beyond lacking a broad institutional penetration, according to the respondents, BPM education offerings should be expanded. A slight majority of 36% still agree on the availability of several opportunities for BPM education, whereas 29% vote against this statement. However, the answers to whether more opportunities should be available indicate a shortage of BPM education opportunities. With 59% (complete) agreement, our results accentuate an increasing demand for public official's opportunities to skill up in the BPM area. The survey results on the relevance of BPM competence for the public sector reveal a

substantial mismatch between the desired and the actual existing competences in BPM. On top of that, even the education opportunities are seemingly insufficient to cope with this competence gap.

As the current applied approaches apparently only contribute insufficiently to BPM upskilling, the questions regarding promising education formats prevail. Overall, the results show that there is no priority given to either presence or online (distance) education since 56% vote for presence and 49% – partly simultaneously – for online learning as an adequate general learning environment (see Table 2). The preferences drastically change when focusing on the medium for tutorials or exercises within BPM education. Here, 61% of the respondents expect digital BPM tutorials, which is contrasted by a very low preference for paper-based tutorials (6%). Although gaining great attention in research, simulation games do not gain such broad acceptance for BPM teaching usage. Still, 21% of the survey participants would appreciate such a scenario.

According to the respondents, priority should be given to the teaching of process modeling. Although it was explicitly asked regarding the teaching focus for BPM in its entirety, a share of 39% expects an educational focus on process modeling. In contrast, only 20% favor targeting managerial aspects of BPM. Also, for the respondents, the classical process analysis (29%) is superior to the teaching of process automation (22%).

Table 6: Survey results: public officials' preferences on proper teaching tools for BPM education (n=710)

Teaching format	Preferred by
Presence teaching	56%
Online teaching	49%
Digital tutorial tools	61%
Paper-based tutorials	6%
Simulation games	21%
Focus on process modeling	39%
Focus on process analysis	29%
Focus on process automation	22%
Focus on management aspects	20%

4.2 Interviews

As already stated above, the survey results served to design an interview guide aiming for a deeper understanding of public officials' preferences regarding educational settings for teaching BPM. The conversations focused on three aspects: presence learning advantages, online learning advantages, and motivation. **Presence learning** has in the past covered the lion's share of vocational training. Standard practices have been workshops, training centers, or in-house training. The preliminary analysis revealed that the main perceived advantages of this kind of training are

- Fast, personal, and uncomplicated communication with both the peers and the teacher
- Designated learning locations that allow for psychologically and physically detached learning
- Professional networking opportunities with colleagues from all over the country
- Social purposes as participants are often provided with board and lodging free of charge, which allows them to enjoy the time with their peers.

However, **online learning** offers a set of perceived benefits over presence learning. Especially during the last year, the COVID-19 pandemic's influence forced public administration agencies to

increase the number of digital offers to their staff. The predominant advantages that were identified in our early stage of analysis are:

- The **time efficiency** and the resulting possibility to integrate the learning into their everyday life as participation does not require travel and sometimes to be present at a specific time.
- Along with that comes **local independence**, which enables the learners to take place in courses from anywhere.
- Various opportunities to organize structured learning through **IS** and **IT**, such as **learning, collaboration, document management, tutorial tools, and instant messaging**.

Another critical aspect highly discussed was the **degree of motivation** it takes to participate in digital learning opportunities, as partaking is not only dependent on the offer's quality but at least as much on the intention of learners to go along with it:

- The learner must necessarily see the **opportunity for personal development**. There is incomparably more motivation to study a topic if the learner can benefit from it.
- **Receiving appreciation**, especially by their hierarchical superiors, has been expressed as boosting motivation to engage in digital learning.: the more positive feedback, the better.
- The interviewees argued that training must be **as close to real-life as possible**. The more abstract a topic gets, the more difficult it gets for the learner to understand the benefit.
- There should be a **distinct structure to the course** of training, such as meeting in periodic, regular cycles with the teacher and the peers and having regular learning checks.

As a preliminary conclusion, a blended learning approach can be suggested. The combination of the advantages of both digital and analog settings will also play a crucial role in the design of BPM education settings. For instance, the basic course skeleton could be organized through regular, onsite training sessions to meet with peers and teachers. To ensure real-life proximity, the course could make extensive use of case studies, meaningful examples and should communicate learning objectives and expectations. These findings are to be seen as preliminary results and are of rather general nature. A central aspect in the following course of the research project will be to understand how BPM as an e-competence can be optimally conveyed through such blended learning settings. This will, for example, include understanding whether process modeling as a central point of BPM, is best learned in 1-to-1 settings onsite, or maybe even better supported by self-learning scenarios with the support of proper tools. Additionally, it can be well researched, if the quality of process analysis understanding is influenced by how a learner discusses it, for example, either in online forums and video calls or in classroom settings with teachers and peers. These and more points will be key to understand how BPM can be imparted to public sector officials.

5. Conclusion and Outlook

The relevance of e-competence and BPM competence for public sector digitalization and e-government is widely accepted in research and practice. Our preliminary results strongly support this notion of process management. Despite this recognition, our study also clearly indicates a lack of BPM knowledge in German public administrations. As rising BPM competence—and e-competence in general—in the public sector has been a pressing issue for years, this divergence between the current and the desired status is surprising. Based on the current status of BPM

competence as pursued with our RQ 1 the questions regarding the "how" arise as stated with our RQ 2: How can educational settings be designed to train BPM competences?

For the design of such settings, it is essential to specify the audience beforehand. The survey results clearly show that BPM competence is necessary for executives, but the relevance for the broad mass of employees is assessed as lower. This relates primarily to the required level of BPM competence. Thus, the survey confirms that a different view is required between managers and employees, which is not reflected in the results on preferred learning formats. Therefore, the preliminary results provide some first general advice for the design of educational settings. Some of those recommendations are no novel findings as, for example, the provision of digital learning material or case studies are widely and across domains applied. However, the results reflect recommendations that follow public officials' perceptions of vocational training design and thus differ from, e.g., academic requirements. Particularly the public officials' openness to engage in blended learning approaches, integrating benefits of both presence and online learning, indicates that current educational offers do not fully satisfy their needs and motivation to acquire more knowledge. This insight makes the exploitation of advantages of both settings inevitable, as it allows to suspect great potential to improve BPM competence and general e-competence among public sector employees dramatically.

Based on the findings above, the next steps of our research will be guided by the desire to understand how and which aspects of blended learning (e.g., presence sessions, online discussions, digital tutorials, interactive assessment) mainly influence the acquisition of BPM competence to develop a benchmark that can be used for other e-competences. For this, we must (1) gain insight into how best to convey BPM competence to learners through blended learning and (2) establish the best way to evaluate the impact of acquired BPM competence. Finally, it must be stated that the presented research also entails limitations. Firstly, our conclusions cannot be fully generalized since our data was collected in Germany, and we have only conducted five interviews so far. Also, our recommendations are preliminary as they will be more elaborated with additional data. To summarize, it will be of utmost importance for public sector digitalization to skill up their employees using a mix of different approaches.

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