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Towards Efficient EGovernment: Identifying Important Competencies for EGovernment in European Public Administrations

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Abstract. In an attempt to enhance efficiency, public administrations around the world and in particular in Europe are increasingly relying on information technology (IT) to improve their performance and service delivery. This growing use of IT results in a changed set of competencies demanded from civil servants. In order to find out the concrete competencies that are required for successful implementation of eGovernment initiatives and that, consequently, need to be included in the education of future professionals, a European-wide survey was conducted (n=697). This paper reports on the first results of this study, revealing that there is a strong need for professionals with socio-technical, organizational and managerial competencies.

Keywords. eGovernment, Competencies, Survey, Europe, Workforce

Introduction

The ever-increasing demands public administrations must fulfil concerning social, economic and political challenges, have raised the pressure to respond appropriately to this environment. Efficiency in terms of the joint creation of public value beyond national borders is therefore at the heart of European political debates and "requires holistic responses, which in turn call for the transformation of public administrations" [1]. In this respect, information technology (IT) and technological innovation can serve as primary drivers since they provide effective and complexity-diminishing tools to deal with the plethora of requirements. They can contribute significantly to the amelioration of the performance and efficiency of the public sector and improve the service delivery [2]. Under the umbrella term *electronic government* (eGovernment), IT and technological innovations that allow public administrations to collaborate more efficiently with all stakeholders are summarized. The stakeholders include private actors, citizens and other

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organizations. Efficient collaboration makes it possible for public administrations to address diverse and constantly increasing needs of stakeholders. According to European Commission (2006), eGovernment means "the use of information and communication technologies in public administrations combined with organizational changes and new skills" with the objective to "improve public services, democratic processes and public policies" [3].

EGovernment initiatives, however, highly depend on the employees' expertise and qualification in this area [4]. To fully leverage the potential of eGovernment, it is important to have a workforce with the right competencies to perform the necessary tasks. The term *competence* can be defined as a combination of work-related knowledge, skills and abilities held by an individual [5]. It has to be ensured that civil servants are trained to be able to deal with new technologies and, thus, to guarantee customer satisfaction and efficient service delivery [6]. Studies show that a high number of eGovernment projects have failed [7], which emphasizes that it is not sufficient to have the technology available; expertise and commitment of qualified professionals are crucial. IT has to be designed and adjusted to the respective context in which it is applied and it needs the right professionals, who are capable of exploiting the new potentials of IT as far as possible [8]. EGovernment is not only about new techniques; it is much more about the people implementing it who need to have the right competencies [9].

Due to the lack of a comprehensive overview, what competencies are required by public administrations for a successful implementation of eGovernment initiatives at all levels, a European-wide survey was set up with the aim to provide such an overview. Awareness about the demanded competencies is of value for both educators to improve existing curricula and training programs and (future) professionals who would like to enter or advance in the eGovernment field. The survey was conducted between January and February 2016 and resulted in 697 usable responses from participants in 34 countries. This paper is focused on the presentation of the survey results and their implications for the development of eGovernment education in Europe.

The remainder of this paper is structured as follows. In the next section we review related literature and introduce the eGovernment competence framework applied in the study. Then, we describe the study method, followed by the presentation of results and their discussion, highlighting constraints and limitations. In the concluding section, we provide a short summary of the work done, together with the areas for future research.

1. Research Background

One way of increasing efficiency of public administrations is to have the right employees in the right positions doing the right things and to train them accordingly. Therefore, it is of utmost importance to define the competencies that are necessary for a successful eGovernment education in the European context. However, research on education of eGovernment in order to identify these competencies has been neglected for a long time: for instance, eGovernment education was not identified among future research topics within the roadmapping for the eGovRTD2020 project [10] and it remains under-researched [11].

Identification of the right competencies for eGovernment has started to attract increasing attention among scholars. A first attempt by [4] identified a first set of competencies and structured an academic debate around developing an eGovernment curriculum [12]. Apart of this eGovernment specific approach, a more generic approach

was developed on the European Union (EU) level. The European e-competence framework (e-CF) was established in 2014 as a means for describing the skills and knowledge requirements of IT professionals [13]. The framework is supported by the European Commission and forms part of the EU strategy for e-skills in the 21st century. The e-CF was developed with the objective of offering a one-stop shop for needed competencies in an IT environment and provide decision support concerning competency requirements and their implications for training, career development and so on. Yet, this framework provides a rather generic reference system, given that it is focused on IT professions in general, and does not take into consideration the peculiarities of different domains. On the one hand, this framework makes a valuable orientation in terms of classifying different types of competencies; but on the other hand, its suitability for the eGovernment domain is limited.

In search for a suitable framework, we decided to orient ourselves closely around the study by [14] for the purpose of designing our questionnaire. In light of the lack of profound examination and classification of eGovernment competencies in the academic field [9], this study is especially valuable, because it offers a comprehensive framework compared, for example, to the e-CF framework, because it is comprised of five different categories of eGovernment competencies, namely technical, socio-technical, organizational, managerial and political-administrative. The dimension of **technical** competencies encompasses all IT-related skills like the fundamentals, strategy and design of Information Systems. **Socio-technical** competencies refer to all the skills that are at the interface of technical system and human beings and involve both of them. Examples for such competencies include framework requirements on the impact of IT/eGovernment. **Organizational** competencies concern the organizational integration of IT/eGovernment, organizational structures, process management etc. The next category of **managerial** competencies deals with business and management skills in the context of IT/eGovernment, such as project-, change and financial management. The fifth category of **political-administrative** competencies addresses all skills that deal with the environment that IT/eGovernment is embedded in, such as legal conditions and policies. These five categories represent the multi-faceted composition of eGovernment and its requisites, beyond purely focusing on IT knowledge as in earlier publications.

2. Research Method

In order to gain an understanding of the competencies demanded by public administrations in Europe, an online survey was conducted among the representatives of public administrations and other organizations working in close cooperation with public administrations (target respondents). The framework by [14], presented in the previous section, acted as a basis for the questionnaire development. On top of that, it was decided to include in the survey several additional questions about the organization location, type, number of residents in the area of responsibility, number of employees and number of implemented eGovernment projects.

Once the agreement on the final set of questions had been reached by the authors, the survey was pre-tested by five experienced researchers, incorporating their feedback to the questionnaire. As a result, for each of the five categories of eGovernment competencies, namely technical, socio-technical, organizational, managerial and political-administrative, questions about the importance of three to five exemplary competencies in each category were asked about (Table 1a). All included exemplary

competencies were derived from the study by [14], who identified them based on extant academic literature in the field. The competence importance was measured using a 5-point Likert scale, with response options ranging from "unimportant" to "very important".

In case a specific competence was perceived important by a respondent (was marked as "important" or "very important"), two additional questions were asked. First, it was valuable to understand whether enough professionals in the organization or on the job market offer this qualification (Table 1b). Second, the respondents were asked, whether employees in the organization have been or will be sent for an additional training to obtain this competence (Table 1c). Both additional questions were measured using a 5-point Likert scale, with response options ranging from "strongly disagree" to "strongly agree".

The final version of the questionnaire was translated from English to German, French, Estonian, Spanish and Dutch. Thus, the survey was made understandable to target respondents in most European countries who do not necessarily speak English. The survey was then implemented using the LimeSurvey platform (www.limeservice.com) in all six languages and tested by ten researchers, making final adjustments. Once the online survey was launched in January 2016, a link to it was sent per email to more than 12,000 target respondents, asking them to distribute the link further to relevant personal contacts. The link to the survey was active for six weeks and during this time 2,155 responses were received in total. However, only 697 of them were complete, meaning that all mandatory questions were responded to. We decided to focus only on complete cases in further analysis, which was done using the SPSS Statistics software package. The results of data analysis are presented and discussed in the following sections.

3. Results

Of the 697completed questionnaires, about 84% of the responses came from Germany, due to the direct access of the authors to the target respondents in this country. In addition to Germany (n=587), Belgium (n=44) and Estonia (n=19), respondents from the following countries participated in the survey: Austria, Azerbaijan, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, Croatia, Finland, Georgia, Hungary, Italy, Kazakhstan, Kosovo, Latvia, Lithuania, Macedonia, Montenegro, Netherlands, Norway, Philippines, Moldova, Romania, Russia, Switzerland, Serbia, Spain, Thailand, Turkey, Ukraine, United Kingdom and Uzbekistan.

More than 90% of the responses came from the representatives of public administrations, out of which 38.2% came from public bodies serving fewer than 50,000 residents. Related to that, most organizations turned out to have less than 500 employees. Moreover, we asked for a general experience with eGovernment and eGovernment projects. In total 69.9% of the respondents implemented five or fewer eGovernment (or eGovernment-related) projects. Therefore, it can be stated that at the participating organizations the overall experience with eGovernment and eGovernment implementation was on a quite low level.

As the main goal of the survey was to identify the competencies sought by public administrations in Europe, the majority of questions were focused on the identification of these demanded competencies. In general, the proposed competencies in the chosen categories from the framework by [14] seem to be relevant. Only three competencies were marked by less than 40% of the respondents as "important" or "very important"

(*expertise in Information Systems design*, *Information Systems competencies* and *expertise in politics of eGovernment*). On the other side, *IT competencies, business/public management competencies, project management competencies* and *expertise in administrative workflows* were pointed out by more than 70% of the respondents as "important" or "very important", and there are further competencies considered as important by more than 60% of the respondents (*process management competencies*, *expertise in legal framework* and *expertise in public policy*). It is quite interesting that besides rather basic IT and administrative workflow competencies the managerial aspects were mentioned most often. It seems that there is a special need for leadership competencies. This is also flanked by the answers in the open-ended responses, where mostly managerial, but also social competencies were mentioned (e.g., communication competencies).

Table 1. Relative importance of eGovernment competencies in practice and, for the eGovernment competencies marked as important, the level of perceived supply and qualification

Category of Competencies	Competencies	(a)	(b)	(c)
	IT competencies	72.2%	46.3%	66.8%
Technical	Expertise in Information Systems design	33.6%	56.8%	59.4%
	Information Systems competencies	26.7%	45.2%	50.0%
	Expertise in eGovernment impact	45.1%	60.5%	51.3%
Socio-technical	Expertise in technology and eGovernment adoption	44.6%	57.9%	47.3%
	Expertise in politics of eGovernment	39.5%	59.6%	44.7%
	Expertise in eGovernment structures	45.9%	52.2%	48.4%
Organizational	Expertise in organizational design	52.9%	39.0%	57.2%
	Process management competencies	60.0%	40.2%	60.8%
	Business/Public management competencies	71.6%	29.5%	57.3%
	Project management competencies	70.4%	33.8%	59.1%
Managerial	Financial management competencies	51.8%	23.6%	58.2%
	Performance management competencies	40.6%	40.6%	42.8%
	Change management competencies	54.4%	48.8%	47.0%
	E-Policy competencies	46.1%	46.7%	42.4%
Political-administrative	Expertise in legal framework	65.1%	22.7%	55.3%
	Expertise in administrative workflows	74.2%	27.3%	56.1%
	Expertise in public policy	60.6%	18.5%	56.9%

(a) Relative importance of eGovernment competencies in practice
(b) For eGovernment competencies marked as important: share of the respondents who stated that there are *not* enough professionals in the organization / on the job market who offer competencies
(c) For eGovernment competencies marked as important: share of the respondents who stated that employees in the organization have been/are planned to be sent for an additional training to obtain competencies

(based on the framework by [14])

Besides the general importance of single competencies, it is also valuable to understand, to what extent the employees working at European public administrations are equipped with these competencies. To address that, for each competence marked as important for eGovernment, we asked whether, from the respondent point of view, there were *not enough* employees in their own organization or on the job market skilled with this competence (Table 1b). It is surprising that only five out of the 18 investigated competencies were mentioned with a share of more 50% saying there are not enough people in the sector. These competencies include *expertise in Information Systems design, expertise in eGovernment impact, expertise in technology and eGovernment adoption, expertise in politics of eGovernment* and *expertise in eGovernment structures*. It is interesting that all socio-technical competencies were considered as not sufficiently supplied by more than 50% of the respondents. Furthermore, it is striking that purely

technical competencies were not demanded, but strategic/managerial aspects seemed to be of importance instead. It is noteworthy that interdisciplinary aspects are especially missing in the skillsets of people already working in the field.

As a next step, we intended to find out if, besides an awareness of missing competencies, appropriate actions were undertaken to address existing gaps (e.g., by additional trainings). For each competence marked as important, we asked, whether there were plans for employees to be sent for trainings to obtain this competence or whether they had already attended such a training (Table 1c). It is surprising that only six out of 18 competencies received less than 50% of the responses, indicating that two-thirds of the employees were either planned or had already been sent to trainings to acquire the competencies. However, it has to be taken into account that here rather basic competencies like *IT*, *Process- and Project Management* were rated with the highest shares of 60% and more. There are two possible explanations for these results: (1) there is more training offering on the market for the rather basic competencies and that is why it is easier to send employees to attend such a training, and (2) seeing it from a maturity perspective, the *basic* competencies are the first ones to acquire, leaving the other competencies to be developed and taught at a later stage.

4. Discussion

From the results above, we could draw three important conclusions for modern public administrations.

First, the survey confirms the initial idea that public sector organizations are in need of *specific* competencies to be able to adopt and implement eGovernment projects and eGovernment-based service delivery in a sustainable way. This is a crucial issue, because, on the one hand, public administrations worldwide are well aware of the importance of IT and digital evolutions for their future development. On the other hand, they still seem to lack the necessary competencies to achieve this. Is that because it is difficult to find professionals with certain profiles? Or is it because public administrations lack the resources to attract the professionals who possess specific competencies? Or is it because there is a lack of specific education capable of addressing the necessary diversity of competencies in a coherent way? If the last explanation is the case, it would mean that there is an important gap in higher education in this domain, and that the higher education sector carries an important and urgent responsibility to develop those competencies.

Second, though the difference is not that large, it seems that there is more need for organizational and managerial competencies in the domain of eGovernment than for technical competencies. This fits the idea that public administrations have for decades (1) reduced the adoption of eGovernment projects to technical projects and (2) have not hired managers and leaders with sufficient specific eGovernment related competencies. Both elements are striking since public organizations have been well aware of the complexity of eGovernment implementation. As stated above, we can argue that public administrations will need to make a shift in their recruitment policy, if they want to be able to embrace the possibilities of eGovernment for a deep efficiency increase and service delivery improvement. From this perspective, it will be important to hire employees who possess all the necessary competencies – technical, managerial, as well as socio-technical and political-administrative.

Third, as can be derived from the first two elements of discussion, it is no wonder that the majority of organizations have limited experience with eGovernment projects in

general. There might even be a vicious circle that a lack of competencies within an organization to adopt and implement eGovernment projects will be an important inhibiting factor for the implementation of eGovernment projects. And, logically, a lack of experience in eGovernment projects will create a lack of internal competencies in this domain and prevent building required internal capacities. Using external know-how would be difficult in times of financial austerity [15]. This means that there might be only one possibility to break this circle: if public sector organizations would like to benefit from the potential advantages of digital evolution, they will have to make eGovernment a foundation for future service delivery. This is a major shift, since eGovernment should become more than a means, but the future of innovative public administrations, which will have to invest in acquisition and development of interdisciplinary competencies to achieve this.

5. Conclusion

Academic studies report that the increased need for efficiency gains drives many eGovernment projects. Hasty eGovernment implementations, combined with a lack of IT understanding and IT skills in the public sector, lead to the failure of many such projects. At the same time, there is still a lack of discussion of the competencies missing in the field.

We conducted a web-based survey with almost 700 respondents from European stakeholders hiring university graduates to work in eGovernment projects. Despite our recognized bias on Germany, the study shows a need not only in IT competencies but also in a more holistic approach that integrates perspectives on several disciplines. Our results indicate that a thorough understanding of public service delivery and information and communication technologies is required, combined with knowledge of organizational processes and political contexts entangled with managerial competencies. The results show evidence that there is a need for interdisciplinary learning which can only be addressed when considered early on in designing new curricula targeted at future eGovernment professionals. New eGovernment curricula should also address the problem of appearance of silos in public administrations. The solution need to be complemented with national initiatives such as the laudable study of eGovernment competencies by the German IT *Planungsrat* (Planning Council) [16]. The survey results confirm that looking at eGovernment projects as only technical projects and understanding eGovernment just as a technical issue does not represent the core of eGovernment. Holistic, interdisciplinary concepts and skillsets are necessary to overcome existing problems.

Further directions of our research will focus on the following aspects: (1) We will analyze the need for social competencies for future eGovernment professionals. Results show that social competencies in the fields of leadership and communication are crucial to manage the digital transformation of the public sector domain. (2) European and international eGovernment curricula and job descriptions for eGovernment professionals need to be developed, because the lack of respective competencies is not a just national phenomenon. The EU common values, guidelines and norms require that civil servants working in this field understand the transnational aspects of implementing an efficient and effective eGovernment architecture.

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