Development of a European Framework for e-Government Competences

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Abstract: The term e-government stands for an ICT enabled transformation of the public sector. New forms of collaboration and inter-organizational public service networks become feasible, to fulfill public tasks more efficiently and effectively. Even though e-government is being promoted by the EU, tangible results are rather scarce. The European Commission and the EU member countries therefore strive for a more coherent development of e-government within the EU. Nevertheless, it's being implemented very differently in the EU member countries. One reason for this diverse development seems to be that different competences for the personnel of public administrations are associated with e-government in the EU member countries. This article describes the first steps of the development of an e-government competence framework. This framework is initially being developed in the COMPATeGov project with public administrations from Bulgaria, Germany, Greece, and Romania. The article sums up the first results of a literature review on e-government competences, a survey, and focus group workshops. It outlines a first set of e-government competences and concludes with a forecast of the next steps in the project, in order to validate and facilitate the results.

1 Introduction and Problem Statement

E-government can be understood as an ICT-enabled transformation of the public sector to achieve better government (type-3, -4 definition of the [OECD03]). In this respect, it is more than just online government, which reduces e-government to the online delivery of public services (type-1 definition of the [OECD03]). Instead, this broader transformational perspective takes into account, that the public sector as a whole can be reorganized by making use of information and communication technologies (ICT). Hence, ICT has the potential to rethink which and how public services are being produced and which actors are being involved in the process. The consequential networking and cooperation are expected to have a transformative impact, albeit the term transformation is being used manifoldly in the e-government context (e.g. [Zu05]; [BH09]). O'Neill [O'N09] defines systemic transformation as a second tier of transformation: Accordingly, the application of ICT goes beyond the mere instrumental use of ICT (first tier) to

change organizational processes and practices; moreover it alters the relationships and behavior of the actors involved and thereby changes the model of public management itself (second tier) [O'N09]. This perspective enables for instance the separation of public services into parts which are conducted in the front office, where public services are delivered, and the back office, where they are produced. Thus ICT facilitates new organizational models, like e.g. shared service centers, which provide a large number of agencies with a standardized service, mostly a support process in the back office [Be03]. Another example are one stop agencies, which bundle a number of different services from a variety of agencies and offer them at one location ("front office") – online or offline [Le02]. With slightly different connotations, these transcending models are underlying the "joined-up" [Bo05] and "whole-of-government" [CL07]-approaches. These approaches address policy-making and -implementing issues across organizational boundaries to mitigate the effects of a fragmented public sector. E-government is a major enabler of these new forms of networked government [CBB05].

Promoting e-government has been a major effort in the European Union [MM09]. Considerable effort has especially been undertaken to measure the implementation of e-government. Different, more or less sophisticated maturity models have been used to display the status of e-government within the European Union (e.g. the limited model in [EC09]; for an overview see [Gr10]; [GM07]). Thus depending on the specific measures, the overall results are rather scarce and very diverse in the different EU countries. Therefore, the European Commission has undertaken various initiatives (e.g. EU Services Directive) to promote e-government. The results remain selective, what can be considered problematic in a Union aiming at a single internal market (see the Digital Single Market in [EC10].

Besides the different legal frameworks, cultural aspects and administrative traditions among the EU member countries [PB04], an obstacle constraining the implementation of a more coherent European e-government seems to be the heterogeneous approaches to e-government in the member countries (critical of a uniform reform approach is [Le06]). One aspect of the context of e-government reforms are the skills which are required of the public administration's personnel [He05]. As a consequence, it can be considered a barrier for a more coherent European e-government that there is no consistent understanding of the skills and competences associated with e-government. Often there is not even an established understanding of e-government competences at all [Sc10].

Because of the increasing importance of lifelong learning, the competency approach is enjoying larger recognition worldwide, as it focuses on the results of learning processes [Gn07]; [KSB07]. In Europe in particular, the competency concept has become important in establishing comparability between educational degrees issued in different countries [WDS06]. When applied in professional life, the competency approach takes into account what a person is able to do in a working context, regardless of how this competency has been acquired. Instead of paying attention exclusively to formal qualifications and degrees, which differ throughout Europe, skills, techniques, expertise, and know-how are becoming more important [EI05]; [WDS06]. While the qualification

concept is input-oriented, the competency concept is output-oriented, i.e., regardless of formal degrees.

However, despite increasing interest in the competency approach, it is a rather "fuzzy concept" [BK06]. In particular the terms competency and competence are often used inconsistently (see [Ho99]; [Ro95]. While the term "competence" can be defined as the ability to fulfill a task to certain, often specifically defined standard, in comparison competency designates the underlying attributes of a person, such as knowledge, skills, and abilities needed to fulfill competence standards [Ho99]. Regarding the focus of this research – the standardization of specifically defined competences – we therefore use the term competences when talking about concrete abilities; in contrast we use the term competency for the knowledge, skills, and competences required of a person [Sc10].

To date, in practice, the topic of e-government competences is – if at all – still being addressed in a very IT-dominated fashion. The same is true for the scientific community in public management and in administrative sciences [Gr10], which often very unilaterally still perceives e-government as an IT subject [EEE04]; [Ka04]; [MKM01]. Nevertheless, in practical projects and in the everyday work of public administration, it is becoming increasingly apparent that new competences are required which go beyond the simple use of an IT application, or even IT specialist and tool knowledge [OECD03]. A comprehensive change of competence requirements for all civil servant groups can be expected—and is already becoming apparent.

To address this problem the research questions at the core of this article ask which competences are considered e-government competences in different European countries? What differences actually exist between these countries? Which competences are specifically important from a transformational perspective on e-government?

To answer these questions, the article will be structured as follows: at the beginning, the methods employed will be briefly laid out. Second, the results of a survey and workshops with e-government experts will be presented in order to determine new competences. These results will then be analyzed and the necessary skills and competences structured in what can be considered a first draft of an e-government competence model. Furthermore, exemplary use-cases for an e-government competence model will be outlined. To conclude, an outlook will be given on how the results will be validated and specified in more detail.

2 Methods

Until now, e-government competences have hardly been discussed in the academic debate. Only a few academic articles addressing e-government-related competences or skills exist (e.g. [Le06], [Se05], [Sc10]), and even these often lack the focus of this article. Other contributions elaborate on organisational capabilities [PBP11], don't explicitly address e-government, but rather ICT in general [Ro03], or mention specific competences without yet integrating these into a holistic approach to e-government competences [He03]. Besides the shortcomings of the academic research, the question

of changing and newly arising competences in the context of e-government faces some significant challenges from practice:

- There is no agreed and established job profile for "e-government public personnel", on which to draw upon.
- The understanding of e-government in practice is at best mixed and rather incomplete.
- Given the dynamics in the field of e-government and the time lag to adjust competence level, it is necessary to reflect upon future competence requirements.

Therefore, the methodology of this article employs a multi-staged methodology: Competences have been derived from a literature analysis of the scarce previous research as well as newly arising e-government structures and processes. Based on this analysis, an initial set of e-government skills and competences has been derived, which served as the basis for an online survey. This survey has been conducted among e-government experts in Bulgaria, Germany, Greece, and Romania. These countries have been chosen, since they represent a sample of diverse administrative traditions and score differently in e-government benchmarking studies [EC09]. Hence, the country selection covers only four out of the 27 EU member countries, one of which is a Mediterranean, one is a central European and two are Eastern European countries. Major administrative cultures and traditions, like e.g. Scandinavian countries, are thus not included. This can be vindicated by the fact that the project is an initial attempt to develop a European competence framework.

The questionnaire used in the survey asked for the relevance of a skill or competence, the competence level necessary in the public sector, and the current competence level in general. The participants were asked to rate the importance of a specific skill on a four-tier scale, zero meaning a skill would not be important and three, a skill would be very important. The assessment had to be made for three different roles of public personnel: staff, mid-level management and senior management. The survey asked specifically for the competences necessary in e-government projects in order to gain an understanding of those competences required to make use of the transformative potential of e-government. Furthermore, statistical personal data was obtained from the participants at the end of the survey. Along with the questionnaire came a glossary that provided a short definition of the item in question. In total, 83 participants completed the questionnaire. The survey results have been validated and specified in more detail in workshops in the different project countries with e-government experts. The participants totalled to 62 experts who were either themselves public personnel, consultants, or scholars from the field of e-government. The results from the survey and the workshops have been consolidated and systematised. They will receive further specification and validation in upcoming workshops and online discussions as part of a project on e-government competences, the COMPATeGov project, which is funded by the European Commission. Together with academic institutions and public administrations in Bulgaria, Germany, Greece, and Romania this project develops a European e-government competence model. A competence model is not a "one size fits all"-approach that tries to force a uniform frame upon public administration across countries with different state structures, admin-

istrative cultures and traditions etc. Rather, it can be considered a construction kit that encompasses the relevant competence categories from which to pick and adapt the specific competence and its required level. The competence model will be used to develop an assessment tool for e-government competences, set up an online repository with relevant training materials adapted to one's individual training needs, and adapt corresponding vocational education and training (VET) offers.

3 Results

3.1 Skills and Competences for the staff level

The Skills considered the most important for e-government project staff across all researched countries are IT Literacy, Information Processing, IT Specialist, Process Management, and Organisational Design Skills (Table 1). The single-country results are – except for Romania – very similar, showing that there seems to be a pretty homogeneous understanding of e-government skills for project staff.

Skills for Project Staff	Bulgaria	Germany	Greece	Romania	Total
IT Literacy Skills	2,37	2,41	2,56	2,67	2,50
Information Processing Skills	1,95	1,59	2,12	2,64	2,07
IT Specialist Skills	1,83	1,88	2,04	2,41	2,04
Process Management Skills	1,63	2,12	1,80	2,05	1,90
Organisational Design Skills	1,58	2,12	1,56	1,86	1,78
Project Management Skills	1,47	2,00	1,36	2,05	1,72
Quality Management Skills	1,44	1,38	1,64	2,32	1,69
Change Management Skills	1,58	1,53	1,52	1,73	1,59
Management Accounting Skills	1,32	1,00	1,36	2,36	1,51
Juridic Skills	1,32	1,00	1,29	2,14	1,44
Risk Management Skills	1,26	1,06	1,32	2,09	1,43
IT Strategy Skills	1,32	1,24	1,08	1,45	1,27
Contract Management Skills	1,17	0,94	1,00	1,95	1,27
Marketing Skills	1,06	0,94	0,88	1,67	1,14
Media Skills	1,11	1,06	0,72	1,45	1,09
Policy Process Skills	1,00	0,88	1,24	0,62	0,94

Table 1: Relevant Skills for Project Staff

The personal and social competences assessed as very important for the staff involved in e-government projects were cooperation competence, communicative competence and self-control.

3.2 Skills and Competences for the project management

The Skills considered the most important for mid-level managers involved in e-government projects across all researched countries are Project Management, Process Management, Organisational Design, Risk Management, and IT Strategy Skills (Table 2). Again, there is not much of a difference between the single-country results, with at least four out of the five general top skills for project managers being identical in each country. Thus, there is a significantly homogeneous understanding of e-government skills for project managers.

Skills for Project Managers	Bulgaria	Germany	Greece	Romania	Total
Project Management Skills	2,84	2,81	2,76	3,00	2,85
Process Management Skills	2,68	2,63	2,60	2,90	2,70
Risk Management Skills	2,68	1,94	2,72	2,86	2,55
Organisational Design Skills	2,42	2,53	2,56	2,82	2,58
IT Strategy Skills	2,68	2,29	2,44	2,76	2,55
Information Processing Skills	2,56	1,88	2,56	2,73	2,43
Quality Management Skills	2,41	2,00	2,16	2,68	2,31
Contract Management Skills	2,53	1,73	2,08	2,68	2,26
Change Management Skills	2,47	2,06	2,44	2,64	2,40
IT Literacy Skills	2,53	2,06	2,92	2,52	2,51
Marketing Skills	1,95	1,44	1,64	2,45	1,87
Media Skills	2,12	1,76	1,80	2,32	2,00
Juridic Skills	1,95	1,65	2,12	2,24	1,99
IT Specialist Skills	1,78	1,38	2,36	2,05	1,89
Management Accounting Skills	2,11	1,71	2,12	2,05	1,99
Policy Process Skills	2,11	1,81	2,28	1,59	1,95

Table 2: Relevant Skills for Project Managers

Even though some of the most important skills for project managers mirror the skills considered relevant for staff, there are significant differences, e.g. the top three skills being completely different. Furthermore, even if the skill's title is identical, the associated skill levels and tasks for the different roles are not.

The personal and social competences assessed as very important for the mid-level managers involved in e-government projects were communicative competence, time-management and cooperation competence as well as leadership.

3.3 Skills and Competences for the senior management

The skills considered the most important for e-government senior managers across all project countries are IT Strategy, Organisational Design, Project Management, Risk Management, and Change Management Skills (Table 3). There is slightly more variance among the single countries, but the results nevertheless show solid consistency. At least three out of the five general top skills for project managers are mirrored in each country. Thus, there is a relative homogeneous understanding of e-government skills for senior managers.

There is a significant similarity between the most important skills for project managers and the skills considered relevant for senior managers; four out of the top five skills are identical. It was explained that the project managers are often recruited from the organisation's management ranks. In the public sector, different from the private sector, there basically is no separate caste of project managers. The project managers in the public sector often keep their responsibilities and tasks in the hierarchical structure and/or go back to their regular occupation, after the project is finished.

Skills for Senior Managers	Bulgaria	Germany	Greece	Romania	Total
IT Strategy Skills	2,63	2,12	2,96	2,79	2,62
Organisational Design Skills	2,47	2,24	2,92	2,76	2,60
Project Management Skills	2,68	1,82	2,76	2,90	2,54
Risk Management Skills	2,58	1,75	2,92	2,76	2,50
Change Management Skills	2,63	1,94	2,58	2,71	2,47
Contract Management Skills	2,29	1,71	2,92	2,81	2,43
Process Management Skills	2,63	1,75	2,48	2,85	2,43
Quality Management Skills	2,47	1,80	2,44	2,62	2,33
Information Processing Skills	2,44	1,59	2,44	2,57	2,26
Media Skills	2,12	1,71	2,68	2,48	2,24
Policy Process Skills	2,26	2,00	2,75	1,85	2,22
IT Literacy Skills	2,53	0,94	2,88	2,35	2,17
Juridic Skills	2,05	1,71	2,68	2,25	2,17
Marketing Skills	2,28	1,44	2,20	2,62	2,13
Management Accounting Skills	2,21	1,65	2,16	1,95	1,99
IT Specialist Skills	1,58	0,53	2,04	1,95	1,53

Table 3: Relevant Skills for Senior Managers

The social and personal competences estimated to be the most important for senior managers responsible for e-government were communicative and cooperation competence as well as leadership.

4 Analysis

The results have shown that apart from IT-related competences a large variety of different skills and competences are estimated to be important in the context of e-government (i.e., mixed competences). Thus it becomes apparent that particularly public managers involved with e-government also need knowledge about the possible applications and opportunities of IT architecture and operational process knowledge, so as to understand coming changes and make strategic decisions. The governance-related leadership literature especially neglects this aspect, either ignoring it or assuming, more or less explicitly, that operational knowledge is not necessary for strategic skills.

The results confirm that the working level is in particular affected in a way which goes beyond knowledge of IT applications. Staff at this level needs a new understanding of work processes and self-organisation skills. Project leaders face special challenges, because they must possess very profound interdisciplinary expert technical knowledge and increased social competences. Executives also require specialist knowledge - sometimes in great detail - to be able to push through projects and to ensure the necessary broader political support.

Looking toward future developments, it can be assumed that the relevance of isolated competences in IT application will decrease, in part because human-machine interactions will continue to improve. It can be expected that technical expertise will gain importance, because IT will become an integral, self-evident element of work in public administration. Already, every branch of public administration – security, law enforcement, social services and others – utilises IT. It is becoming clear that the changes in competence requirements at issue have much less to do with digitisation and much more to do with new procedures and processes of public administration. This also applies to executives. To date, however, there is a lack of consistent management and control concepts which address digital and spatially distributed work forms and the related competences.

Analysing the obtained results particularly from the workshops in detail, newly arising skills and competences can be distinguished from other skills and competences, which have been prevalent in the public sector and "merely" need to be applied to e-government. We thereby differentiate between these latter, which we term generic government skills and competences on the one hand and newly arising core e-government skills and competences on the other hand (Figure 1).

The so-called generic government skills and competences contain personal competences (creativity, self-control and -motivation, and self-management) and social competences (leadership, cooperation and communication). These competences gain higher relevance in this more networked and partly less hierarchical e-government working environment which requires more cooperation across organisational borders. They furthermore encompass policy and legal skills (policy process, administrative law and cultures, specialised law) and change-related skills (project and change management skills and implementation competence). These latter categories are also more or less generic competences that are required in the public administration, but which are necessary in order to implement the transformational changes.

Among the so-called core e-government skills and competences which can be grouped together, the e-government management skills and competences (risk management, quality management, performance management, and contract management), e-government design competences (organisational design, process design, IS design, IT specialist, and marketing skills), eCompetences (IT literacy, information processing, and media skills), and ePolicy competences (eStrategies and ePolicies, models and concepts, and information processing law) can be distinguished. These comprise rather new competences that arise in the context of e-government.

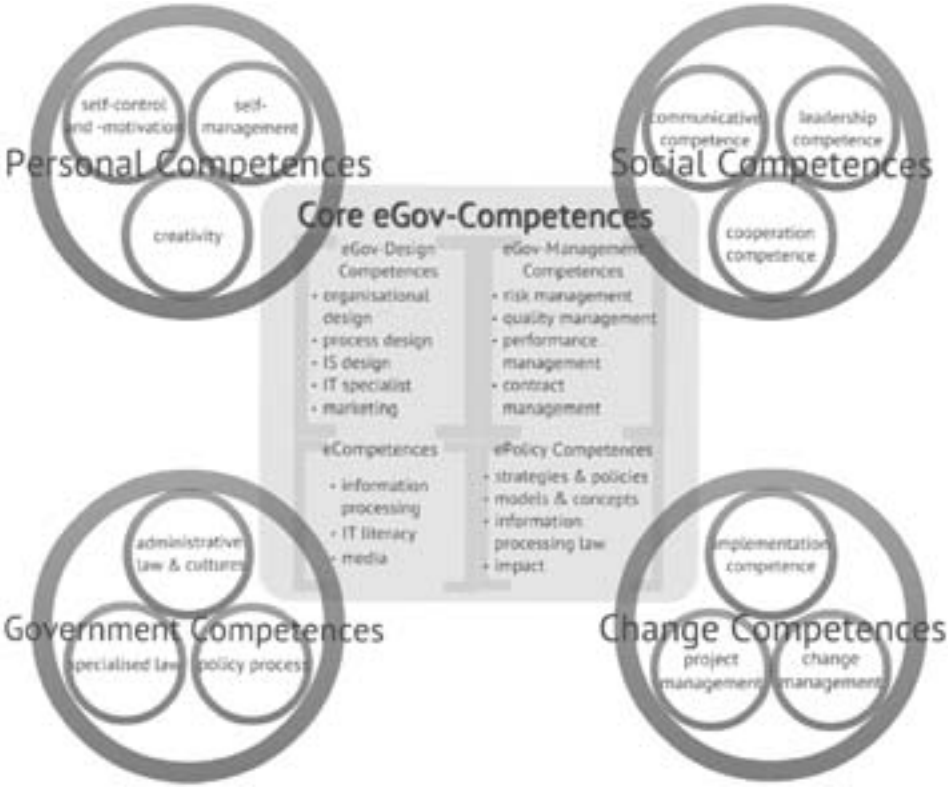

Figure 1: E-Government Competence Structure

In order to use a competence framework for competence development, a distinction between generic and core e-government competences is especially useful to analyse the competence gap which is presumably larger among the newly arising skills and competences. Such a systematisation of the necessary skills and competences can serve as the basis for practice and academia to design training programs and for work force planning efforts. "E-government work force planning efforts […] offer organizations the opportunity to assess their current work force capabilities, determine future work force requirements in the context of e-government[.], and implement strategies to eliminate gaps, both current and future, between work force capabilities and work force requirements."[Ar02] Considering the challenges the public sector faces in the upcoming years, with e.g. a large part of the public work force retiring and its scarce financial resources these efforts are especially necessary.

5 Summary and Outlook

Drawing on the literature, an initial set of e-government skills and competences has been assembled. These have been evaluated, complemented and specified in a survey and workshops in Bulgaria, Germany, Greece, and Romania. Comparing all these results for the different skills and competences assigned to the different roles in e-government transformation it is striking to see that even though e-government is developed quite differently in the four project countries, the necessary skills and competences are rather similar across all countries. Thus it can be stated that a shared understanding of e-government competences does exist. These e-government competences encompass a large variety of different skills and competences (i.e., mixed competences) which go far beyond a limited set of IT-related competences. Going back to the initial hypothesis, that different skills and competences are one factor contributing to different outcomes in how successful e-government has been implemented in a country, it becomes apparent, that at this stage of the research, the hypothesis does not stand. However, further research is necessary to analyse, whether the actual differences in competence levels can account for the how far a country has come in implementing e-government.

During the next stages of the project, these e-government skills and competences will be refined and the different competence levels which are necessary will be described in more detail. Further refinement and validation will be based on the first draft of the competence model. Therefore workshops with training centres and the liable authorities at the different levels of government will be conducted and online discussions will be held with e-government experts from academia and practice. Based on these further discussions, a curriculum will be developed and pilot sessions will be conducted. Parallel activities aim at disseminating the competence model to ensure its use by public administrations within the European Union.

References

[Ar02] Armstrong, A.: E-government Work Force Planning: A Pilot Study. In: The Journal of Government Financial Management 51; pp. 32-35.

[Be03] Bergeron, B.: Essentials of shared services. John Wiley & Sons, New York, 2003.

[BH09] Bloomfield, B.P.; Hayes, N.: Power and Organizational Transformation through Technology: Hybrids of Electronic Government. Organization Studies 30; pp. 461-487.

[Bo05] Bogdanor, V. (Ed.): Joined-Up Government. Oxford University Press, Oxford, 2005.

[BK02] Boon, J.; van der Klink, M.: Competencies: The triumph of a fuzzy concept. In: Academy of Human Resource Development Annual Conference. Proceedings Vol. 1; pp. 327-334.

[CBB05] Centeno C.; van Bavel, R.; Burgelman J.C.: A Prospective View of e-Government in the European Union. In: The Electronic Journal of e-Government 3; pp. 59-66.

[CL07] Christensen, T.; Laegreid, P.: The Whole-of-Government Approach to Public Sector Reform. In: Public Administration Review 67; pp. 1059-1066.

[EEE04] Elovaara, P.; Eriksén, S.; Ekelin, A.; Hansson, C.; Nilsson, M.; Winter, J.: Educational Programs in e-Government. In (Traunmüller, R. Ed.): Electronic Government. Third International Conference, EGOV 2004. LNCS 3183. Springer, Berlin, 2004; pp. 457-459.

[EC09] European Commission (ed.): Smarter, Faster, Better Government. 8th Benchmark Measurement.

[EC10] European Commission: A Digital Agenda for Europe. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. COM(2010) 245 final/2.

[EI05] European Institute for Public Administration: Organisational Changes, Skills and the Role of Leadership required by eGovernment, Luxembourg, 2005.

[GM07] Gil-Garcia, J.R.; Martinez-Moyano, I.J.: Understanding the evolution of e-government: The influence of systems of rules on public sector dynamics. In: Government Information Quarterly 24; pp. 266-290.

[Gn07] Gnahs, D.: Kompetenzen - Erwerb, Erfassung, Instrumente. W. Bertelsmann Verlag, Bielefeld, 2007.

[Gr10] Grönlund, A.: Ten Years of E-Government. The 'End of History' and New Beginning. In (Wimmer, M.A.; Chappelet, J-L.; Janssen, M.; Scholl, H.J. Eds.): Electronic Government. 9th International Conference, EGOV 2010. LNCS 6228; pp. 13-24.

[He03] Heeks, R.: Most e-Government-for-Development Projects Fail How Can Risks be Reduced? Paper 14, i-Government Working Paper Series, Institute for Development Policy and Management, University of Manchester, UK.

[He05] Heeks, R.: e-Government as a Carrier of Context. In: Journal of Public Policy 25; pp. 51-74.

[Ho99] Hoffmann, T.: The Meanings of Competency. In: Journal of European Industrial Training 23; pp. 275–285.

[Ka04] Kaiser, S.: Qualification Requirements in e-Government: The Need for Information Systems in Public Administration Education. In (Traunmüller, R. Ed): Electronic Government. Third International Conference, EGOV 2004. LNCS 3183. Springer, Berlin, 2004; pp. 464-467 .

[KSB07] van der Klink, M.; Schlusmans, K.; Boon, J.: Designing and Implementing Views on Competencies. In (Sicilia, M.-A. Ed.): Competencies in Organizational E-Learning: Concepts and Tools. IGI Global, Hershey/PA, 2007;pp. 221-233.

[Le06] Leitner, C.: eGovernment: People and Skills in Europe's Administration. In: Proceedings of the 39th Hawaii International Conference on System Sciences. Hawaii: IEEE; pp. 77-86.

[Le02] Lenk, K.: Electronic Service Delivery - A Driver of Public Sector Modernization. In: Information Polity 7; pp. 87-96.

[Le06] Lenk, K.: E-Government in Europe: Uniform solutions for all countries? In: Information Polity 11; pp. 189-196.

[MM09] Malmö Ministerial Declaration on eGovernment: Fifth Ministerial eGovernment Conference. Malmö, Sweden. http://www.egov2009.se/wp-content/uploads/Ministerial-Declaration-on-eGovernment.pdf accessed 28 September 2011.

[MKM01] Mundy, D.; Kanjo, C.; Mtema, P.: Meeting training needs for information age reform: shortcomings of current training provision. In (Heeks, R. Ed.): Reinventing Government in the Information Age: International practice in IT-enabled public sector reform. Routledge, London, 2001; pp. 271-292.

[OECD03] OECD: The E-Government Imperative. OECD e-Government Studies. OECD Publications, Paris, 2003.

[O'N09] O'Neill, R.: E-Government: Transformation of Public Governance in New Zealand? Victoria University of Wellington, Wellington, 2009.

[PBP09] Plattfaut, R.; Niehaves, B.; Pöppelbuß, J.; Becker, J.: Development of BPM Capabilities – Is Maturity the Right Path? In: Proceedings of the 19th European Conference on Information Systems (ECIS). Helsinki/Finland, 2011, Paper 27.

[PB04] Pollitt, C.; Bouckaert, G.: Public Management Reform. A Comparative Analysis, 2nd ed. Oxford University Press, New York, 2004.

[Ro95] Rowe, C.: Clarifying the use of competence and competency models in recruitment, assessment and staff development. In: Industrial and Commercial Training 27; pp. 12-17.

[Ro03] Ross, J.: Creating a Strategic IT Architecture Competency: Learning in Stages, CISR Working Paper No. 335, Center for Information Systems Research, Sloan School of Management Working Paper No. 4314-03.

[Sc10] Schuppan, T.: E-Government Competencies. Looking Beyond Technology. In (Shea, C.M.; Garson, G.D. Eds.): Handbook of Public Information Systems, 3rd ed. Taylor & Francis, Boca Raton, 2010; pp. 353-370.

[Se05] Settles, A.: What Skills are Needed in an E-World. E-Government Skills and Training Programs for the Public Sector. In (Khosrow-Pour, M. Ed.): Practicing E-Government: A Global Perspective. Idea Group Publishing, Hershey/PA, 2005; pp. 383-414.

[WDS06] Winterton, J.; Delamare-Le Deist, F.; Stringfellow, E.: Typology of knowledge, skills and competences: clarification of the concept and prototype. Office for Official Publications of the European Communities, Luxembourg, 2006.

[Zu05] Zuurmond, A.: Organisational Transformation Through the Internet. In: Journal of Public Policy 25; pp. 133-148.

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