

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/330442212>

Different But Still The Same? How Public And Private Sector Organisations Deal with New Digital Competences

Article in Journal of E-Government · December 2018

CITATIONS

8

READS

3,122

2 authors:



Sara Hofmann

Universitetet i Agder

36 PUBLICATIONS 508 CITATIONS

[SEE PROFILE](#)



Nadine Ogonek

University of Münster

20 PUBLICATIONS 100 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Multichannel management; Channel Choice [View project](#)



Imparting Competences in the Public Sector through innovative means [View project](#)

Different But Still The Same? How Public And Private Sector Organisations Deal with New Digital Competences

Sara Hofmann¹ and Nadine Ogonek²

¹University of Bremen, Germany

²ERCIS – WWU Münster, Germany

sara.hofmann@uni-bremen.de

nadine.ogonek@ercis.uni-muenster.de

Abstract: One of the greatest challenges that digitalisation brings along for the public sector is the need to equip their employees with digital competences. Since private sector companies are often assumed more progressive in exploiting digital media, it seems worthwhile for the public sector to understand how the need for digital competences is addressed by the private sector. However, the public sector needs to be careful before transferring solutions from the private sector one-on-one as both sectors exhibit various differences. Our aim in this study is therefore, to analyse which digital competences are needed by employees in both sectors and how the employees are equipped with these competences. In doing so, we have conducted 17 interviews in German public and private sector organisations. Our results exhibit only marginal differences between public and private sector organisations. Furthermore, we find that rather than being able to handle IT, the most important competences in the digital era are soft skills such as time and self-management as well as to understand the impact of digitalisation in general. In the private sector, analytical skills are furthermore important for developing new business opportunities. In order to equip employees with the required competences, training plays an important role in both sectors. Based on our results, we enhance an existing framework of digital competences by adding the dimension impact awareness in order to provide for the required ability to evaluate the impact of digitalisation on processes and activities outside of the digital world.

Keywords: digitalisation, competences, public sector, private sector, training

1. Introduction

One of the greatest challenges that digitalisation brings along for the public sector is the need to equip their employees with digital competences (European Commission, 2016a). Digital competences refer to the technological, cognitive and social knowledge, skills, and attitudes in order to apply ICT for investigating and solving problems and developing further knowledge (Vieru et al., 2015). Thus, it is imperative for public sector organisations to understand which digital competences their employees need and how they can best acquire these competences. However, while studies have analysed singular aspects of digital competences such as technical skills (cf. e.g. Kaiser, 2004) up to now, research has not yet presented a comprehensive empirical analysis of the required digital competences in the public sector.

Since private sector companies are often assumed more progressive in exploiting digital media (Halvorsen et al., 2005; Sethibe et al., 2007), it seems worthwhile for the public sector to understand how the need for digital competences is addressed by the private sector. Rather than developing own concepts and solutions, the public sector has repeatedly adopted solutions developed by the private sector (e.g. Bozeman and Bretschneider, 1986; Cordella and Iannacci, 2010; Dufner et al., 2002). However, the public sector needs to be careful before transferring solutions from the private sector one-on-one as both sectors exhibit various differences. Bozeman's famous model of publicness (cf. e.g. Boyne 2002), for example, contains the three dimensions ownership, funding and control as distinguishing features. First, while owners of public sector organisations are all members of a political community, the owners of a private sector organisation are entrepreneurs or shareholders. Second, funding opportunities in the private sector are mainly the customers' fee whereas for public sector organisations, the most important funding source is taxation. Finally, while public sector organisations are controlled by political forces, the controlling mechanism for private organisations is the market. These differences and their implications can make it difficult for the public sector to adopt solutions from the private sector. Hence, before implementing external practices, it is first of all imperative to identify similarities and differences between governments and companies in this area.

Although a variety of research comparing the public and the private sector exists, studies that analyse how public and private sector organisations differ in dealing with digital competences are missing. In order to close this gap, our aim in this study is to answer the following research questions.

1. Which digital competences are needed in public and private sector organisations and in how far do the employees have these competences?
2. How do both sectors equip their employees with the required digital competences?

We argue that our study is important because it is the first to provide a comprehensive perception of the competences that the public sector needs in the digital era. Furthermore, we conduct an unprecedented cross-sector analysis of digital competences and show that the private sector struggles with similar problems as the public sector. Finally, we demonstrate that rather than differentiating between public and private sector organisations in general, it makes more sense to consider further characteristics when categorising organisations according to their level of digital competences.

In order to answer our questions, we conducted seven semi-structured interviews with managers responsible for HR in public administrations and ten interviews with managers from private sector companies, which we analysed using content analysis. We classified our results according to the digital competence framework by (Vieru et al., 2015) and further extended it.

The remainder of this paper is organised as follows: In the next section, we present related work on digital competences in public and private organisations. Afterwards, we introduce our interview and analysis method, and subsequently present and discuss our results and answer our research questions. We finish the article by pointing out directions for future research.

2. Background

Digitalisation is not new, but remains a fuzzy concept. Technology fundamentally transforms processes of all kinds, and the application of IT in business contexts has ever since led to organisational changes and receives continuing attention because its invasiveness on people's work is increasing (Robey et al., 2013). The abundance of existing terms that describe those organisational changes caused by IT such as digitisation (e.g. Coreynen et al. 2017), e-transformation (e.g. Scott 2007), and digital transformation (e.g. Berman 2012; Chanas 2017) underlines its blurred perception. For the purpose of this paper, we examine the impact of technology integration as a whole and therefore follow the definition by Legner, who introduces digitalisation as "[...] the manifold sociotechnical phenomena and processes of adopting and using these technologies in broader individual, organizational, and societal contexts." (Legner et al., 2017, p. 301).

In any business context, digitalisation needs to be thoroughly prepared in order to exploit the large potentials promised by an increasing use of IT. Especially in the public sector, oftentimes coping with financial hardship (Kickert et al., 2015), digital services can be a means to increasing efficiency, effectiveness, and transparency (European Commission, 2016b). Besides introducing new and changing existing systems, also "the adjustment of the whole set of technological, managerial, and political variables affected by ICTs implementation" (Gascó, 2003, p. 13) need to be considered. This development causes an increasing demand shifting from lower-skilled to high-skilled employees (e.g. Arvanitis and Loukis, 2015; Brynjolfsson and Saunders, 2010). However, IT can only be supportive in nature, if the preconditions within the organisation are set (Kraemer and King, 2006; Scholl, 2005). Thus, it should be managers' primary task to provide the organisational preconditions and to "work to empower the organisation and HR staff units as well as invest more in managerial education of administrative personnel" (Bof and Previtali, 2007, p. 8). Miller et al. (2006) and Shah et al. (2017) claim that employees' knowledge and skills are among the decisive workplace factors determining the employees' readiness for change.

Therefore, new digital competences are needed. Whereas earlier literature has mainly emphasised IT skills (Kaiser, 2004; Kim et al., 2011), a growing number of studies take a more holistic view, thus acknowledging the importance of a variety of skills beyond the "technical" ones (Brynjolfsson and Saunders, 2010; Cordella and Tempini, 2015; Hunnius et al., 2015; Hunnius and Schuppan, 2013; Janowski et al., 2012; Leitner, 2006). In order to acknowledge the diversified skill set needed in times of digitalisation, we use the definition by Vieru et al. (2015, p. 4683) who define an individual's *digital competences* as the "[...] individual capacity to use and

combine one's knowledge (i.e., know-what), skill (i.e. know-how), and attitude (i.e. know-why) associated with three related competence areas, technological, cognitive and social, to use new or existing ICT to analyze, select and critically evaluate information in order to investigate and solve work-related problems and develop a collaborative knowledge base while engaging in organizational practices within a specific organizational context." This definition offers a framework of digital competence that encompasses three learning domains knowledge (know-what), skills (know-how) and attitude (know-why) as well as three competence areas: technological competence, i.e. the selection of suitable IT and its flexible handling, cognitive competence, i.e. the access to, organisation and evaluation of the information embedded in data, and social competence, i.e. dealing with IT in an ethical and confident manner as well as making use of the collaborative forms of interaction enabled by IT (Vieru et al., 2015).

There is no comprehensive empirical analysis of the required digital competences in either one of the two sectors. While some studies deal with the implications of digitalisation on the workforce, they generally rather focus on parts of this phenomenon, not taking a holistic perspective. Neither have there been cross-sectoral comparison to the best of our knowledge, which analyse the need for digital competences in the public and the private sector.

3. Research Method

Since scientific literature focusing on digital competences hardly exists (Murawski and Bick, 2017) neither in the public nor in the private sector, we deemed a qualitative approach in terms of interviews most adequate, given that qualitative research is especially appropriate in fields with limited prior research (Recker, 2013). A summary of our approach is shown in Figure 1.

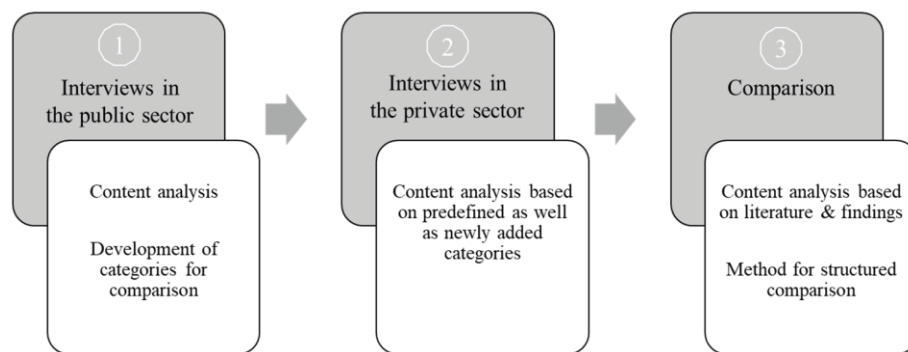


Figure 1: Research approach

We started with interviews in public sector organisations to get insights into the required digital competences, the status quo of these competences among the employees, and the actions for equipping employees with the required competences. In total, we conducted seven interviews with the help of a semi-structured interview guideline. Table 1 shows the sections of this guideline and the related objectives. For our interviews in private sector organisations (step 2), we slightly adjusted the interview guidelines due to the insights from the first round of interviews as well as newly gathered literature and conducted ten interviews.

Table 1: Sections of the interview guideline and objectives

Section	Objectives
Impact of digitalisation on work and new required competences	Understanding the influence of digitalisation on the employees' work and their required skills and competences
Employees' current competences	Understanding the current status of employees' competences
Actions for acquiring employee competences	Understanding the actions taken in order to equip the employees with competences

All interviewees were responsible for the organisation and rollout of trainings, or at least familiar with the structure. Most of the interviewees were from the human resources department, one from the IT department (public) and two from the corporate strategy department (private). An overview of all context data can be found in Table 2.

After the first two interviews in the public sector, which were done by both researchers to make sure they followed the same lines and did not include major flaws, the remaining interviews were mainly conducted by one researcher. All interviews were audiotaped and transcribed using a reconstructive transcription technique (Brinkmann, 2013) that primarily focuses on the content of the interview and neglects dialects and breaks.

Table 2: Interview context data

	Public sector	Private sector
Number of interviews	7	10
Responsibility/ Size of organisation	Municipal public administrations in North Rhine-Westphalia covering all seven different German size classes (in terms of inhabitants)*	Nationally operating SME (1), internationally operating medium and large organisation (9)
Interviewees	HR manager (6), IT manager (1)	HR manager (6), CEO (2), CIO (1), executive director (1)
Industries	Public administration	Agriculture construction, manufacturing, communications, wholesale trade, finance, services
Period of interviews	Summer 2016	Spring 2017
Average duration interviews	40 minutes	35 minutes

* cf. <https://www.kgst.de/groessenklassen> (in German)

Subsequently, the interviews were analysed using content analysis, which is a common approach in social sciences (Recker, 2013). In doing so, the interview transcripts were coded with the help of categories (Krippendorff, 2004). Most of the categories were derived deductively based on literature. We also added two categories in the second interview round (private) inductively while coding the interviews. Subsequently, all interviews were coded in-depth by both researchers with the help of the online coding tool QCA Map (<https://www.qcmap.org/>), which is based on the qualitative content analysis by Mayring (2000). Finally, we discussed the results and jointly analysed the content.

In a third step, we categorised our results on the required digital competences according to the framework by Vieru et al. (2015), which we extended by a fourth dimension, impact awareness, which is further detailed in the next sections. Finally, we contrasted our findings with relevant literature and identified differences and similarities between the public and private sector.

4. Results

We first present our results on the digital competences that our interviewees from public and private sector organisations regarded as important as well as the degree to which employees currently meet the competence requirements. Afterwards, we elaborate on how both sectors equip their employees with the required digital competences. Our findings are backed by interview quotes from both, private sector interviewees (pr) and public sector interviewees (pu).

Required and existing digital competences in public and private sector organisations

We categorised the required and existing digital competences according to the above described framework provided by Vieru et al. (2015). Our interviews revealed the need for all three digital competence areas, i.e. technological, cognitive, and social, in both sectors – although to a varying degree. In addition, a further dimension of competences was frequently mentioned that concerned the ability to evaluate the impact of digitalisation on processes and activities outside of the digital world, which we call *impact awareness*.

Technological competences

Although the interviewees in both sectors acknowledge IT aptitude as the basic competence needed by the employees today, this is, however, not seen as the most important one. Much more vital are soft skills such as time and self-management, flexibility, openness towards innovations, and courage in using IT. “More important than IT competences is if people have the ability and willingness to learn, are open to new experiences and have cognitive skills.” (pr) “A general openness to innovation and self-management becomes increasingly important.” (pu) In both sectors, digitalisation goes along with further challenges including increased system complexity, which requires additional competences. “The complexity of many (IT) programmes is such that the employees need to be ready and willing to be trained, because otherwise they will not be able to work in many areas anymore.” (pu) “The most important thing for me is the change process in people’s mind sets. People are willing to think new and are up to accepting changes.” (pr) Interviewees from

both sectors mentioned employees' fears as barrier of increasing digitalisation. Especially in the public sector, it is the fear of unknown situations. "Public sector employees are known for their general fear, and they would rather wait, then to be the first movers." (pu) "There is a fear of new technologies, which to a lesser extent is a question of adjustment than more of flexibility and a mental problem that many colleagues have." (pu)

Cognitive competences

Unlike public sector organisations, which do not need to explore new business models, private sector organisations need to make sense of the abundance of digital data and use them in their interest. "Besides automation, less paper use and process optimisation, digitalisation primarily means new business models and this is where most people have difficulties with." (pr) The intelligent use and evaluation of data also enables new business models. "Only thanks to consumers' increased use of smartphones and tablets and the digital developments throughout the last six years, we were able to start our business and grow." (pr) Especially private sector organisations see the need for higher-skilled employees and look for analytical competences and expertise in databased work, which goes hand in hand with the above-mentioned search for new business opportunities (see also impact awareness).

Social competences

For public sector organisations, another challenge refers to legal uncertainties in dealing with digital documents. "Sometimes, you have to do legal assessments yourself. Can this e-mail be taken as an official document? This needs to be decided on a case to case basis." (pu) "There are just not enough starting points, to adapt the processes in a meaningful way to the digitalisation requirements. Moreover, there are legal hurdles that exist despite all the technical advancements." (pu)

Impact awareness

Many interviewees raised a further dimension of competences, which we summarised as impact awareness. It refers to the ability to evaluate the impact of digitalisation on processes and activities outside of the digital world. Especially among managers in both sectors the awareness of digitalisation and its impacts are crucial since they are seen as role models and provide the basis for a digital-friendly organisation culture. In some cases, managers seem unable and unwilling, to appropriately communicate and support digitalisation initiatives. Some deny their employees the possibility to attend digitalisation-specific trainings. "There are really managers who complain that their employee is gone for two days without having talked to him before. [...] If the superior does not create the framing conditions that the employee can apply the newly learnt behaviour patterns, that is strictly for the birds." (pr) In addition, it is important to understand both the positive and negative consequences of digitalisation since otherwise rumours emerge. "[The managers] are the ones most afraid of losing status, importance and function." (pu) For private sector employees, this fear seems more clearly linked to possible losses due to automation. "There is a great fear that robots take away the jobs of people and this especially, if we as a company, decide to develop a new technology. Then we just do not need three to four only fairly trained employees, but machines or robots doing this instead." (pr) In addition, employees are afraid of being monitored and controlled. "There is always the fear, [with increasing IT] more monitoring and more control will be possible." (pu) Furthermore, employees fear to become dependent on IT and thus lose 'offline' skills. Especially in the private sector, the ability to understand how the benefits of digitalisation can be exploited to enhance business opportunities and which dangers are linked to this endeavour is important. "What we need in our team are creative minds, who think about business opportunities independently of IT." (pr) Finally, the impact of digitalisation on the organisational structure needs to be understood. "[Digitalisation] is only a tool, if at all, it is a process linked to a transformation we are going through. It is a mistake, many – also in our industry make – to think that just by digitising they will become automatically successful. Digitalisation needs to be understood as complete transformation of your business." (pr)

Existence of required competences

No clear picture exists as to whether employees possess the required competences. The interviewees from the public sector more often regard the current competences as rather sufficient ("I would say that all of the employees have the needed competences." (pu)) whereas the interviewees from the private sector acknowledge a competence gap. "Well, few have the competences. The reason for the gap is that they have never been taught." (pr). Management is seen as a primary inhibitor. Both representatives from public sector organisations and – especially large, traditional – private companies report that managers are often not IT-savvy themselves and thus do not live up to a role model. "There is a lack, especially on higher levels of the

organisation. It is not only the “simple” workers, but especially the managers who do not know themselves how to (electronically) invite ten employees simultaneously.” (pu) Another interviewee added that even if the managers are generally very open towards it, “they don’t get the approach, how to make it work.” (pr). Employees from organisations in the public sector and, again, especially large private organisations seem to lack a comprehensive understanding of digitalisation that goes beyond the use of single IT tools. In contrast, in younger and smaller private sector organisations, neither employees nor managers seem overburdened by digitalisation.

How to equip employees with the required digital competences

Both sectors acknowledge the importance of continuous competence education by means of trainings. In the public sector as well large organisations in the private sector, traditional offline trainings take the lead, whereas younger and smaller private sector organisations tend to rely more on direct feedback and on-the-job training. Especially larger companies increasingly plan to offer e-learning and blended learning courses. In the public sector, in contrast, e-learning is seldom a topic.

With regard to content, 90% of the trainings in the public sector cover juridical topics, followed by trainings on specific programmes and procedures, soft skill-related trainings concerning self-, time- and stress-management, and training on basic IT tools, such as Microsoft Office. In the private sector, especially the larger companies offer a variety of trainings on “offline” competences. Like the public sector, they offer hardly any trainings on digitalisation, but a range of soft skills (e.g. change management) or methodological courses (e.g. prototyping, design thinking, and agile management). Yet, training alternatives become more important in both sectors such as informal trainings with and by colleagues. In the public sector, for example, multipliers who have followed a traditional training are in charge of teaching their peers on the job.

Problems in the competence equipment arise, if trainings are not taken seriously. Especially private sector organisations plan to evaluate trainings more strictly in order to avoid wasting money. “I am fascinated, we spend incredible amounts of money on training and we do not measure the results.” (pr)

5. Discussion

Based on the above described results, we now answer our two research questions. Furthermore, we explicate our implications for theory and practice.

1. Which digital competences are needed in public and private sector organisations and in how far do the employees have these competences?

In both sectors, a general IT aptitude is seen as a prerequisite for being able to work in today’s interconnected business world. More important in both sectors, however, is to acquire soft skills such as time and self-management. In addition, especially private companies call for analytical skills to analyse the bulk of data arising through digitalisation. These findings are in line with the digital competence framework by Vieru et al. (2015). Besides, employees need to have a general awareness of digitalisation and its consequences, i.e. they need to be able to evaluate the impact of digitalisation on processes and activities outside the digital world. This so-called impact awareness is important since otherwise, possible fears, which are not necessarily fact-grounded, such as being monitored and losing a function, or eventually the job might arise. In addition, it also comprises, for example, the understanding that digitalisation goes hand in hand with a need to adjust the organisational structure.

No clear answer can be given whether employees generally have the required digital competences. Whereas public sector organisations and large organisations in the private sector at least acknowledge their employees’ lack of a profound and comprehensive understanding of digitalisation, employees of smaller and younger private sector organisations are generally digitalisation-savvy.

2. How do both sectors equip their employees with the required digital competences?

Training plays an important role as a major means for equipping employees with the required digital competences in both sectors – in the private sector at least for large organisations. This is in line with Harel & Tzafir (2001) who found that in general, the “[...] nature of the environment determines the amount of

investment in training and the level of employee participation, irrespective of the sector in which the organization operates.” Yet, the formats and ways are different and gradually change. Private sector organisations increasingly use IT as a medium for training their employees (e.g. virtual reality glasses, e-learning courses) whereas public sector organisations stick to traditional ways of teaching. Younger and smaller private sector companies rather refrain from traditional training but rely on training on the job and the employees’ intrinsic motivation to stay up to date with new digital trends.

To a certain extent, our findings contradict existing literature, which assumes that private sector organisations are far more advanced in the use of IT than public sector organisations (Sethibe et al., 2007). This seems mainly true for younger and smaller companies, which have a deeper understanding of digitalisation since digital technologies are often the basis for their business models. Especially large, traditional private sector organisations appear similar to their public counterparts in their slow adaption to the digital world and both see the need for a more comprehensive understanding of digitalisation.

Our results provide value to theory and practice in various ways. As to theory, our study contributes to the existing body of knowledge by extending the digital competence framework by Vieru et al. (2015) with the new dimension impact awareness, which describes the ability to evaluate the impact of digitalisation on offline processes and activities. In contrast to some studies comparing the public and the private sector, our results suggest that private sector organisations cannot be regarded as homogenous entity. Rather than discovering differences between the public and the private sector in their entirety, we could identify differences between public sector organisations and large private sector organisations on the one side and small, younger companies on the other side. Thus, many factors play a role in the status of digital competences in an organisation and the differentiation between public and private should only be one constituent element. Strikingly, the majority of literature regards private sector as the norm and compares the “deviating” public sector to it, suggesting that the public sector can learn from the private sector. However, we could not verify this imbalance in our results. For practitioners, our results suggest to acknowledge the importance of digital competences, to offer soft skills and out-of-the-box trainings – not just mere IT courses, to encourage employees to learn digital competences, adjust the company structure to the digitalisation environment, and prepare managers to become role models in the digital world. Furthermore, since equipping employees with the needed digital competences is a task for organisations across all sectors, we suggest to create platforms for exchanging best-practice experiences and for jointly developing training strategies. Furthermore, the required competences should be taught early on. Thus, school education should prepare pupils for the soft-skill ‘competences’ such as flexibility, curiosity, and problem solving.

6. Conclusion

In our study, we have conducted 17 interviews with public and private sector organisations in order to identify the need for digital competences, to understand in how far employees have these competences, and to figure out the actions that are taken in order to equip employees with those competences. Our study shows that requirements for employees are indeed changing due to digitalisation. However, the required competences in the digital age are not purely technical but also cover soft skills such as time-management and understanding the impact of digitalisation on the offline world. Our findings indicate that especially young and small private organisations differ from public ones. There is not much of a difference between public organisations and big, traditional private sector organisations.

Our study exhibits several limitations, too. Our interviewees might not be IT-savvy themselves and therefore provide a limited evaluation. Furthermore, we conducted only 17 interviews, which are limited to the German context, thus being another bias to our findings. Therefore, future research in this field should consider different contexts and also involve employees as interviewees. In addition, our study showed that many factors play a role concerning the status of digital competences in an organisation, which have not yet been analysed. Subsequent studies should pay attention to these influencing factors. Finally, future research should also enquire about the ideal digital competence mix.

References

- Arvanitis, S. and Loukis, E. (2015), “Employee education, information and communication technologies, workplace organization, and trade: A comparative analysis of Greek and Swiss firms”, *Industrial and Corporate Change*, Vol. 24 No. 6, pp. 1417–1442.

- Berman, S.J. (2012), "Digital transformation: opportunities to create new business models", *Strategy & Leadership*, Vol. 40 No. 2, pp. 16–24.
- Bof, F. and Previtali, P. (2007), "Organizational Pre-conditions for e-Procurement in Governments: the Italian experience in the Public Health Care Sector", *Electronic Journal of E-Government*, Vol. 5 No. 1, pp. 1–10.
- Boyne, G.A. (2002), "Public and private management: what's the difference?", *Journal of Management Studies*, Vol. 39 No. 1, pp. 97–122.
- Bozeman, B. and Bretschneider, S. (1986), "Public Management Information Systems : Theory and Prescription", *Public Administration Review*, Vol. 46 No. Special Issue, pp. 475–487.
- Brinkmann, S. (2013), *Qualitative Interviewing*, Oxford University Press, New York.
- Brynjolfsson, E. and Saunders, A. (2010), *Wired For Innovation - How Information Technology Is Reshaping the Economy*, MIT Press, Cambridge.
- Chanias, S. (2017), "Mastering Digital Transformation: The Path of a Financial Services Provider Towards a Digital Transformation Strategy", *Proceedings of the 25th European Conference on Information Systems (ECIS)*, Guimarães, pp. 16–31.
- Cordella, A. and Iannacci, F. (2010), "Information systems in the public sector: The e-Government enactment framework", *Journal of Strategic Information Systems*, Elsevier B.V., Vol. 19 No. 1, pp. 52–66.
- Cordella, A. and Tempini, N. (2015), "E-government and organizational change: Reappraising the role of ICT and bureaucracy in public service delivery", *Government Information Quarterly*, Vol. 32, pp. 279–286.
- Coreynen, W., Matthyssens, P. and Van Bockhaven, W. (2017), "Boosting servitization through digitization: Pathways and dynamic resource configurations for manufacturers", *Industrial Marketing Management*, Elsevier Inc., Vol. 60, pp. 42–53.
- Dufner, D., Holley, L.M. and Reed, B.J. (2002), "Can Private Sector Strategic Information Systems Planning Techniques Work for the Public Sector?", *Communications of the Association for Information Systems*, Vol. 8 No. 1.
- European Commission. (2016a), "Digital Single Market - Digital Economy & Society", *Digital Skills & Jobs*, available at: <https://ec.europa.eu/digital-single-market/en/skills-jobs> (accessed 3 May 2017).
- European Commission. (2016b), *EU eGovernment Action Plan 2016-2020 - Accelerating the Digital Transformation of Government, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*, Vol. 2016, Brussels.
- Gascó, M. (2003), "New Technologies and Institutional Change in Public Administration", *Social Science Computer Review*, Vol. 21 No. 1, pp. 6–14.
- Halvorsen, T., Hauknes, J., Miles, I. and Roste, R. (2005), "On the differences between public and private sector innovation", *Publin Report*, Vol. 16 No. 1, pp. 1998–2002.
- Harel, G.H. and Tzafrir, S.S. (2001), "HRM Practices in the Public and Private Sectors: Differences and Similarities", *Public Administration Quarterly*, Vol. 25 No. 3, pp. 316–355.
- Hunnius, S., Paulowitsch, B. and Schuppan, T. (2015), "Does E-Government education meet competency requirements? An analysis of the German university system from international perspective", *Proceedings of the 48th Hawaii International Conference on System Sciences (HICSS-48)*, IEEE, Kauai, Hawaii USA, pp. 2116–2123.
- Hunnius, S. and Schuppan, T. (2013), "Competency requirements for transformational e-government", *Proceedings of the 46th Hawaii International Conference on System Sciences (HICSS-46)*, IEEE, Maui, Hawaii, pp. 1664–1673.
- Janowski, T., Estevez, E. and Ojo, A. (2012), "Conceptualizing Electronic Governance Education", *Proceedings of the 45th Hawaii International Conference on System Sciences (HICSS-45)*, IEEE, Maui, HI, USA, pp. 2269–2278.
- Kaiser, S. (2004), "Qualification Requirements in e-Government: The Need for Information Systems in Public Administration Education", in Traunmüller, R. (Ed.), *Electronic Government: Proceedings of the 3rd International Conference, EGOV 2004. LNCS 3183*, Vol. 3183, Springer, Berlin Heidelberg, pp. 464–467.
- Kickert, W.J.M., Randma-Liiv, T. and Savi, R. (2015), "Politics of fiscal consolidation in Europe: a comparative analysis", *International Review of Administrative Sciences*, Vol. 81 No. 3, pp. 562–584.
- Kim, G., Shin, B., Kim, K.K. and Lee, H.G. (2011), "IT Capabilities, Process-Oriented Dynamic Capabilities, and Firm Financial Performance", *Journal of Association for Information Systems*, Vol. 12 No. 7, pp. 487–517.
- Kraemer, K.L. and King, J. (2006), "Information Technology and Administrative Reform: Will E-Government be different?", *International Journal of Electronic Government Research*, Vol. 2 No. 1, pp. 1–20.
- Krippendorff, K. (2004), *Content Analysis. An Introduction to Its Methodology*, 2nd Ed., Thousands Oaks, California.
- Legner, C., Eymann, T., Hess, T., Matt, C., Böhmman, T., Drews, P., Mädche, A., et al. (2017), "Digitalization: Opportunity and Challenge for the Business and Information Systems Engineering Community", *Business & Information Systems Engineering*, Vol. 59 No. 4, pp. 301–308.
- Leitner, C. (2006), "eGovernment: People and skills in Europe's administrations", *Proceedings of the 39th Hawaii International Conference on System Sciences*, Vol. 4, IEEE, Kauai, Hawaii USA, pp. 1–9.
- Mayring, P. (2000), "Qualitative Content Analysis", *Forum Qualitative Social Research*, Vol. 1 No. 2, pp. 1–10.
- Miller, D., Madsen, Susan, R. and John, Cameron, R. (2006), "Readiness for Change: Implications on Employees' Relationship with Management, Job Knowledge and Skills and Job Demands", *The Journal of Applied Management and Entrepreneurship*, Vol. 11 No. 1, pp. 3–16.
- Murawski, M. and Bick, M. (2017), "Digital competences of the workforce – a research topic?", *Business Process Management Journal*, Vol. 23 No. 3, pp. 721–734.
- Recker, J. (2013), *Scientific Research in Information Systems. A Beginner's Guide*, Springer, Berlin, New York.

- Robey, D., Anderson, C. and Raymond, B. (2013), "Journal of the Association for Information Systems Information Technology , Materiality , and Organizational Change : A Professional Odyssey Organizational Change : A Professional Odyssey", *Journal of the Association for Information Systems*, Vol. 14 No. 7, pp. 379–398.
- Scholl, H.J. (2005), "Organizational Transformation Through E-Government: Myth or Reality?", edited by Wimmer, M.A., Traunmüller, R., Grönlund, Å. and Andersen, K. *VElectronic Government: Proceedings of the 4th [IFIP WG 8.5] International Conference, EGOV 2005*, Copenhagen, Denmark.
- Scott, J.E. (2007), "An e-Transformation Study Using the Technology – Organization – Environment Framework", *BLED 2007 Proceedings*, pp. 50–61.
- Sethibe, T., Campbell, J. and McDonald, C. (2007), "IT governance in public and private sector organizations: Examining the differences and defining future research directions", *ACIS 2007 Proceedings - 18th Australasian Conference on Information Systems*, pp. 833–843.
- Shah, N., Irani, Z. and Sharif, A.M. (2017), "Big data in an HR context: Exploring organizational change readiness, employee attitudes and behaviors", *Journal of Business Research*, Elsevier Inc., Vol. 70, pp. 366–378.
- Vieru, D., Bourdeau, S., Bernier, A. and Yapo, S. (2015), "Digital competence: A multi-dimensional conceptualization and a typology in an SME context", *Proceedings of the Annual Hawaii International Conference on System Sciences*, Vol. 2015–March, pp. 4681–4690.