Exploring e-government skills and competencies required in public sectors: a literature study

Author: Maihemuti Sali
Date of birth: 81/06/18
Contents

Executive summary........................................................................................................3

Abstract..........................................................................................................................5

1. Introduction..................................................................................................................6

2. Topic area definition and theoretical concepts.............................................................8
   2.1 E-government skills..................................................................................................8
   2.2 EPAN’s four skill sets.............................................................................................8
   2.3 Communities of civil servants in e-government.........................................................10
   2.4 Skill requirements for different communities.........................................................11
   2.5 Distinction of e-government and e-business skills..................................................12

3. Research method.........................................................................................................12

4. Results.......................................................................................................................15

5. Discussion..................................................................................................................19

6. Conclusion..................................................................................................................21
   6.1 Conclusion..............................................................................................................21
   6.2 Implications............................................................................................................22
   6.3 Limitations and recommendation for future work..................................................23

References......................................................................................................................24

Appendix: Several international organizations working on e-government......................28

List of figures and tables

Figure 1: E-government communities and skills.............................................................11

Table 1: E-government skills identification in four skill sets...........................................9
Table 2: Concept matrix of literature review..................................................................15
Table 3: Skills/competencies for dealing with eGovernment processes in previous literature...16
Table 4: E-government skills suggested by literature but not identified in the instrument.....18
Table 5: E-government skills/competencies needed by different civil servant communities.....19
Executive Summary

Background of this study
A range of skills and competencies will need to be developed in public-sector organizations in order to properly implement and manage e-government. The skills required for e-government are not simply technical, as general managers also need broad skills to engage in the ICT decision-making process; necessary skills include a basic technical understanding (IT literacy), but also an understanding of information management and the information society. According to a survey conducted by EIPA team among the members of EPAN e-government working group, there seems to be no common understanding of what skills and competences are required for e-government initiatives, often respondents (only) referred to skills as (basic) ICT skills. Also based on the findings of this survey, there appears to be a need to identify, define and classify the different skills and competences required by e-government; and also needs to assess the skill requirement for the different communities of public servants who are relevant to e-government service.

Research questions/objectives
The research question in this study is: “What skills and competencies are needed for civil servants in the context of e-government in the research literature? What is the changing trend of skill requirement during last 10 years? And what skills and competencies are linked to different communities of civil servants?” This study will identify and explore the skills and competencies required by e-government initiatives in public sector; and it will analyze the skill requirement changing trend during last 10 years; it will also classify these skills and competencies among different community and roles of civil servants.

Research method
This study is conducted as a literature review in which selected literature and government documents are used to compile a checklist of e-government skills and competencies. The literature review is outlined in four stages: problem formulation; literature search; data evaluation and collection; data analysis and interpretation. “E-government skills/competencies” and identification of the “e-government civil servants communities”, “different skill sets” are the conceptual theories in this study. These concepts are defined and clarified first before the data collection.
Findings & Conclusions

The main findings of this study are: 1) The introduction of e-government has different impacts on civil servants and their skills; the skills and competencies need by civil servants in the context of e-government are IT skills, IM skills, IS skills and updated management skills. 2) Although the work flow is 100 percent digitalized in introduction of e-government, the main changes in skills requirement of e-government are related to IS and updated management skills during the last 10 years, and it did not imply that all of the civil servants suddenly needed IT training, however, it did imply much more flexible structures and attitudes enabling individuals and units to form new networks to find a new way of working. 3) The need for basic IT literacy exists among all communities of civil servants in the context of e-government. IM community needs both of the IM and IS skills; Service community needs both of the updated management and IS skills. Besides IT skills, IT community needs some of the IS or updated management skills such as IT vision ability, communication & coordination skills.
Abstract

In this study, the skills and competencies required by e-government initiatives in public sectors are identified and explored. The changing trend of skill requirements during last 10 years is analyzed; and different skills/competencies among different community and roles of civil servants are classified. The study is conducted as a literature review in which selected literature and government documents are used to compile a checklist of e-government skills and competencies. The main findings are: the skills and competencies need by civil servants in the context of e-government are IT skills, IM skills, IS skills and updated management skills; the main changes in skills requirement of e-government are related to IS and updated management skills during the last 10 years. The study also found that effective e-government implementation requires changes to skills and competencies of civil servants in public sector. Modern working conditions often require further mixes of generalized and more advanced skills and competencies.

*Key words:* E-government, public sectors, E-government skills and competencies
1. Introduction

A trend towards reforming the public sector has emerged in many countries in recent years spurred, primarily by the aspirations of citizens around the world, who are placing new demands on governments (United Nations, 2008). This trend has been supported by the view that by improving adoption of e-government will offer governments a cost-effective and highly efficient means to deliver citizen services (Deakins & Dillon, 2002). Over 160 countries worldwide have already begun some kind of e-government project, creating a major market for IT vendors and service providers that are competent in helping public agencies in their technology initiatives (Greiner, 2005). According to the definition by Shin and Kim (2008), e-government in general refers to public sector’s use of the Internet and other digital devices to exchange services and information with citizens, businesses and other arms of government to improve internal efficiency, the delivery of public services, or processes of democratic governance.

European Institute of Public Administration (EIPA) (2005) argued that there is “no return” for governments in e-government trend, and explained that the "point of no return" has been reached as: e-government projects have become a fact of life and there is no way to turn back time; Governments are looking into return on investment, impact on and benefits for all stakeholders. In this case, the question is no longer to be or not to be "e". Reffat (2006) emphasized that direct effects of e-government include cost effectiveness in government and public operations, significant savings in areas such as public procurement, tax collection and customs operations, with better and continuous contacts with citizens, especially those living in remote or less densely populated areas. Previous cases studies in some developing countries indicated the good impacts of e-government in disseminating information and developing organizational networks. For example, in the case of People-First Network (PFnet) in Solomon Islands, Bertucci and Senese (2007) described how the Internet allows remote locations across the islands to have access to various information regarding development activities and to expand rural business. Cameroon was able to improve the transparency of personnel management systems (Tazo, 2003),
and in Romania, a web portal made government procurement more transparent (Ailioaie & Kertesz, 2003).

A range of skills and competencies will need to be developed in public-sector organizations in order to properly implement and manage e-government (Settles, 2005). An emerging need seems to be the requirement for a new set of skills in the public service – both at the organizational and personal level – to cope with the structural challenges of modernization and transformation against the background of socio-economic considerations (EIPA, 2005). E-government initiatives, of whatever type, are complex mixtures of technological, managerial and policy related challenges, and the risk of not understanding and addressing these complexities is costly failure (Pardo, 2000). The skills required for e-government are not simply technical, as general managers also need broad skills to engage in the ICT decision-making process; necessary skills include a basic technical understanding (IT literacy), but also an understanding of information management and the information society (OECD, 2003). And Leitner (2006) emphasized that apart from IT skills, the introduction of e-government invariably leads to new types of non-technology skills, in particular 'softer' personal, communication and organizational skills. Traditional management skills need to be updated and strengthened to deal with the impact of e-government, and additional competencies are needed in areas such as organizational change, cooperation and collaboration across departments, and public-private partnerships (Lau, 2003).

According to a survey conducted by EIPA (2005) among the members of EPAN e-government working group, Leitner (2006) concluded that there seems to be no common understanding of what skills and competences are required for e-government initiatives, often respondents (only) referred to skills as (basic) ICT skills. Also based on the findings of this survey, he added that there appears to be a need to identify, define and classify the different skills and competences required by e-government; and also needs to assess the skill requirement for the different communities of public servants who are relevant to e-government service. A literature study on this topic would be interesting and necessary; it would help to collect all the research outcomes on this topic to get a comprehensive view. Research on this topic also would be helpful to government organization and civil servants to carry out better e-government initiatives, and help
the e-government researchers to deeply understand the e-government skills and competencies required by governmental sectors.

The research question in this study is: “What skills and competencies are needed for civil servants in the context of e-government in the research literature? What is the changing trend of skill requirement during last 10 years? And what skills and competencies are linked to different communities of civil servants?” The problem domain in this study is “the skills and competencies requirements in e-government”. This study will identify and explore the skills and competencies required by e-government initiatives in public sector; and it will analyze the changing trend of skill requirements during last 10 years; it will also classify these skills and competencies among different communities and roles of civil servants.

2. Topic area definition and theoretical concepts

2.1 E-government skills and competencies
The term “e-government skills” are defined by Khan et al. (2010) as “The set of skills, knowledge, and concepts that are needed for effective access, locate, operate, manage, understand, and evaluate e-government initiatives in different stages.” E-government competencies are defined by Career Executive Service Board of Philippines (2010) as “the requisite ability to set a broad e-government vision and show commitment to that vision by: 1) articulating the positive impact of e-government on efficiency, service quality, and customer service; and 2) to identify the potential benefits of e-government and how to achieve them; and the qualifications of executives to effectively develop, implement and manage e-government programs and initiatives.” Skills and competencies are used in this study interchangeably.

2.2 EPAN’s four skill sets
EPAN (European Public Administration Network) (2003) identified four sets of skills, both technical and managerial, as essential for e-government: Information Technology (IT), Information Management (IM), Information Society (IS), and updated management skills. While the borders of these skill sets are blurred, they provide a useful framework for analysis (Lau, 2003). IT skills are the technical skills which are necessary to implement e-government, and this skills set include basic IT literacy for all employees, and technical skills for IT specialists to
design and implement technical elements (hardware, software, communication) of e-government initiatives (Ojo et al., 2007). IM skills span the deployment of knowledge resources within the public administration and the sharing of knowledge with partners and other stakeholders outside the organization, and this skills set are essential for coordination and collaboration within the organization in order to create a transparent image to the public (UK department for education, 2003). IS skills include the ability to use ICT resources to implement an e-government strategy of an organization in accordance with its overall strategy, this skills sets involve understanding new technologies and their limits vis-à-vis the organization’s service strategy (Repo, 2003). Updated Management Skills: since e-government has a significant impact on the structure and processes of public administrations, traditional managerial skills are insufficient for new organizational needs; managers need skills to manage organizational changes resulting from e-government, and they also need to improve customer responsiveness, develop accountability frameworks, create incentives for cooperation and manage relationships with the private sector (Ojo et al., 2007). Each skill set composed of several specific skills, the classification of specific skills into each skill set are adopted from the classification done by EPAN (2003), Parrado and Capra, Francalanci, & Marinoni (2005); it is mixed from the three sources’ contribution. The skills division is presented in Table 1 shown as below.

**Table 1: E-government skills identification in four skill sets**

<table>
<thead>
<tr>
<th>Information Technology skills</th>
<th>Basic IT literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specialist IT skills</td>
</tr>
<tr>
<td>Information management skills</td>
<td>Information Management</td>
</tr>
<tr>
<td></td>
<td>Privacy and security protection</td>
</tr>
<tr>
<td></td>
<td>Information user service skills</td>
</tr>
<tr>
<td>Information Society skills</td>
<td>ICT vision abilities</td>
</tr>
<tr>
<td></td>
<td>ICT strategy and planning</td>
</tr>
<tr>
<td></td>
<td>Organizational change</td>
</tr>
<tr>
<td>Updated management skills</td>
<td>Risk management</td>
</tr>
<tr>
<td></td>
<td>Communication and coordination</td>
</tr>
<tr>
<td></td>
<td>Financing arrangements skills</td>
</tr>
<tr>
<td></td>
<td>Public-private partnerships</td>
</tr>
</tbody>
</table>

*Source: EPAN (2003), Parrado (2005), Capra et al. (2005)*

In this skill sets table (Table 1), Basic ICT skills include the skills such as use of a PC, mobile devices, standard programs; and Specialist IT skills include the skills such as software development, web design, database design, the use of specialized programs; and also include the ability of maintenance of hardware and software systems; reception of problems reported by the
users and the provision of technical fixes; and the training of end-users to make an appropriate use of technology and designing proper tools for continuous computer literacy policy (EIPA, 2005). Information User Service skill refers to the support of the customer organization, the end-user and the customers (citizens) in the use of information (Parrado, 2005). ICT vision ability is the ability to understand new ICT trends and strategic impacts; current, effective and operative use and exploitation of ICT; ability to support development of ICT culture (Capra et al., 2005). ICT strategy and planning implies understanding the principles of the service strategy, facilitating the implementation of the e-government service; and also implies understanding the business, the process and the overall strategy of the organization in order to better design the information system (Parrado, 2005). Organizational change management skill is the ability to understand and manage change process, organizational changes (integration, different customer approaches, communication, home working, etc.), development of process ownership and orientation towards transparency and cooperation (Culbertson, 2005). Communication skill refers to the ability to involve stakeholders and maintain involvement and raise interest of public servants; coordination skill is the ability to manage “multi-objective” teams and multi-competence teams (Capra et al., 2005). Public-private partnership is the ability to foster partnerships with private institutions (e.g., with banks) (Al-Almaee, 2008).

2.3 Communities of civil servants in e-government

According to Parrado (2002), the Canadian government has defined three different skill communities: Information Technology (IT) community, Information Management (IM) community and Service community (SC) as a part of its strategy to identify skills needed in the e-government services and the assignment of these skills to them. Other governments, however, tend to merge the IT and IM community and accordingly, their skills, under the same label of IT specialists, and the differentiation of these two communities proves to be useful for rightly approaching the topic on e-government skills (Settles, 2005). In e-government projects, the IT community is relatively easy to recognize, because it is basically formed by technical staff that work primarily in fields such as IT supplies and services, telecommunications, IT consultancy, multi-media and Internet-based products and services (Parrado, 2005). According to the Treasury Board of Canada Secretariat (2010), the limits of the IM community are more blurred; it is because the specialists and managers responsible for the provision of IM services constitute this
community. In any e-government project, the work of IM professionals encompasses professions like librarians, archivists, and access to information and privacy specialists, communication managers and records managers among others, and the members of this community hypothetically have the role of shaping the content management to be produced for different output media (Khosrow-Pour, 2005). The Service community (SC) in e-government, formed by general managers and front line staff, provides services to citizens and other stakeholders by traditional or electronic means; the SC is made up of generalists, and they develop the whole life cycle of a service (IBM Institute for Electronic Government, 2011). All legal, financial, managerial and other professional experts related to e-government context typically belong to the service community. The IT and IM communities share the supply-side of e-government service, they have to meet the business requirements of the demand-side or “end user” organizations, i.e., the service community (Parrado, 2005).

2.4 Skill requirements for different communities

In terms of e-government, ICTs and the internet imply modernized service delivery processes which regarding the sharing of data, business process redesign and human resources; both clerical staff and managers need to develop a new and challenging set of skills, and apart from basic technical skills, general managers need an understanding of information management and the information society (EIPA, 2005). Three skill and competency sets which are directly related to e-government are: Information Technology (IT) skills, Information Management (IM) skills, and Information Society (IS) skills (Information Resource Management (IRM) College, n.d.). According to Parrado (2002), e-government services require a combination of skills in each community (see Figure 1), IS skills and updated management skills are cross-cutting for the three communities. The service community should at least have some IS skills, while updated management skills should be added to the repertoire of the IT and IM communities.

Figure 1: E-government communities and skills (Parrado, 2002)
In figure 1, While IS skills constitute the contribution of ICT to the Service Community; Updated Management Skills represent the contribution of the Service Community to the IT and IM communities. E-government service requires these intersectional skills in each community and each community should have business and IS skills (Parrado, 2002). Boundaries among sets of skills are also blurred because it is difficult to distinguish IT skills (or IM skills) from IS skills in the Internet era as most specialised skills are nowadays linked to the Information Society. A common sense distinction would be to identify IT and IM skills with “hard” (technical) skills and IS skills with the “soft” ones, and all these skills can be referred as to ICT (Information and Communication Technology) related skills (Khosrow-Pour, 2005). An attempt to distinguish between “hard” technical skills and “soft” skills within the IT/IM might be a fruitless exercise. However it is not spurious to disentangle IS skills from Updated management skills for the Service Community as IS skills seem to be lacking in this community in a period of transition from traditional service delivery to e-government services (Parrado, 2005).

2.5 Distinction of e-government and e-business skills
Civil servants in the context of e-government should be aware that there might be a distinction between E-government and E-business (Leitner, 2006). Civil servants in the context of e-government will be dealing with intra- and inter-governmental agencies, and external customers; there is a stewardship responsibility and security/privacy concerns, certain roles are inherently governmental and can't be "contracted out" (EIPA, 2005). E-business skills requirements are broad, encompassing management and creative skills as well as IT technical skills and IT literacy (Irish national competitiveness council, 2000). Since e-government is more about government than “e” (OECD, 2003), there are similarity and difference between e-government skills and e-business skills. First, both of them needs the IT skills and management skills, but e-government
require the updated management skills emphasizing the skills such as public-private partnership; some IS skills such as Organizational change management, ICT strategy and planning for government and ICT vision ability are more required by e-government.

3. Research Method

This study is conducted as a literature review in which selected literature and government documents are used to compile a checklist of skills and competencies required by e-government in government sectors. Webster and Watson (2002) stated that literature review traditionally propose the use of a concept matrix in which the presence and absence of particular research themes are traced throughout groups of articles. The character of the research question is to explore skills/competencies required by e-government, to analyze the changing trend during different time, and to indentify the different skill requirements among different communities. Conducting a qualitative study or quantitative study which investigates a number of governments or organizations involved to e-government projects could also find the answer or solve the problem, but it is not efficient when investigating the skill requirement in the past. For example, it is hard to get a appropriate answer when asking the civil servants that how the skill requirement was in 2001. A literature study will cover the time from past to present; cover more amounts of e-governments research and practices done by top researchers and experienced practitioners, and will widely cover the different regions, socio-economy and cultures. As stated by Klopper, Lubbe & Rugbeer (2007), literature review is a powerful and practical research tool that forms the initial scaffolding to help researchers sharpen the focus of their research and to enable them to rapidly progress from the initial state of conscious incompetence to the stage of conscious competence as outlined above

Wellington et al. (2005) state that reviewing the literature involves searching, collecting, prioritizing, reading with a purpose and seeking out key issues and themes, and then presenting and discussing these critically. According to them, in this study, literature review is outlined in four stages following the guidelines of literature review suggested by the University of California Writing Center (2011):

Stage 1 – Problem Formulation: it examined the topic/issue of the study and its component issues. In this study, the primary topic is what skills and competencies which are needed for civil
servants in the context of e-government. Emphasis in this study is on the skills and competencies requirements for the civil servants such as e-government project designers, managers and related government staffs. Related topics for this study are different groups and roles of civil servants in e-government.

Stage 2 – Literature Search: several keywords are identified during Stage 1, including “e-government”, “e-government skills”, “e-government competencies”, “e-government requirements”, “e-government human capacity requirements”, “e-government sector”, “civil servants” and “e-government community”. These keywords are searched from the academic database and search engines such as Google Scholar, elin@örebro from Örebro University and Google.com. The books about e-government are searched and reviewed in Örebro University library. Some governments and international organization’s website also been examined to check the skill requirement for civil servants who work with e-government.

Stage 3 – Data Evaluation and Collection: deciding on the most relevant literature to be used for the study. First, 53 papers and documents from e-government researchers, government organizations and e-government work groups were found as useful source which are focused on e-government skills and e-government civil servants team construction. The criteria for choosing the literature as the research object are that: 1) the articles should be written after 2001, because the changing trend of skill requirements during last 10 years is also aimed to be investigated in this study; 2) the articles should deal with e-government skill requirements or civil servant team construction in e-government. Thus there are 28 article selected for data collection. Other 25 articles did not prove helpful as they did not deal with e-government skills or e-government civil servants, or they are written before 2001. Papers and documents provided by respected international agencies such as the OECD, EIPA, EPAN and the Italian Ministry for Innovation and Technology had the priority in this study, because they deal specifically with e-government projects implementation and provide a multiple of case studies examples. The data which address e-government skill requirement and e-government civil servants communities are collected.

Stage 4 – Data Analysis and Interpretation: a concept-centric matrix which recommended by Webster and Watson (2002) is compiled after reading is completed, and the literature will be synthesized by discussing each identified keywords. In this concept-centric matrix approach, the articles are listed below one another in the leftmost column of the matrix, with e-government skill concepts a, b, c, d … being listed at the head of subsequent columns so that for each article
the presence of a particular skill concept can be marked with a right tick (√) in the appropriate cell of the matrix. The use of such a concept matrix enables the researcher to directly establish at a glance, which articles deal with a particular research theme, enabling the researcher to explicitly identify, classify and assess facts thematically, rather than infer them indirectly from memory of articles read in isolation of one another (Klopper et al., 2007). If a skill is stated by the author as essential for e-government in the article, a right tick (√) is marked in the appropriate cell of matrix. The percentage is calculated by counting the right ticks (√) to make out that in how many articles, a specific skill/competency are suggested by authors as essential for e-government service delivery. And the changing trend of skill requirements is analyzed by comparing the different requirements in the different time. The concept-centric matrix used for data collection which is suggested by Webster and Watson (2002) shown as table 2:

**Table 2: Concept matrix of literature review (Webster & Watson, 2002):**

<table>
<thead>
<tr>
<th>Concepts</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>......</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author 1</td>
<td></td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author 2</td>
<td>√</td>
<td></td>
<td></td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Author 3</td>
<td></td>
<td>√</td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>..........</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Results

In this study, 28 papers and documents from e-government researchers, government organizations and e-government work groups are selected and reviewed for data collection, and these articles are written and published during the last 10 years (from 2001 to 2010). All of the papers are the research works in which the skills and competencies need by civil servants are explored for dealing with e-government process. Some of the documents from governmental organizations are dealing with e-government skills training programs, but they also emphasized the skills and competencies required by e-government. These articles are the production of top researchers and experienced practitioners in the field of e-government, or the authorized
international e-government working organization from Europe and the U.S.A, such as EPAN, EIPA and OECD. The quality of these articles can be trusted.

For presenting the collected data, first, the skills and competencies are divided into four skill sets as: IT Skills, IM Skills, IS Skills, and Updated management skills according to the instrument in Table 1. Each skill set composed of several specific skills; the classification of specific skills into different skill sets is presented in instrument in Table 1. The data (e-government skills needed by civil servants) collected from the reviewed literatures are presented in Table 3 as shown below. First, in the head of the columns, it displays the four skill sets; then the head of each column displays a specific e-government skill/competency. The first column presents the reviewed articles by using author(s) and published year instead of article name. The APA referencing style is followed when listing these articles. To compare the skill requirements for e-government in different time during the last 10 years and see the changing trend, all reviewed articles are listed by year (from 2001 to 2010). In an article, if a skill/competency is stated by the author(s) as essential for e-government service delivery, a right tick (√) is placed in the appropriate cell. For example, in the article LaVigne (2001), Basic IT literacy is considered as essential for e-government civil servants, in this case, a right tick (√) is placed in the cross cell of the article and skill (row /column), other skills are explored in the same way from articles.

Table 3: Skills/competencies for dealing with eGovernment processes in previous literature

<table>
<thead>
<tr>
<th>Articles</th>
<th>IT skills</th>
<th>IM skills</th>
<th>IS skills</th>
<th>Updated management skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic IT literacy</td>
<td>Specialist IT skills</td>
<td>Information management</td>
<td>Privacy and security protection</td>
</tr>
<tr>
<td>LaVigne (2001)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Study</td>
<td>2002</td>
<td>2003</td>
<td>2004</td>
<td>2005</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Government of Italy</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parrado (2002)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Lau (2003)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>OECD (2003)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Sherwood (2004)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riding (2004)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>EIPA (2005)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>McDaniel and Carr (2005)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Capra et al. (2005)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Settles (2005)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parrado (2005)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Leitner (2006)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Reffat (2006)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empirica (2007)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Ojo et al. (2007)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Ahmad and Othman (2007)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal CIO council (2008)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rexed (2008)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Beres (2008)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misra (2008)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
E-government is a broad term which is mixed with many fields including such as system development, project management, public administration and so on. Researchers and organizations dealing with e-government have different background, e-government skills in these articles identified from different aspects from researchers. For some skills, it is the same meaning when referring to the human capacity requirement for e-government initiatives, but the authors used different terms. For example, many articles used the term “specialist IT skills”, but in some articles, they used more specified terms such as “IT system development skills”, or “programming skills”. There are also some other skills which are stated to be necessary for e-government by the researchers, but these skills only appeared in one or two articles, when identifying the skills into skill sets (instrument, see Table 1), they are excluded from the instrument. But they are still the skills required by e-government civil servants. These skills are listed in Table 4 shown as below:

Table 4: E-government skills suggested by literature but not identified in the instrument

<table>
<thead>
<tr>
<th>Articles</th>
<th>Other skills mentioned in articles</th>
<th>Refer to the skills from instrument (Table 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LaVigne (2001)</td>
<td>Analytical skills</td>
<td>Strategy and planning</td>
</tr>
<tr>
<td>Government of Italy (2002)</td>
<td>Customer relations management</td>
<td>Communication and coordination</td>
</tr>
<tr>
<td>OECD (2003)</td>
<td>- Co-operation and collaboration</td>
<td>- Communication and coordination</td>
</tr>
<tr>
<td></td>
<td>- Performance management</td>
<td></td>
</tr>
<tr>
<td>McDaniel and Carr (2005)</td>
<td>Leadership skills</td>
<td></td>
</tr>
<tr>
<td>Settles (2005)</td>
<td>Leadership skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Human resource management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Innovation management</td>
<td></td>
</tr>
<tr>
<td>Ojo et al. (2007)</td>
<td>- Performance assessment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Acquisition skills</td>
<td></td>
</tr>
</tbody>
</table>
From these literatures, the data from classification of different e-government skill requirements for different civil servant communities is collected and presented in Table 4 as shown below. First, in the head of the columns, it displays the four skill sets; then the head of each column displays a specific e-government skill/competency. The first column is the three e-government civil servant communities. After reviewing all the selected articles, if a specific e-government skill/competency is needed by a community in the articles, a right tick (✓) is placed in the appropriate cell. And the number of articles which support this decision are placed beside of the right (✓) in the brackets. For example, 22 articles hold the idea that the Basic IT literacy is needed by IT community, then a right tick (✓) and number 22 in the brackets are placed the corresponding cell in the table (the cross cell of Basic IT literacy and IT community). During review work of these articles, the identification of e-government civil servant communities followed the identification theory which is presented in chapter 2 in this thesis.

Table 5: E-government skills/competencies needed by different civil servant communities

<table>
<thead>
<tr>
<th>E-government skills</th>
<th>IT skills</th>
<th>IM skills</th>
<th>IS skills</th>
<th>Updated management skill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic IT literacy</td>
<td>Specialist IT skills</td>
<td>Information management</td>
<td>Privacy and security</td>
</tr>
<tr>
<td>IT community</td>
<td>✓(22)</td>
<td>✓(18)</td>
<td>✓(11)</td>
<td>✓(6)</td>
</tr>
<tr>
<td>IM community</td>
<td>✓(20)</td>
<td>✓(20)</td>
<td>✓(14)</td>
<td>✓(15)</td>
</tr>
<tr>
<td>Service community</td>
<td>✓(20)</td>
<td>✓(9)</td>
<td>✓(8)</td>
<td>✓(14)</td>
</tr>
</tbody>
</table>

5. Discussion
The result shows that most of the authors and government organizations emphasized the necessity of all these e-government skills found by their study. The IT skills set is the most suggested one when these authors and government organizations are developing the skill requirements for e-government. In other three skill sets, some skills are stated by articles as necessary for e-government implementation, but some skills are not. All of the articles believed the Basic IT literacy as essential skills for the public servants in the e-government context; the rate of referring in articles is 100%, the reason for this phenomenon is as stated by Leitner (2006) that ‘e-government is using ICTs in government service deliveries; all civil servants need basic IT literacy.’ Organizational change management and information management are the second most mentioned skills by authors in the literatures; they are mentioned 79% and 71% of reviewed articles. There are 4 skills considered as necessary for e-government in 50% to 54% of reviewed articles, such as privacy and security protection, Information service, ICT vision ability, strategy and planning; all these skills are belong to the IM and IS skill sets. The updated management skill set is the least mentioned one in these articles, and they only appeared in 37% articles. It means that when implementing and managing e-government projects, most of the e-government practitioners and government organizations emphasized the importance of the IM and IS skills, not only focused on IT skills. But at the same time, many of them neglected the importance of updated management skills.

Table 5 shows that in IT kill set, both of the two skills are needed by IT community, it is suggested by 22 and 18 articles; IM and Service community only needs Basic IT literacy (suggested by 20 articles). In IM skill set, all of the IM skills are only needed by IM community (in 20 articles). The IS skills are both need by the IM and Service community. The majority of the IS skills and updated management skills are needed by the Service community; IT and IM community needs some IS skills and updated management skill, buy only one or two. This result agreed with the literature cited in theoretical concepts part and this finding also matched with the Figure 1, and it is the complementary for Figure 1. In terms of e-government, ICTs and the internet imply modernized service delivery processes which regarding the sharing of data, business process redesign and human resources; for e-government civil servants, both clerical staff and managers need to develop a new and challenging set of skills, and apart from basic technical skills, general managers need an understanding of information management and the
information society. E-government services require a combination of skills in each community; updated management skills and IS skills is cross-cutting for the three communities. The service community should have the basic IT literacy and at least have some IS skills, while updated management skills should be added to the repertoire of the IT and IM communities.

From the result (Table 3), it is also easy to see that during the last 10 years (2001 to 2010), the skill and competency requirement for e-government is changing. In the first half (2001 to 2005), the researchers and practitioners from e-government working organizations are more considered the necessity of “hard” skills such as IT skills, and less mentioned the “softer” skills. For example, Specialist IT skills are appeared in 12 articles during 2001 to 2006, and only 6 during 2006 to 2010. IS skills and updated management skills are mentioned more in the articles which are published during 2006 to 2010 compared to the first half of the last 10 years. This change agreed with the statement made by Leitner (2006) that: ‘in the early phases of online services, when the Internet was relatively unfamiliar, many projects were driven by IT specialists, general managers lacked interest and/or the required skills; a major challenge is to overcome the view, still held by many employees and managers, that the e-government skills are technical matters best left to specialists.’ Most of the articles found that the number of staff requiring Basic ICT literacy increases, even if only to use the new applications. However, not all of the civil servants need specialized ICT skills, it can be either provided by dedicated specialist staff or contracted out to the private partners under general strategic leadership.

6. Conclusion

6.1 Conclusion

From the results, it can be concluded that: 1) The introduction of e-government has different impacts on civil servants and their skills; the skills and competencies need by civil servants in the context of e-government are IT skills, IM skills, IS skills and updated management skills. 2) Although the work flow is 100 percent digitalized in introduction of e-government, the main changes in skills requirement of e-government are related to IS and updated management skills during the last 10 years, and it did not imply that all of the civil servants suddenly needed IT training, however, it did imply much more flexible structures and attitudes enabling individuals and units to form new networks to find a new way of working. 3) The need for basic IT literacy
exists among all communities of civil servants in the context of e-government; IM community needs both of the IM and IS skills; Service community needs both of the updated management and IS skills. Besides IT skills, IT community needs some of the IS and updated management skills such as the IT vision ability and communication & coordination skills.

As Leitner (2006) said, the increasing importance of ICTs and the internet for public administration calls for complex skills to drive change in government; in terms of e-government, ICTs and the internet imply modernized service delivery processes regarding the sharing of data, business process redesign and human resources. This in turn requires organizational change, as it is shown by this study that 71% of these articles are emphasized organizational change skills as necessary. Civil servants need to have an ICT strategic vision for E-government, as it is proved by this study that 51% of the articles stated its necessity. Effective e-government implementation requires changes to skills and competencies of civil servants in public sector. Basic ICT skills are a precondition both for ordinary Service community and IM community. More advanced ICT skills can also be required depending on the type of work to be performed. In addition, however, modern working conditions often require further mixes of generalized and more advanced skills and competencies. As Leitner (2006) emphasized, in a fast-changing government work environment, with a wide variety of work forms and perhaps also contractual arrangements, there is an increasing need for individuals to take more responsibility for their own work and sometimes also for their own skills development, this includes fostering abilities like self-organization and self-management, inter-personal skills, dealing with unexpected rather than routine situations, greater initiative and self-reliance. In this study, many practitioners and government organizations emphasized the importance of the IM and IS skills, not only focused on IT skills. But at the same time, many of them neglected the importance of updated management skills required by civil servants. According Pardo (2000), neglecting the necessary updated management skills might lead to e-government project failure, because e-government initiatives, of whatever type, are complex mixtures of technological, managerial and policy related challenges.

6.2 Implications
This study contributes to e-government research and practices both conceptually and empirically. By integrating the literature on e-government skills and relevant civil servant community, the process of e-government skill identification is conceptualized. Empirically, it is contributed by indentifying the changing trend of skill requirement needed by utilizing the concept-matrix method. The findings of this study have important implications for e-government practitioners. By providing practitioners with some insight into the e-government skill requirement, the findings can serve as a standard curriculum for training and educating public sector employees relevant with e-government. Furthermore, the study will promote awareness to the governments regarding e-government skills and will facilitate governments to put their effort and money in right direction. Finally, for the developing countries at the initial stage of e-government implementation, the findings can serve as a roadmap for skills acquisition at earlier stages of e-government and prepare for successful e-government initiatives.

6.3 Limitations and recommendation for future work
This study has some limitation that must be mentioned. First, it is a literature review, the number of reviewed article and documents are limited, and it did not investigate practical e-government projects, the data might be not covering all specific skills, it might be better if combined with a qualitative or quantitative study. Second, the skills identified may not be an issue for developed countries where the computer literacy is high, and employees as well as citizen possess the minimum skills required. Therefore, future research work may involve improving the study approach and applying it to developing countries for identification of the skills needed for next generation of e-government implementation.
References


EIPA (European Institute of Public Administration), (2005). Organizational changes, skills and the role of leadership required by e-government. Survey for the 44th meeting of the Directors general responsible for Public Administration of the EU member STA. Luxembourg, June 2005.


Pardo, T., (2000). Realizing the promise of digital government: it’s more than building a web site, Center of Technology in Government, University of Albany.


Appendix

Several international organizations working on e-government:

EPAN: The European Public Administration Network (EPAN) is an informal network which brings together the responsible ministers, director-generals and civil servants to exchange experiences on and coordinate programs and policies in matters related to public administration within the EU. The EPAN eGovernment group consists of 29 members (25 EU Member States and the four accession countries). Regular surveys are conducted in the group (average return of 50-80% depending on the topic and priorities in each country) (www.eupan.org)

OECD e-government working group: The Organization for Economic Co-operation and Development (OECD) is an international economic organisation of 34 countries founded in 1961 to stimulate economic progress and world trade. The OECD E-government Working Group is a group of researchers and practitioners from 12 OECD Member countries (Australia, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea, Mexico, Netherlands, United States) who work with e-government research work and practice among these member countries. (www.oecd.org)

EIPA: EIPA is the leading centre of European learning and development for the public sector. With over 30 years experience, EIPA is the place where people who deal with European affairs can learn in a multi-cultural environment benefiting from our unique combination of practical
know-how and scientific excellence. Its focus area is involving European decision making, European policies, European public management, European union law, regional affairs, public financial management. (http://www.eipa.eu/)

**DPADM/UNDESA:** United Nation Division for Public Administration and Development Management/The United Nations Department of Economic and Social Affairs. (http://www.unpan.org/DPADM/tabid/420/Default.aspx)