

e-Platform to Maintain Digital Competencies for Collaborative Network Organisations

Silvia Matern (✉)

Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, Sofia, Bulgaria, <http://www.iict.bas.bg/EN/index.html>

ABSTRACT:

The article proposes a model to maintain digital competencies for networked organisations in a collaborative online environment, e-Platform for human capital development and management in a complex environment of national and international IT organisations. The research suggests the method and tools that should be used in the digital platform for organisational collaboration in order to develop and implement successfully a competencies model for IT organisations to support them in the human capital development process of sustaining IT key personnel.

ARTICLE INFO:

RECEIVED: 11 Jun 2020

REVISED: 18 Aug 2020

ONLINE: 17 SEP 2020

KEYWORDS:

Digital Competences, e-Platform, IT education, Organisational Collaboration, Networked Organisations, Human Capital Development



Creative Commons BY-NC-SA 4.0

Introduction

In the era of IT services, the shortage of IT experts in a number of businesses have led to the change of focus towards their human capital as one of their most important and valuable assets, thus “their fundamental resource” for company’s success. The personnel are no longer seen as staff performing repetitive tasks, but the focus “has shifted to a new dimension that treats personal issues such as working environment, welfare of personnel, their feelings, and creative potential of personnel as high priority.”¹

In this article, a subject of research will be the Human Capital Development (HCD) process that is part of operational Human Resource Management (HRM). The process is dealing with individuals and keeping up to date the digital competences of personnel, as well implementation of competencies model within organisations.

HRM includes all processes that enable, guide, execute and control the matching of personnel supply to the jobs required. Furthermore, HRM can be operational or strategic. Operational HRM is dealing with individuals, concerning tactical activities such applications are processed, current openings are filled, supervisors are trained, safety problems are resolved and wages and salaries are administered, strategic is a holistic approach that manages the personnel, but aligned with the organisational long-term goals, dealing with “having the right number of people in the right places at the right time”.¹

A critical success factor for operational HRM is how the process is governed and managed, because it is on the one hand, technology intensive with human factor in the centre, and on the other hand, digital competences development is an indispensable aspect of governance itself. One of the key elements of maintaining digital competences within IT organisations (national or international) is the proper definition and implementation of the competencies model.²

In practice, there is a link between strategic human resource management and human capital development (HCD). HCD is part of HRM (one of the many functions) designed to offer an up to date proficiency among the employees. In fact, we can refer to HCD as the framework for helping the employees to further develop their personal and organisational skills and knowledge or in short, the competencies model. With the current changes in technology, HCD can be used to support various activities of the organisation in which competence is required.²

Definition of Competencies

The simplest and most straightforward definition of competence is “the ability to do something successfully or efficiently”. Another definition states that “competence is the ability to use a set of relevant knowledge, skills, and abilities to successfully perform critical work functions”.³ Competences are defined also as behaviours that can be observed and measured. Competences are essential when defining job requirements, recruiting, retaining and developing staff.⁴

Competences are enablers as they provide to organizational staff a clear understanding what is expected in order to achieve the desired organizational goals and results. They also provide a clear path for which behaviours and actions will be recognized, valued and rewarded by the organization.

The most efficient method used by IT companies is implementing competency frameworks. A competency framework is a model usually represents the way the organization understands performance excellence. It includes a number of competencies for occupational roles within the organization.⁴

A well-structured competency framework is a major enabler within an organisation and serves as a key for achieving organizational goals and mission. The use of competency frameworks within an organisation ensures that:

- Clear expectations are set and staff members are guided as to how they can assume and reinforce behaviours in line with the organization's mission, culture and goals.
- A shared language is created to describe what is needed and expected in the work environment, thereby providing for reliable and high-quality performance delivery.
- The various facets of human resources management can be integrated, enhancing consistency in human resources planning, recruitment, learning and development, and performance management, and thereby contributing to the streamlining of human resources operations and ultimately to efficiency gains.
- Skills gaps are addressed, strengths are further developed and requirements for career progression are clarified.
- Staff mobility, organizational change and shaping of the organizational culture are fostered.⁴

Competencies Issues

In 2019, a team of researchers from IICT BAS, IPA and eSEGA performed a research on the definition of the required competencies and career path for IT experts and leaders in the public administration. The research revealed that the creation of a competency model and its implementation in the public administration is a fundamental requirement for the success of the government strategy. How to select, develop, promote, rotate with the security sector IT organizations, industry and international public IT organizations, retain people has an important priority for the e-Government implementation.⁵

According to another research performed by Brandon Hall Group in 2019, in most organizations, needed competencies and skills are determined by HR and business stakeholders when creating Individual Development Plans (IDPs) that lay out needed competencies and skills. Many organisations do not have IDPs for every employee, which makes the regular tracking progress in developing competencies and skills a very difficult task.⁶

In order for competencies models to impact organizational performance, they must be integrated across HRM processes, including learning, performance management, career development, and planning. Many organisations are experiencing difficulties in managing competencies and skills. As a consequence, failure to develop and implement a well-structured competencies model to meet current and future business needs, the impact on the organization will result in inadequate employee engagement, talented personnel will leave the organization, inability to

react to business demand, low levels of creativity and innovation and all of that will certainly lead to decreased revenues and profitability growth.⁶

Implementing competencies model into a company that does not have the adequate digital systems will be a definite mission fail. Human capital development is a technology intensive process with human factor in the centre, as already mentioned earlier. Therefore, an analysis of the current IT organisation needs to be done to evaluate the readiness and adequacy of the company to undergo implementation of competencies model.

It is very important to understand the context of building and development of an IT organisation. Of course, there are many aspects of the environment, but priority is given to the understanding of all stakeholders and the role of IT in the transformation of organisation, as well as the perception of the wider context in a collaborative networked format.

The re-organisation of IT within the company is the basis of transformation, which includes:

- Design of work processes and necessary data
- Organizational redesign in support of the processes
- Technological support of the processes and the organization
- Selection and preparation of people for work in the organization on certain processes with certain technologies.⁷

e-Platform Competencies Model

As mentioned previously, a team publication “Human Factor in Digitalization and Cyber Resilience of Public Administration” by researchers from the State Agency e-Government, the Institute of Public Administration and the Institute of ICT at the Bulgarian Academy of Sciences has identified the challenges of digitalization and cyber resilience of Public Administration (PA). The authors have proposed a model for digital transformation of PA in support to e-Government strategy as a basis to identify the requirements for the competences and career path of IT experts and leaders.⁵

In addition, to address these requirements a model for personnel development was proposed, based on the experience in the Institute of Public Administration (IPA), working closely with the State e-Government Agency (SEGA) and Institute of ICT in the Bulgarian Academy of Sciences (IICT-BAS) to develop and test an academy for IT leaders in 2018.⁵

The analysis of the personnel development model was used to define the general architecture of the e-Platform for IT competences development and building of ecosystem for IT experts’ career management. In 2019, a research article “e-Platform Architecture for Organisational Collaboration and IT Education” has proposed a model for collaboration in online environment. The model represented a creation of a digital platform for organisational collaboration and management of IT competencies for IT organisations that are experiencing challenges in the selection, development, employment and sustaining of key IT experts. The model of the networked e-Platform offers close partnerships between leading national/inter-

national educational bodies representing schools, colleges, universities and research institutes, employers, governmental organisations and businesses, students and IT professionals. The platform should be developed, in order to enable the creation of knowledgeable IT people cluster, “one-stop-shop for IT staff resources” to facilitate, organise and initiate access to knowledge, innovation, market, talent, and capital. As a continuation of this research, the current article continues the efforts in direction of developing an effective IT competencies model for IT organisations and public administration as well as refers to the creation of CIO certification program as a continuation of the overall development of all aspects of such e-Platform.⁸

In connection to the architecture and stakeholders in the e-Platform, Figure 1 depicts the scheme of interaction of these interested parties with regards to maintaining competencies. With the implementation of an IT competence model into the platform, the different user groups will have the following positives:

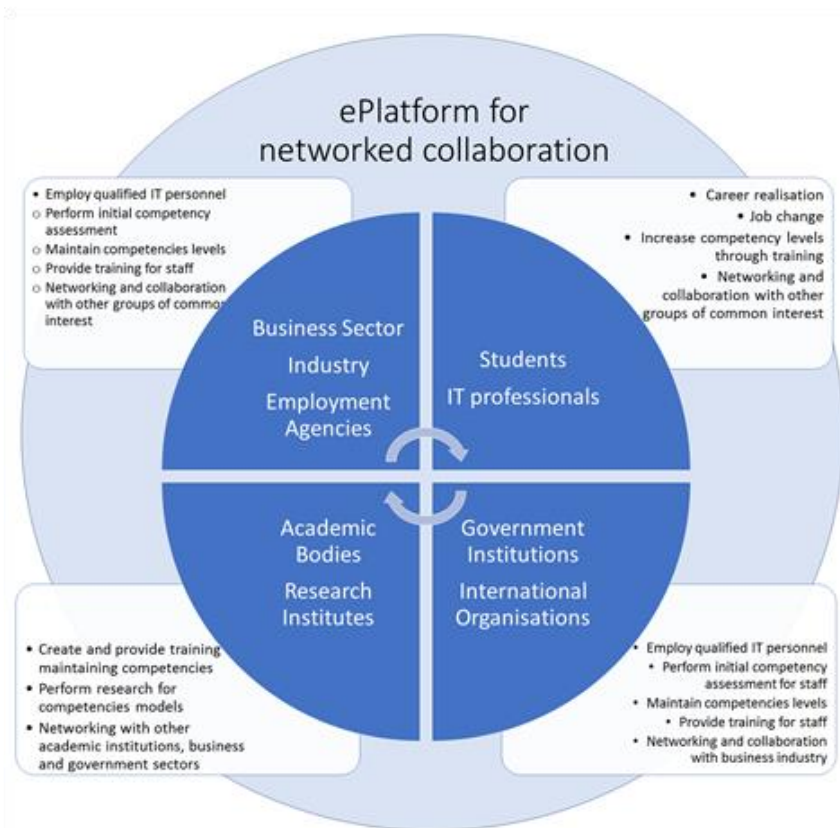


Figure 1: e-Platform Networked Collaboration for Maintaining Competencies.

- *Students/IT Professionals*
 - Perform initial competency assessment

- Undertake additional training to fill up the gaps
- Undertake career change training
- Networking and collaboration with users
- *Business Sector/Employment Industry*
 - Employ qualified IT personnel
 - Perform initial competency assessment for new and hired staff
 - Maintain competencies levels for hired personnel
 - Provide additional training for staff
 - Networking and collaboration with other groups of common interest
- *Academic Bodies/Research Institutes*
 - Create and provide training for maintaining competencies
 - Perform research for business needs for competencies models
 - Networking with other academic institutions, business and government sectors
- *Government Organisations/International*
 - Employ qualified IT personnel
 - Perform initial competency assessment for new and hired staff
 - Maintain competencies levels for hired personnel
 - Provide training for staff
 - Networking and collaboration with business industry

Competency Framework Definition

A competency framework is defined as a model which describes performance excellence within an organisation. It usually includes multiple competencies such as knowledge, skills and attributes that are applied to multiple occupational roles within the organisation. In generic terms, each competency is defined as the excellence in working behaviour. Each occupational role has its own set of competencies which represents the benchmarks against which the staff is assessed.

A competency framework could be defined as the communication to the personnel by which the organisations expect the staff to behave and which of these behaviours are required, valued, recognized and rewarded and all of this connected with the occupational roles.³

When organisations develop competencies frameworks, they should have a deep understanding of the organisation and its business processes. To create a successful, effective and efficient competencies model, one should complete the minimum steps: a) make use of predefined common standard competencies and customize them to their own needs and b) acquire help in developing the framework from professionals.⁹

Building Blocks of Competencies

Maintaining competencies is essential for career development. A well-structured model should clearly show to the staff which competencies are required for the job positions and how these change along different career pathways. The model should also provide assessment tools so the employees are able to have a clue where their current competencies are in relation to roles of interest and where

the gaps are.



Figure 2: Competencies Model Components.

There are a number of developed competencies models for each industry and many of them could be used as a starting point when an organisation decides to build its own model. This research will focus on the creation of competency model for e-Platform for networked organisations. In order to better understand competencies, they can be broken into categories within the IT organisation. For the purpose of this research and creation of the competency model, an automated tool has been used called “Build a competency model tool” by Competency Model Clearinghouse located on the following internet address <https://www.careeronestop.org/competencymodel>. The website offers the option of building your own customized model with the preinstalled options for IT industry.

The tool gives an excellent start to any organisation with the free option to build their own competencies models and to use the ready templates. Each option can be customized and adjusted to the changes needed by the organisation. Each competencies model consists of a set of “building blocks” arranged in a pyramidal structure and consisting of nine layers as depicted in Figure 3.

Each layer represents the increasing level of specialty and narrows the specialization of the content. The nine layers are grouped into three categories. At the top of the pyramid stand the occupation-related competences which consist of four tiers.

In the middle category are the industry-related competencies that contain two tiers, and at the bottom of the pyramid are the foundation competences that include three tiers.

The tool has been used by a number of industries and has many implementations of models in action that show many innovative ways of how the workforce investment system, employers, and educators are using industry competency models to address their workforce challenges. The U.S. Department of Labor's Employment & Training Administration (ETA) published these case summaries to provide examples of how competency models have been successfully used.¹⁰

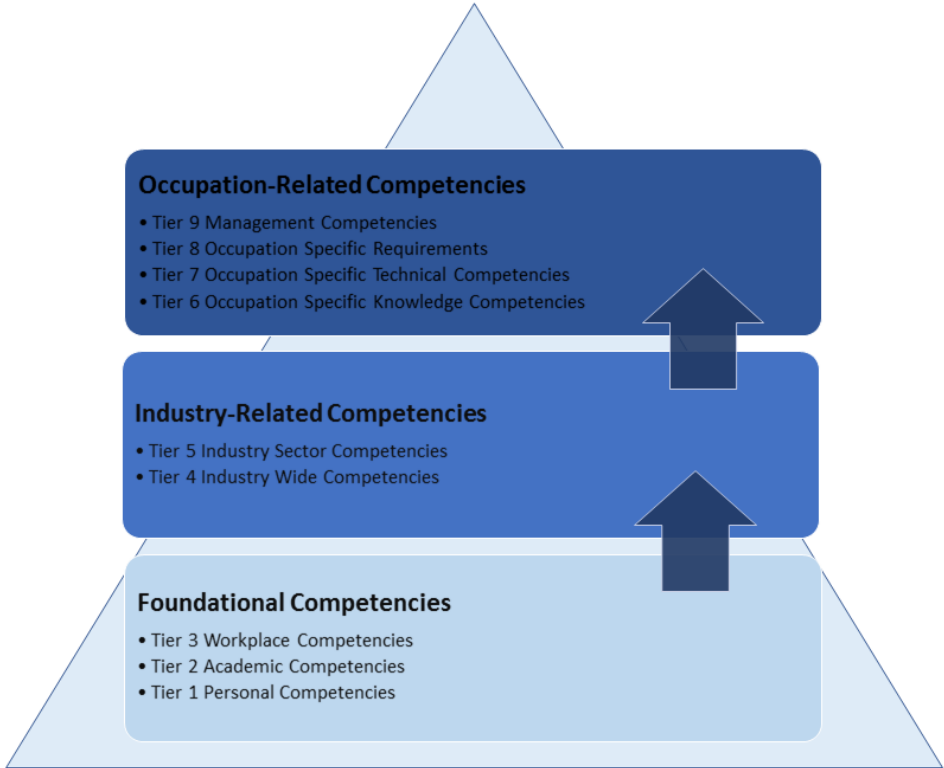


Figure 3: The Generic Building Blocks Model by Competency Model Clearinghouse.

Occupational Roles Matrix

Based on the 3 categories Foundational, Industry related and Occupation Related Competencies, we will propose an occupational roles matrix for a company. Based on experience, agencies that have already implemented competencies frameworks, advise to assign a maximum of 3-5 core and 10 functional competencies to a given job. It is possible for the companies to adopt numerous core and functional competencies; “however, following a thorough analysis of all scientific and administrative fields of work, the results of this analysis revealed that many competencies are shared across many positions and that a more standardized approach would ensure more effective and efficient human resources management.”³

Occupational Roles broad definitions:

- Associate – a junior staff member, without supervisory responsibility, who are accountable for their individual performance, provides support to colleagues and works under the technical guidance of the supervisor
- Specialist - a senior staff member who has expert knowledge in his/her field of specialization and works independently. A Specialist does not normally have direct supervisory responsibility for staff members; however, he/she may assume project management responsibilities, including the coordination of human and/or financial resources.
- Manager - a staff member with managerial responsibility for human and financial resources who oversees the performance of people, infrastructure, and delivery of results. These functions normally include: Section Head, Unit Head, Team Leader and Technical Lead.
- Senior Manager - a staff member who is responsible for creating an enabling environment and takes decisions impacting the entire programme/functional area.³

Table 1. Competency Model Occupational Roles Matrix.

Competency Description		Associate	Specialist	Manager	Senior Manager
Definition	List of expected behaviours				
Indicators	List of how it will be measured				

Competencies Focus

The development of leadership as a focus component of the development of human capital in the organization means that the greatest potential is seen in the managers-leaders and their interaction with other employees.¹¹

In practice, IT managers are often responsible for systems and infrastructure and people and teams. To perform as a successful IT manager, one needs to possess hard skills, that means to understand many topics from the industry i.e. fundamentals of security, data storage, hardware, software, networking and IT management frameworks and also should know how they function in the business.

In addition, the IT manager needs to have a number of soft skills such as leadership, communication or time management.

The required hard skills competencies and certification for IT leader may vary depending on the following: a) the industry, b) the types of technology used and c) the adopted methodologies.¹²

Conclusion

Implementation of competencies model is a timely and costly effort which might not go as planned if not assisted by experts. A competency model based on Building blocks model has been suggested to be implemented in e-Platform for networked collaboration as a starting point for all the stakeholders. The model can be customized by each company to the level of their needs and industry sector, however a generic model implementation up to Tier 6 could be a helpful source for many companies that do not have the finances, time and expertise to implement a competency model on their own.

Competencies should be the adhesive that links business objectives with individual and organizational performance goals, learning and development, and career growth. Instead, competencies are adrift. Competencies are closely linked to employee performance goals in only 16 percent of companies. Almost half of organizations don't have Individual Development Plans for all employees, and 60 percent of organizations struggle to integrate competencies and skills into the IDPs that do exist.

Employee performance will not meet the ever-changing needs of the business until employers figure out how to unify and synchronize business goals with learning, performance development, career development, and competency and skills development. The leading technology providers are starting to roll out solutions that help sync performance and business goals, but systems are only tools. Employers need to get all the pieces together, and that breakthrough is elusive.⁶

Acknowledgements

This paper was supported by the National Scientific Program "Information and Communication Technologies for a Single Digital Market in Science, Education and Security (ICT in SES)," financed by the Ministry of Education and Science of the Republic of Bulgaria.

References

- ¹ NATO Research and Technology Organisation, FRANCE, "NATO Human Resources (Manpower) Management (Gestion des ressources humaines (effectifs) de l'OTAN)," 1 February 2012, available at: <http://citeseerx.ist.psu.edu/viewdoc/download> (Accessed 29 May 2020).
- ² Centranum Group, "Competency – A Definition," 2005-2020, available at: <https://www.centranum.com/resources/competency-management/what-is-a-competency/> (Accessed 15 May 2020).
- ³ IAEA, "The Competency Framework – A Guide for IAEA managers and staff," 1998-2020, available at: <https://www.iaea.org/sites/default/files/18/03/competency-framework.pdf> (Accessed 5 May 2020).
- ⁴ Silvia Matern, "e-Platform for IT Personnel Development: Addressing the Most Strategic Challenge in Cyber Domain – People," *Information & Security: An International Journal* 42 (2019): 50-62.

- ⁵ Silvia Matern, Gabriela Savova, Denitsa Goleva, and Velizar Shalamanov, "Human Factor in Digitalization and Cyber Resilience of Public Administration," *Computer and Communications Engineering* 13, no. 2 (2019): 3-14.
- ⁶ Claude Werder, "How Organizations Develop Competencies and Skills," Brandon Hall Group, 26 September 2019, available at: <https://trainingmag.com/how-organizations-develop-competencies-and-skills/> [Accessed 29 May 2020].
- ⁷ Dimitrina Polimirova, Velizar Shalamanov, Nikolai Stoyanov, Todor Tagarev, Yantsislav Yanakiev, George Sharkov, Yavor Papazov, Vasil Rizov, and Krassimira Ivanova, *Cyber Security and Opportunities for Application of Innovative Technologies in the work of the State Administration in Bulgaria* (Sofia: Bulgarian Academy of Sciences, 2018).
- ⁸ Human Capital Development Systems, "Human Capital Development Systems," available at <http://humancapitalbg.com/> (Accessed 15 May 2020).
- ⁹ Silvia Matern, "e-Platform Architecture for Organisational Collaboration and IT Education," *Information & Security: An International Journal* 43 (2019): 161-172, <https://doi.org/10.11610/isij.4314>.
- ¹⁰ "CareerOneStop," 2020, available at: <https://www.careeronestop.org/Competency Model/> (Accessed 3 June 2020).
- ¹¹ Mind Tools, "Developing a Competency Framework," *Mind Tools*, 2020, available at: https://www.mindtools.com/pages/article/newISS_91.htm (Accessed 3 June 2020).
- ¹² Communications, IDG, "10 IT management certifications for IT leaders," CIO, 30 May 2018, available at: <https://www.cio.com/article/3276653/10-it-management-certifications-for-it-leaders.html> (Accessed 10 June 2020).

About the Author

Silvia **Matern** is a Ph.D. Student in Informatics at the IICT-BAS with over 15 years of experience in system support, software engineering, web development, system implementation, site acceptance, testing and documentation for government and international organisations such as NATO. Her research focuses on the development of a centralised solution for management of IT competencies that should serve as a digital platform for qualification and pre-qualification of IT specialists and the creation of a collaborative environment for government organisations, educational bodies, businesses, IT experts and students.