
IMPACT OF DIGITAL TRANSFORMATION ON KNOWLEDGE MANAGEMENT IN ORGANIZATION

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Abstract

Changes in the organizational environment as an outcome require organizational changes. With the development of Industry 4.0, there is a need for digital transformation which is focused on digitizing business as well as in the automation of activities. To adapt the organization to the new conditions in an environment, it is necessary to develop organizational knowledge. Once created, knowledge should be managed and must be disseminated to all organizational levels. With the automatization of the organization system, there is a need for applying artificial intelligence that will manage implemented automated systems but will also manage created the base of knowledge. Furthermore, for the knowledge management organization may employ different models, but with the change in the organizational environments, there is a need for developing new models that will enable knowledge mining, management and dissemination of knowledge in the digital age. It is also necessary to mention security, which is crucial, as the digital age brings with it the challenge of being able to give others access to information in a violent way, which can violate the privacy and business secret of the organization.

Key Words

Industry 4.0; digital era; knowledge management; organizational environment.

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INTRODUCTION

Changes in organizational environments' have an impact on today's business paradigms. There is the emergence of a new type of economy that is based on digital technology. Digitalization and digital technology lead to changes in ways of communication in organizations and have an impact on business processes. Described forces drive a need for the digital transformation of the organization which implies implementation of cyber-physical systems, internet of things technology and the whole line of innovations.

Furthermore, described changes and need for digital transformation, today's organization's forces to develop new knowledge that will enable organizational adaptation to new requirements from environments. Organizational learning process means exchange of knowledge whit organizational environments and adjustment of current knowledge to organizational needs (Zbuceha, Vudu, 2018). Once acquired, knowledge must be managed to create and add value to product, service and organizational processes at all. Organizational knowledge is managed by processes that are focused on creation, dissemination and use of created knowledge. However, the use of knowledge depends on the competence of organization and competence of organizational employees at all (Sharma, 2005).

Digital transformation can be one of the foundations for organizations to create a competitive advantage in the market. Through the use of innovations of information-communication technologies, sharing and creating of organizational knowledge is made more effective and efficient. The organization can create a knowledge base within which can accumulate, and store created knowledge bud also can analyze that knowledge for different purposes. However, to the organizations are recommended for creation of a knowledge management system that will not be based only on the gathering and documentation of knowledge, but also on creating the relationship between the knowledge and its use to create value. Besides, the need to manage organizational knowledge is not only a consequence of changes in organizational environments but also results of the need for much better adaptation to future changes.

This paper aims to outline the most important concepts and to define the impact of the digital age on organizational knowledge management models. Furthermore, the paper aims to give an overview of the most important models that today's organizations can use to manage their knowledge, given the increasing demands placed on the organization by the stakeholders, ie the opportunities offered by the digital age.

METODOLOGY

This paper is based on a secondary survey conducted by relevant professional and scientific journals in journals such as WoS and Scopus. The secondary research included papers discussing digital transformation as

well as changes that occur through digital transformation in an organization. Furthermore, the research used papers that talk about and describe new and existing organizational knowledge management models as well as papers that describe the importance of developing an awareness of secure communication as the Internet becomes the dominant medium for communication and dissemination of information in the digital age.

Main aim of this research is to present impacts of digital transformation and digitalization of the bunnies to organizational knowledge and way organization manage its knowledge. Digitalization have many opportunities for the knowledge creation but there is also need for different approach to ensuring safety of generated knowledge.

REVIEW OF LITERATURE

Knowledge management is a discipline which is still in development, especially when come to the digital environment. Today's scientific papers that are talking about knowledge management are focused on benefits that an organization has from focusing on collecting, manage and dissemination of knowledge. Ghosh (2003) in his paper talking about the importance of libraries which are some kind of knowledge bases in physical form. In his research, Ghosh refers to the importance of customization to the new environmental condition's whit the implementation of new technologies (Ghosh, 2003). Gavrilova, Alsufyev, Kokoulina (2017) in their research are talking about the importance of organizational support that organizational have formed an informational technology (IT) in all processes that are related to knowledge management. Except for the importance of IT, Gavrilova, Alsufyev, Kokoulina concluded that every organization must ensure that strategic management is committed to defining goals and strategies that are related to collecting knowledge. Furthermore, there is identified an oversized focus of some organization to IT although the organization has a small maturity level of existing organizational knowledge (Gavrilova, Alsufyev, Kokoulina, 2017). Digital transformation, on today's organizations, sets a request and challenges that are related to the safety of organizational knowledge. Ilvonen, Thalmann, Manhart, Sillaber (2018) emphasize that ensuring the safety of organizational knowledge is one of the biggest challenges with whom organizations are facing today. They emphasize the need for developing models of securing organizational knowledge and security-related threats that are coming from organizational environments. Because of this fact, organizations must include experts from different areas to the development of the security model (Ilvonen, Thalmann, Manhart, Sillaber, 2018). With the gathering of large amounts of data, there are challenges related to defining how collected data will be managed. Given this need, Grigorov, Georgiev, Petrov, Varbanov, Stefanov (2009) explore various possibilities that are different information systems offering and recommend that information system should have three levels of access, public, limited private and shared access (Grigorov, Georgiev, Petrov, Varbanov, Stefanov, 2008).

Given the fact that organizational knowledge stems from organizational changes and adapt to the environment, Mizintseva and Gerbina (2018) talk about the need to create organizational knowledge so that the organization can develop and holistically approach to the digital transformation of business (Mizintseva, Gerbina, 2018). On the other hand, Schwarzmüller, Bros, Duman, Welpé (2018) write about several changes affecting the organization, resulting in the need for the digitization and digital business transformation. Changes in the environment are resulting in need of a different kind of competence that is required for the employees that work in the organization and which is related whit creativity in the process of problem resolution (Schwarzmüller, Bruce, Duman, Welpé, 2018). One of the technologies that enable collecting and generating organization knowledge is big data. Big data is the base of information that organization are generated and collecting in processes. Whit mining techniques, an organization can identify knowledge from big data and used it for different purposes.

INDUSTRY 4.0 AND DIGITAL TRANSFORMATION

The concept of Industry 4.0 was first mentioned in 2011 in the context of the German development strategy until 2020. Industry 4.0 involves the use of technologies such as RFID (Radio-frequency identification), IoT (Internet of Things), artificial intelligence (AI), big days, sensor, CPS (Cyber-physical system), etc. The use of such technologies requires a digital transformation of the organization. Digital transformation involves replacing the traditional approach to business with new digital models, which can affect the efficiency, effectiveness and economy of the entire organization (Vial, 2019). As such, digital transformation is significantly changing customer expectations. Customers, because of the ability for an organization to personalize products, place demands on the organization related to the development of new products and services, as well as the development of innovative ways of meeting their requirements (Verhoef, et al., 2019). With increasing demands from organizational environments and the rapid changes that result from the emergence of new technologies, the organization must develop new mechanisms to adapt to the new conditions. By adapting, the organization creates organizational knowledge that can result in the development of competitiveness in the long run.

However, the digital transformation, as well as the use of technologies that use an Internet connection for communication, is a challenge related to the unauthorized use of information that may become available to third parties. Therefore, it is necessary to implement mechanisms that will increase security, but also help to retain once collected information stored in databases (Şerbu, Rotariu, 2015). One way to increase security is to implement an information security management system and its certification to ISO 27001. European Union countries (Tankard, 2016).

The implementation of new technologies, as a consequence, also has increasing demands placed on organizational employees in terms of their

competencies. New technologies also mean the need for organizational employees to acquire new knowledge and skills to stay and become competent to perform tasks and activities (Nyikes, 2018). Furthermore, it is necessary to mention the role that modern technology, such as virtual and augmented reality, plays in educating employees and expanding their knowledge, that is, disseminating the knowledge gathered in the organization. When it comes to dissemination of knowledge, it is necessary to mention both cloud computing and its use in the organization for the dissemination of information and knowledge. Specifically, cloud computing provides access to the collected knowledge, that is, the information gathered through the possibility that all employees who have permission can access and use the organizational knowledge collected.

IMPORTANCE OF INFORMATION SAFTY IN DIGITAL ERA

Industry 4.0 offers organizations many benefits related to increasing the efficiency and effectiveness of organizational processes, but it also brings with it many challenges, such as the security of information stored in databases. Cyber attacks on organizations are becoming more sophisticated, and the risk of new attacks is increasing. As such, cyber attacks can result in information theft as well as theft of trade secrets, which can endanger the existence of an organization, or impair its business continuity (Pereira, Barreto, Amaral, 2017). This implies the importance of identifying and mapping risks as well as defining the measures by which risks will be nullified. Cyber attacks can also result in the theft of organizational knowledge, which can jeopardize the competitive advantage of organizations. Information security is of particular importance for all organizations that store information about their customers, that is, customers, as well as information that is collected from the process, and the organization plans to use it to analyze and create organizational knowledge (Hutchins et al., 2015). Networking organizations face the particular challenge of securing information, which means they may or may not share the knowledge they have with stakeholders involved in the network. However, stakeholders involved in the network may abuse their position and may gain access to organizational knowledge through cyber-attacks or other mechanisms, which for the organization means a risk that must be abolished (Marabelli, Newell, 2012).

MODELS OF KNOWLEDGE MANEGMENT IN ORGANIZATIONS

Need for development of a new model for knowledge management arises from the requirement for increasing organization efficient and effective. Organizational management is in constant search for new model's whit help of whom will be possible to use existing organizational knowledge for organizational growth and development. Parallel whit raising organizational needs for models for managing knowledge, many models are developed

which are focused on different things (Hacienda, Sarinah, 2009). Furthermore, models for organizational knowledge management allows the dissemination of existing knowledge to all organizational levels. In turbulent conditions of organizational environment, it is imperative to adopt the model for knowledge management because knowledge is one of the factors that is correlated with the ability of the organization to survive those turbulences (Mohajan, 2017). Which model will organization choose depends on organization needs and existing strategy for knowledge management (Hoagie, Kingston, 2003).

Nonaka, Takeuchi (1995) in their paper in which is described research made in Japan in 1995 identified that in the organization are existing two types of knowledge, explicit and implicit. They conclude that an organization's success depends on mechanical processing of collected explicit knowledge. Furthermore, they described that process of creating organizational knowledge is determined whit four factors: socialization, externalization, combination and internalization. These are factors that affect transforming implicit knowledge in explicit through dialogue and communication, linking new knowledge with existing one, learning whit doing things and working in teams (Tavakoli, Gandomani, 2016). Implicit knowledge is intuitive knowledge of employees, and it is neither defined nor documented, while explicit knowledge is clearly documented and easily accessible to everyone in the organization. Takeuchi emphasizes that regardless of the source from which knowledge is gathered it is the basis for the development of innovation (Takeuchi, 2006). There are some similarities between models that are presented from Boisot (1987) and Nonaka and Takeuchi (1995). Boisot in his paper speaks of a codified and unqualified knowledge that is consistent with the explicit and implicit knowledge represented by Nonaka and Takeuchi. Both models assume the expansion of knowledge through all levels of the organization (Haslinda, Sarinah, 2009).

Although the transfer of knowledge in an organization is a complex process that assumes that knowledge differs depending on the employee's career stage and can be divided into individual, group, organizational and inter-organizational relationships that relate to the knowledge of partners, suppliers, competitors and other (Haslinda, Sarinah, 2009). So, the level of knowledge depends on career development, and such knowledge as can be articulated and tacit. In the existing literature, many authors do not clearly define the concepts of storage, transformation and transfer, which are clearly defined in the model that is represented by Hedlund (1994). Furthermore, the same the model describes three fundamental concepts, articulation and internalization of knowledge, expansion and appropriation of knowledge or assimilation and dissemination of acquired knowledge. Assimilation of knowledge refers to the collection and adoption of knowledge from the environment, which can be a two-way process and is linked to career development. Dissemination refers to the expansion of knowledge outside the organization, while the processes of articulation, dialogue, reflection and internalization occur between articulate and tacit knowledge at different career stages (Hedlund, 1994).

It is important to say how tacit and articulated knowledge is considered intellectual capital in organizations. A model that is represented by Skandia considers the model that is developed for measuring the level of existing intellectual capital in organizations. The focus of the model is on the establishment of equality between buyers, suppliers and innovations. Therefore, this model is depending on these components; structural, human and buyer. In model is described how the market value of an organization depends on the level of intellectual capital in an organization which is determinate by organizational employees. Structural capital is determinate by the capital of buyers and organizational capital is the determinate whit capital of inventions and processes (Hacienda, Sarinah, 2009). Organizational focus on intellectual capital allows organizational development and growth as well as the growth of organizations market value which depends on goodwill. In other words, investments in the development of organizational intellectual capital determinate faster growth of organizational market value (Edvinsson, 1997).

Demerst model of knowledge management point that organizational knowledge is made in organizations, and once made, knowledge is embodied in the organization. Scientific paradigms determinate creating of organizational knowledge parallel whit impact of the paradigm of society. Creating knowledge is an interactive process which is constantly embodied in the organization and through an organization is disseminated. Result of creating management knowledge is seen through the emancipation of employees, which determines many of the benefits for the organization (Haslinda, Sarinah, 2009). On the other hand, Frids model of knowledge management is talking about the maturity of knowledge level and may bring down to five levels; chaotic state, the state in which an organization recognizes organizational knowledge, the degree in which the organization is focused on knowledge, the degree in which the organization is guided by the knowledge and the last degree in which the knowledge is in the organization centre (Caganova, Szilva, Bawa, 2015). Stankosky and Baldanza (2001) identified several factors that are classified as factors that enable organizational knowledge and they are learning, leadership, organizational structure and culture and technology. However, the authors emphasize that knowledge creation is not only influenced by such factors, but also whit disciplines such as strategic planning, finance, psychology, economics, engineering, etc. (Haslinda, Sarinah, 2009). Descriptive models are just some of the models that enable organizations to manage the created knowledge. However, under the influence of industry 4.0 and digital transformation, existing organizational knowledge management models have to adapt to newly defined requirements.

KNOWLEDGE IN DIGITAL ERA

To ensure the growth and development of the organization as well as its sustainability, it recommends to the organization to create and implement some of the models for knowledge management. Different knowledge

management models focus on different aspects, and the type of model the organization will implement depends on the type and characteristics of the organization (Mohajan, 2017). Particular attention should be paid to the strategic knowledge management that can provide the possibility of adapting the organization to new requirements in a turbulent environment. One of the challenges facing today's organizations, driven by changes in the environment, is needed for developing new knowledge that is based on IT and which today's entrepreneurs and owners of organizations must have (Sousa, Rocha, 2019). The importance of the existence of an information system within an organization that will enable communication of acquired knowledge and data protection in an implemented information system is constantly emphasized because organizational knowledge can be a competitive advantage (Kushwaha, Tripathi, Chauhan, Saxena, 2017).

Industry 4.0 and its related innovations determinate development of new systems that enable organizations to efficiently manage their knowledge as well as possible to collect new knowledge. Development of technological innovations in organizational knowledge management faces challenges that are associated with the ability to identify data from different locations within the organization, the ability to collect data of the machine performance, as well as on the activities that employees perform on machines, optimize data collection and initial processing of collected data (Rot, Sobinska, 2018). Digitalization and technological innovations become an essential component of today's organizations and directly affect the management processes in the organization. Newly created technological innovations enable organizations to achieve much greater flexibility in decision making than organizations that have not been digitized (Kaivo-oja, Virtanen, Jalonen, Stenvall, 2015).

here is not enough scientific and professional research that could contribute to the identification of the impact that digital business transformation has on managing and generating knowledge in the organization. Furthermore, networking in the organization and the use of sensors is enabling the collection of a large number of data from which is possible to identify and create organizational knowledge (Zhou, Alexandre-Bailly, Piramuthu, 2016). The growing need for a transformation of the traditional knowledge-based economy to an innovation-based economy is identified (Meško, Suklan, Roblek, 2017). However, it is important to emphasize that the innovation-based economy cannot be acquired without organizational knowledge which is possible to collect and improve it with digital technologies. Digital technologies enable management of created knowledge bases, extraction of knowledge from databases, dissemination of knowledge as well as analysis of acquired knowledge (Zbucea, Vudu, 2018). Besides, digital technologies and more accurately networking in the organization enable better communication and transfer of acquired knowledge. Research has shown that the creation of communication networks in the organization can be a significant cost, but can, in the long run, lead to significantly higher profits (Vladova, Ullrich, Bahrs, Bender, 2018).

ORGANIZATIONAL KNOWLEDGE AND ARTIFICIAL INTELLIGENCE

Digital transformation implies the implementation of expert systems as well as automated systems that are based on artificial intelligence. Artificial Intelligence in the last few years is mentioned as one of how tacit organizational knowledge can be identified and transformed into clearly defined knowledge. However, the issue of artificial intelligence in organizations is not strictly related to its use only within expert systems, but also in automated activities. As such, artificial intelligence cannot now contemplate the context of certain activities delegated to it that can result in a possibility of harming the organizational environment (Sanzogni, Guzman, Busch, 2017). The question is whether artificial intelligence can really replace the intelligence and knowledge of people and also there is a question that is related to the risk to people if artificial intelligence begins to carry out activities that people have done so far. In practice, artificial intelligence is beginning to be applied in healthcare where is serving in expert systems that assist medical personnel in making decisions (Furmankiewicz, Sołtysik-Piorunkiewicz, Ziuziański, 2014).

Furthermore, there is not yet a sufficiently well-designed artificial intelligence system that could communicate with people. However, existing knowledge management systems implemented some form of artificial intelligence that allows a variety of functions, such as mining knowledge (Tsui, Garner, Staab, 2000). Implementing of artificial intelligence into organizational knowledge management systems is imperative because of the functions that knowledge management systems have and must do, often requiring complex activities (Birzniece, 2011). Birzniece (2011) On the other hand, linking the knowledge base to artificial intelligence allows easier programming such systems and setting up algorithms to perform activities almost without the intervention of organizational employees. In other words, updating operating instructions makes it easier to define automated system settings that will upgrade existing activities performing. The application of such systems will be emphasized concerning the development and focus on the development of the cognitive computing that integrates many functions within it, such as learning automated systems, motion recognition, speech recognition etc.

KNOWLEDGE MINING AND BIG DATA

By implementing technological innovations like sensors in organizations, the organization collects a large amount of data that is stored in the database. For collected data, there is a need for analysis, so data can be used for making decisions (Ruzgas, Jakubėlienė, Buivyte, 2016). From the database, it is possible to extract and identify organizational knowledge using mining techniques. In this context, knowledge identification techniques are divided into a data classification, which means grouping data in individual groups from which it will be possible to identify knowledge, create a cluster of data, then classify data in the same group, and finally create a conditional

formatting to identify whether there is a link or correlation between individual data (Silwattananusarn, Tuamsuk, 2012). In addition to this, there are several different ways to identify knowledge from big data, which primarily depend on the type of data being processed (Fayyad, Piatetsky-Shapiro, Smyth, 1996). Big data and data mining techniques can be useful when it comes to using identified data for quality improvement, production planning, process improvement, etc. (Cheng, Chen, Sun, Zhang, Tao, 2018). However, data mining should not only be seen from the aspect of generating knowledge from big data, but also from gathering existing knowledge hidden in organizations, due to insufficiently well-articulated communication between employees, that is, the insufficient commitment of management to documenting and gathering knowledge.

CONCLUSION

Digital transformation of organizations becomes imperative due to changes and innovations that arise from the development industry 4.0. Along with that and by increasing the complexity of the organizational environment, organizations are forced to adapt to new conditions. By adjusting to the new requirements, organizations acquire new knowledge based on which they can develop a competitive advantage on the market or differentiate themselves from the competition.

There is a deficit of research that would cover a digital area of organizational knowledge management. Furthermore, the organization's knowledge that is acquired must be managed. Existing organizational knowledge management models must adapt to new conditions. Organizations need to define new models that will gather organizational knowledge, given the fact that digital transformation enables organizations to apply new technologies for dissemination of organizational knowledge across all organizational levels as well as automated systems that are often based on artificial intelligence. Furthermore, because of the increasing risks of cyber-attacks, there is also a need for implementing risk identification and risk management model in the model of knowledge management. This kind of approach can increase the safety of generated knowledge.

Industry 4.0 for organizations means many different advantages and opportunities associated with increasing the efficiency and effectiveness of organizational processes as well as the ability to create organizational knowledge using artificial intelligence. But on the other hand, there are many challenges associated with securing once-created knowledge, since digitizing organizational knowledge and storing it in databases, consequently, has the risk of cyber-attacks that can compromise the security of organizational knowledge as well as the privacy of customers and users. The organization must implement measures that will ensure the safety of all customer information to keep costumers and all interested parties satisfied.

Organizational growth and development are based on organizational knowledge that needs to be adapted to new conditions. It should also be noted that the knowledge profile of organizational staff changes because the

activities carried out in organizations often automate, which means they need to develop the competencies of organizational staff that will enable them to manage such systems. Organizations are encouraged to create a knowledge base as well as disseminate knowledge generated according to the needs at different organizational levels to enable the foundation of competitive advantage and improve organizational performance.

The main conclusion of the research is the need of creating a new model for the knowledge management because existing models are not good enough to satisfy new requirements that are related to the challenges like possibilities of cyber-attacks etc. A new model of knowledge management must include also the possibilities to create organizational knowledge through the usage of new technologies that arrives from development of Industry 4.0. Furthermore, with the usage of such innovations organization can disseminate once created knowledge through the internet connection and cloud computing.

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