

ROLE OF MANAGEMENT IN INDUSTRY 4.0

MILAN KUBINA – GABRIEL KOMAN – OLIVER BUBELÍNY

Abstract: *The arrival of the Fourth Industrial Revolution, known as Industry 4.0, began to significantly affect businesses. By implementing the Industry 4.0 concept, the company is gaining many advantages and significantly improving its competitive position in the market. Information and communication technologies, which are involved in all business processes, have become the basis for the use of this concept. Because of this connection, it is necessary to provide for the management of infotainment technologies in the enterprise. This creates IT departments that are responsible for its management in the enterprise. The rationale of management in the event of the Fourth Industrial Revolution is highlighted by the fact that the adoption of this concept also adopts innovative models that can support rapid decision-making in the company. The aim of the article is to describe the importance of IT management in the company and its follow-up to the fourth industrial revolution itself. Various data analyses and predictions can be performed through the large volume of data generated by Industry 4.0 components. The result is currently processed data that can provide managers at different levels of the business with a set of documents for the implementation of the decision. IT management of enterprises is mainly influenced by the size of enterprises and their global scope.*

Keywords: *industry 4.0, management, information technologies, information management*

JEL Classification: *D8, L8, M15, M21*

1. INTRODUCTION

Continual improvement in technology development generated topics like Digitalization, Automation, Internet of Things and its implementation in industry. The connection of all these topics resulted in a new business environment and caused a revolution of an industrial magnitude. Such a progress opened new possibilities for companies to be more efficient and productive than before. However, every big change needs to be managed in a certain way to result in success. At this point, the management complies with its role as a key factor in making it all work together. Therefore, not only the fourth industrial revolution itself becomes a challenge, but also its implementation and management. Information technology management in the company is provided by information management. It directly defines the vision, strategy, and goals of information policy across individual companies in the world. [5, 15]

2. METHODOLOGY

To fulfil the objective of the article being processed, which is to describe the importance of IT management in the company and its follow-up to the Fourth Industrial Revolution, it was necessary to obtain sufficient information through the method of obtaining, processing, and evaluating the information. Primary resources have been used:

- scientific research articles and publications focusing on Industry 4.0 and IT business management;
- book resources focusing on int management and IT strategy of enterprises;
- published empirical studies describing the importance of implementing industry 4.0 in the enterprise;

Secondary resources have also been used in the processing of the article, which are mainly websites describing Industry 4.0. The method of induction and

deduction was used in shaping conclusions to IT management and Industry 4.0.

3. INDUSTRY 4.0

The Fourth Industrial Revolution, known as Industry 4.0, originates in Germany. In 2011, so German manufacturing responded by moving some industries to third countries. The reason for the shift was mainly lower production costs for the implementation of outputs. [9] In order to maintain industry in the original countries and maintain competitiveness, it was necessary to start implementing a plan that would support such efforts. Industry 4.0 can be characterized as an interdisciplinary concept that was primarily used in the engineering field. Later, however, other areas such as management were added. Information and communication technologies are an essential element of Industry 4.0. It is these technologies that are also linked to the Internet of Things (IoT), which is an important basis for the whole concept, which allows interaction between cyber and physical components. At the same time, it can be argued that IoT makes it possible to improve communication in the human-machine relationship. [8] It is also necessary to mention that, if the IoT is used, large volumes of data can be generated, which the enterprise can then use for data analysis. A correct interpretation of the results leads to a generalization of the decision-making processes of the undertakings. The Industry 4.0 concept is built on pillars such as: augmented reality, system integration, cloud computing, big data, internet of things, 3D printing, cyber – security, autonomous robots, simulations. The aim of using and involving individual components in production enables the business to become intelligent. Smart Factories can be defined as a company that helps devices and people perform their tasks. This is done through ICT, online connectivity, which ensures an up-to-date view of production in real-time. [2, 6, 7, 8]

4. IT MANAGEMENT

Management is the process, where people in charge can carry out basic managing activities with help of scientific knowledge and practical recommendations, while they raise the value of available resources with a purpose to set up and reach business goals of the company. [4]

Management is practical activity which is represented by basic management functions. These functions create cyclic management process consisting of several phases. The main phases, which are also presented in the following figure, are planning, organizing and controlling. The supportive functions to main phases are provisioning of people and supporting of their development and leading people.

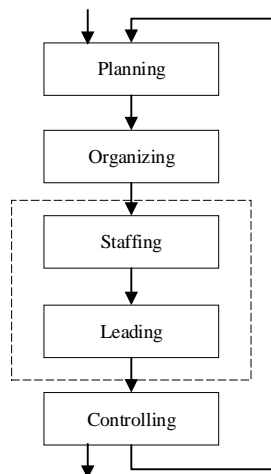


Figure 1 Managerial functions
 Source: [4]

This process of dealing with or controlling things or people is applied in each company and organization. It is the basic and core activity of the businesses. The changes adapted in the companies are results of management process. The topic of the industrial revolution is driven by the development of information technologies. There is a specific approach towards managing these technologies and it is part of the IT Management.

Function of IT became one of the most visible business functions in the 21st century showing its importance in almost every type of business and it ties up many new employees. Its mission is to optimize operations of the company's remaining functions that are composed of back-offices, inter and intra offices. [1]

The strategic planning of IT applications in the company is a complex process and requires a systematic approach in defining IT aims alike mission, creed, goals, and targets, what supports the business aims. [1]

Since IT Management is very complex, it needs a lot of attention and efforts to be put into. Companies of bigger size are usually setting up an internal IT organization. Setting up the IT organization depends on the organization's advancement and can be recognized with four stages. The first is IT Initiation which may lead towards the selection of application champions within the users' departments, who will promote IT solutions among peers. The second one is Application Proliferation and should create an inter-departmental steering committee, which will promote dissemination of IT applications. The third one represents Enterprise Applications Integration what requires a strong IT

organization, capable of professional supervision which could create an advanced EII. The last and fourth stage is Inter-Enterprise Applications Integration which leads towards the expansion of the IT organization into a core business function which transforms other functions' ways of doing business. [1]

Considering some large-sized companies on an international level, the IT Organization transforms into a structured **IT Management Organization system** including all important functions. The management of IT varies greatly from sector to sector and from small to large organizations. However, the presented figure emphasizes the complexity and comprehensiveness of the IT function within a business organization. Three major divisions of Global delivery of IT solutions, Corporate Enterprise Information Infrastructure (EII) management and IT project research, development (R&D) and maintenance are managed by a Chief Information Officer (CIO). The CIO is responsible for all IT related operations. [1]

"The core division is Corporate Enterprise Information Infrastructure management, composed of the integration of business and IT strategy, IT solutions quality assurance, mergers of integration and IT resources, data and application architecture, EII architecture and new technology and business resumption (by CTO-Chief Technology Officer), integration and security support, and outsourcing. " [1]

Furthermore, the infrastructure for Information Technologies, IT management and IT organization are very supportive for intentions to implement concepts of the fourth industrial revolution. This new concept should be managed in a certain way to achieve as much success as possible. For this reason, the approach of management of Industry 4.0 has to be considered.

5. IMPLEMENTATION OF INDUSTRY 4.0

The decision to implement and assess the readiness of the company for the entry of Industry 4.0 is on the managers of individual enterprises. In order to adopt the concept, it is essential that managers have sufficient knowledge and information about Industry 4.0 to be able to perceive its benefits in implementation. A 2016 PwC survey focusing on implementation shows that [10]:

- Over the next 5 years, up to 20% of businesses plan to invest in Industry 4.0 solutions;
- Businesses with digitisation expect costs to be cut by 3.6% per year, while efficiency gains of 4.1%;
- 72 % of enterprises expect that the use of data analyses will improve their customer relations;
- 83% of respondents expect the data collected to have a significant impact on decision-making;

From the above, it can be assumed that managers perceive the benefits of implementing the conception and are also aware of the importance of the use of information technology in the enterprise. The data obtained from the IoT components can then be used for data analyses, the results of which and correct interpretation can significantly improve the position in the competitive environment. For the actual implementation, it is necessary to implement a series of steps that will gradually prepare the company as well as the employees themselves for the adoption of the Industry 4.0 concept. Figure 3. Displays the basic steps of implementation. [12]

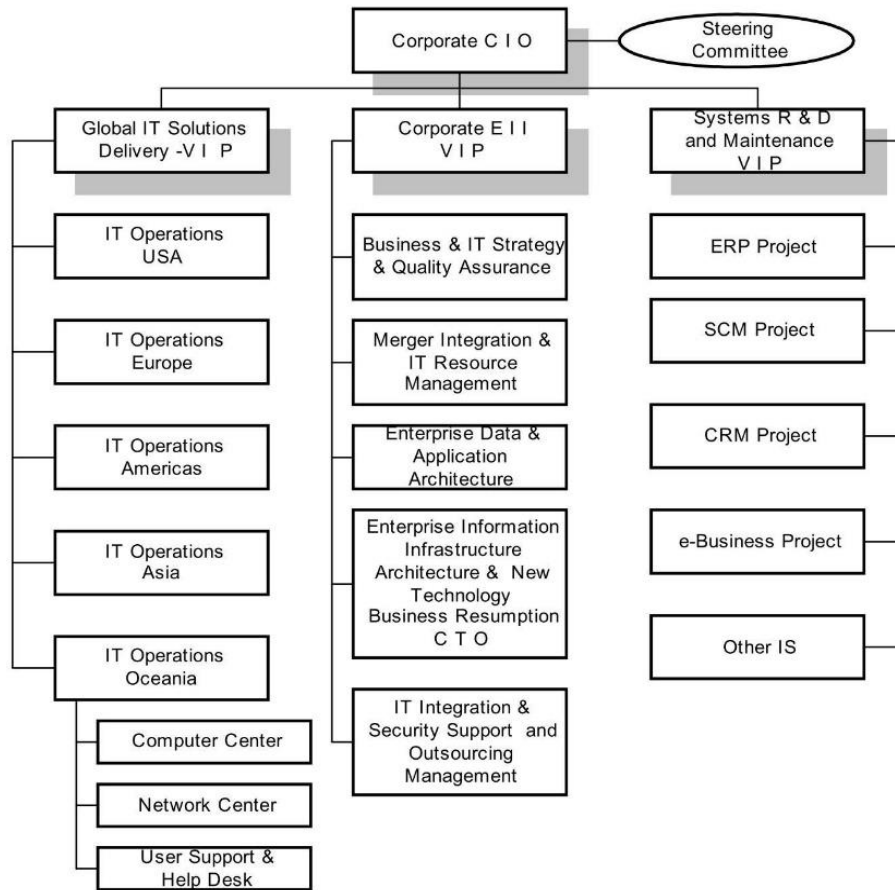


Figure 2 An Organization Chart of the Global Firm's IT Management
 Source: [1]

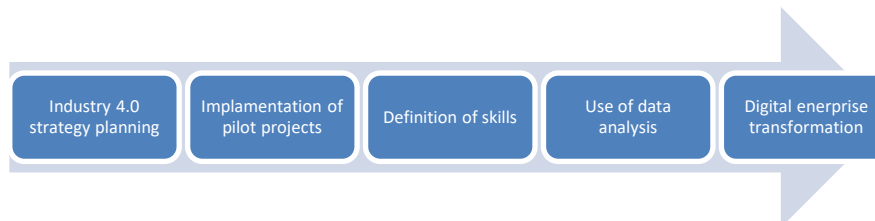


Figure 3 Implementation of Industry 4.0.
 Source: [10]

The first step in the concept is to define a strategy and individual strategic objectives about the future state of the business with a view to digital transformation. This should be a comprehensive strategy, taking into account the need to manage IT processes, change processes, and also human capital management, as well as the new staffing needs of enterprises. The next step is to carry out pilot projects aimed at quantizing economic efficiency. In particular, the aim is to show the management of the company and other stakeholders the benefits of adopting the concept and to prepare for the implementation of other key projects. Within these projects, the enterprise can focus on data analytics, digitization of R&D, automation of equipment, predictive maintenance, or digital marketing. The definition of skills is a necessity for adapting organizational structures and also for the staffing of qualified staff with a view to innovation. It is also important to set up business processes correctly in this step. When developing a business strategy, it is also essential

to focus on data analysis as a key tool for decision-making and forecasting. As part of the data analysis setup, it is necessary to assess the suitability of current ERP systems for the subsequent possibility of conducting data analysis. The digital business itself will only take place if it receives support from senior management. The Digital Agenda is mostly the responsibility of its management of the company and in roles such as CIO. [10, 13, 14]

6. DISCUSSION

Industry 4.0 has become part of many businesses around the world and undoubtedly brings many benefits to businesses. It is also possible to describe certain disadvantages associated with this concept. At present, most businesses that have not yet implemented this concept are hesitant to implement it precisely because of the uncertainty of the financial benefits that this concept can bring them. Small and medium-sized enterprises may have a problem

with the identification of advantages and also with sufficient awareness of the concept and its implementation. Smaller businesses also cannot adequately describe the impact of Industry 4.0 on their particular business model. [8] At present, however, business management also has to assume the necessity of itency in the company. From the point of view of planning, it is possible to use large volumes of data that are generated from different business spheres. Realistic business goals can be defined based on the data collected. Organizing in a rapidly changing environment brings the possibility to use elements of decentralization, team cooperation with the strengthening of individual competencies, using information and communication means. In the case of industry 4.0, it is possible to monitor the use of the matrix organizational structure, project teams. People's leadership should support innovation and education. However, it is important to stress that the fourth industrial revolution, with the massive development of information and communication technologies, will ensure the disappearance of some professions, which will then be provided by Industry 4.0 components. These will mainly be jobs in the higher overlap of manual labor. It is, therefore, essential that businesses focus on the selection of qualified employees and their continuous personal and career development. The use of individual data will allow real-time control in management and better control, so businesses can

respond much more quickly to possible deviations. [3, 5, 10, 11]

7. CONCLUSION

The massive development of information and communication means and the need for competitiveness of some countries vis-à-vis third countries, where production is significantly less costly, has created the scope for the start of the fourth industrial revolution. The industrial revolution in the enterprise itself is not just about digitisation itself, although it is an essential element of the concept itself. It is also about changing the very thinking and thinking in the company, as well as changing the corporate culture. Industry 4.0 is an attractive opportunity for businesses to gain a competitive advantage to reduce costs, increase efficiency, and ensure the overall sustainability of the business. However, for implementation, senior management needs to understand and clearly accept the concept. By implementing Industry 4.0, the company changes processes, organizational structures, and begins to use the data analysis as a powerful tool for decision making. It is essential to stress that, in the case of human potential, certain jobs will become unusable and therefore further consideration should be given to how to use the staff concerned. The ideal way can be to retrain and move to other jobs within the enterprise. The theme of the Industrial Revolution is very attractive and is also making rapid progress in the field of information technology.

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Milan KUBINA, prof. Ing., PhD.

Gabriel KOMAN, Ing., PhD.

Oliver BUBELÍNY, Ing.

Department of Management Theories, Faculty of Management Science and Informatics, University of Zilina

Univerzitná 8215/1, 010 26 Zilina, Slovak Republic

e-mail: milan.kubina@fri.uniza.sk, gabriel.koman@fri.uniza.sk, oliver.bubeliny@fri.uniza.sk