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ROLE OF HUMAN CAPITAL IN ENGINEERING

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Abstract. *In the turbulent environment, in which we live, the changes are inevitable and commonplace. Technological development, information technology era, as well as uncompromising competition are conditions that exist in organizations today. Those organizations, as well as their employees, primarily engineers who are unwilling to change will not long be able to survive in the market. Big changes are happening in all industries, and all that affect changes in the nature of the job, which requires changing patterns of behavior of employees in the industry and a change of their competencies. Human resources is a category of strategic importance for any modern business system in the contemporary business development, because it directly affects business results: increases revenues, reduces operating costs, increases market share, as well as reduces the absence of employees and their fluctuations, diminishes accidents on work, decreases job dissatisfaction, conflict and lack of work acceptance.*

Key words: *Human capital, engineering, business competences.*

1.INTRODUCTION

Modern business conditions, characterized by significant technological change, require increasing attention on the development of humanity and human capital. Human capital consists of many dimensions, which have been explored by a large number of researchers. The research of human capital association with work performance clearly shows a link between human capital and organizational performance. Human capital was often observed in the level of education of the respondents, and a connection is established with increasing economic indicators [2, 20, 3, 10]. Results indirectly show that in situations where one aspect of human capital, such as knowledge, is increased, magnification of other aspects of human capital, such as willingness to change can be expected. The concept of HC has becomethoroughly integrated into theoretical and empirical studies in economics and other social sciences, during the past decades. Being linked with outcomes, HC has been considered as a significant driver of performance, at both macroeconomic and microeconomic levels.
However, it is even more relevant that HC has been considered as an important source of innovation and strategic renewal [4, 5, 18].
In this modern business environment, customer needs are changing on daily basis, with competition becoming more global, and technology advancing at an incredible rate. To maintain competitiveness in such a challenging environment, companies need efficient management engineers who understand the ways of doing business.
Industrial engineering and engineering management as scientific disciplines emerged a century ago are strongly progressing nowadays. They are multidisciplinary by nature, their knowledge being applied in all business areas [14]. Industrial engineering has emerged much earlier than engineering management .
In such a dynamic environment, management engineers are required to be knowledgeable and skilful in the fields of organization and management, marketing and commercial, economic and financial and managerial and control functions, and be resolute in implementing the principles of engineering management [15]. Management engineers should also possess specific technical and engineering knowledge and experience, which makes them responsible for results of the work unit, department or sector they are managing. In modern business conditions, the work of management engineers also refers to functions related to the coordination of any movement of materials, products and goods in physical, informational and organizational sense. Thus, the task of management engineers is to integrate all components (activities) of engineering management, i.e. planning the activities, providing customer services, organizing logistic communication, managing the inventory,

transportation and storage, controlling business processes, etc. Engineering management also confirms the fact that "man is the most important factor when it comes to integrating all elements of the industrial system." Accepting the concept of modern engineering management, in addition to other benefits, the company (industrial system) can be able to reach its basic market objective, i.e. providing customers or consumers with high-quality services while minimizing the overall costs and making profit at the same time.

The objective of this article is to consider the role of human capital in engineering, with the special emphasis on willingness to change and innovation.

2. COMPETENCIES OF HUMAN RESOURCES

Human capital can be defined as the knowledge, qualifications, ability, experience, capabilities, skills, education, creativity, innovativeness, motivation, communication, flexibility, tolerance, teamwork capacity, learning capacity, commitment, personal characteristics and competence of employees, which assumes adequate application of all potentials and enables employees to execute their tasks and fulfill the expectations of customers, consequently creating certain value for the employer [11, 16]. Human capital can improve the organization's ability to sense changes in critical environmental variables that require changes in the organization's activities. Organizations in the new economy are facing turbulent environments and strong competition and because the environments within which organizations exist are becoming increasingly complex and dynamic, the need for the development of alternative mechanisms for monitoring the environment becomes more important.

The role, the character of work and the tasks of modern management engineers are highly complex. Management engineers are planning, organizing, directing and managing people, teams, money, technology, facilities and other resources with the aim of achieving the business objectives of the industrial system [7]. To ensure the short term operation of the industrial system, they are focused on resolving the problems and conflicts. As a rule of thumb, management engineers, instead of pursuing strictly technical jobs, are rather concerned with human resources. Their task is to decide how a specific unit or sector can contribute to the achievement of objectives of the industrial system, and then to distribute the resources that implement the decisions.

High levels of human capital increase the organization's monitoring capability by decentralizing the monitoring to meet the complexity of the environment. No longer is the monitoring only carried out by a centralized department, but additional information can be gained by employees who are closer to the actual stakeholder groups. Although top management has the responsibility for setting the strategic direction of the organization, the many submits engage in developing the strategies and tactics necessary to function effectively in their particular environments.

From the standpoint of the individual and the psychological dispositions of readiness to change, we distinguish the following aspects:the existence of emotional attitude toward change, voluntary or motivational potential to achieve change, the existence of a positive attitude and thinking about change and aspects of behavior towards realizing the changes [9]. Changes in people are the most difficult to define because they are associated with a range of external and internal influences, that are not visible in all situations[17].Willingness to change is the basis to sustainable development [8].

On which level of development can we count on the need for change? Is human being able to assess its own tardiness on time? When and under which conditions adaptation is enough, and when the organization has to initiate and implement changes? Competencies represent a basic unit of human resource development and the language of communication in organizations in the part related to the performance, efficiency and effectiveness. Understanding the competences and their proper observation in the work environment, identifying as well as defining is the fundamental process in human resources development. Guidelines for the use of the ISO 10015 standard defines competence as the application of knowledge, skills and behaviors that result in performance.We can conclude that competences are the knowledge, skills and attitudes that create our behavior in the workplace. There are three aspects of competencies that we take into account: cognitive (knowledge), functional (skills) and social (behavior). Competencies identified at least two types of competences: behavioral and tehnical.Tehnical competencies define the knowledge and skills so that employees can perform their work roles in an efficient and effective manner[1].

As a result of automation and the beginning of mass production, during the industrial revolution, the separation of technical and non-technical competencies took place. Today, when we are in the second industrial revolution, we move away from mass production chain, so that the division of labor into smaller tasks is no longer an adequate way for work organization.

Characteristics of the second industrial revolution, which have high implications for staff competencies, as Mansfield states, reflected in [13]:

- The use of modern technology that requires employees who are organized and have specific thinking skills: to plan, make decisions, solve problems;
- rapid changes in product development as a response to consumer demand;

- high demands for quality and products that are adaptable to the individual requirements of customers;
- new forms of organizational design, where there is no need for multiple hierarchical structure;
- modified management and control systems, where it is essential that people may lead themselves through the process of work.

Today, in order to be successful in their professions, employees need to have more than technical competences, because experience has shown that only training for technical competence can not respond to the above mentioned needs and changes in the workplace demands.

The crucial skills required by the job in the modern organization is focused at the use of numbers, communication, problem solving, decision making and learning abilities. The function of this type of competencies provide horizontal and vertical mobility within organizations, and for those who are looking for a job ensure flexibility and adaptability in the labor market.

Woodruff [21] states that competent people are those who reach and / or exceed the impact that is expected of them. A special contribution to defining behavioral competencies, which are based on behavior, gave Klemp and Boyatzis who consider that the competence is a primary characteristic of an individual that results in superior performance at the job [12], while Boyatzis [6]. considers that competence is the primary individual characteristics and states that it can be: a motive, characteristic, skill, aspect of our own self-image or social role, or body of knowledge that is used [19]. Great influence on competence have the organizational context. According to Whiddett and Hollyford [19]., organizational context provides the parameters for individual behavior. The organizational context includes the value of the organization and its culture, mission, vision and other elements of the business system.

For an organization to effectively and efficiently apply the concept of competence, develop and implement a framework of competencies, and successfully guided the behavior of its employees to achieve results, it is necessary that behavioral competencies are associated with the values and mission of the organization, which ensures that an organization not only stated its commitment to the values but also integrates the behavior required to achieve results in organizations. A study conducted in Poland in 2009 revealed that the group of competencies, which largely determines the employability of people (team work, motivation and communication), can be just as important or even more important than technical skills (World Bank Group, 2012 specified in the IFC Job Study, 2013). Companies and policy makers have begun to recognize that technical skills are not the only ones which need to be developed. It takes a strong focus on core competencies and related groups of skills in the future, in order to create efficient generation of workers in the coming decades.

The key competences are formed as response to changes in the economy and the labor market, in the 20th century. Taking into consideration the consequences of economic change that have taken place over the past few decades, labor roles have become broader [13] and employers required employees with additional skills and competencies.

The crucial competences are all skills that are not specifically designated as technical. Key competences represent a transferable, multifunctional set of knowledge, skills and attitudes necessary for every individual to personal fulfillment and development, participation in social life and employment. This set of knowledge, skills and attitudes should be developed at the end of compulsory education or training, and should serve as a basis for further learning in the process of lifelong learning.

3. CONCLUSIONS

Thus, modern industrial systems are becoming increasingly complex. Engineers profession in modern business conditions presupposes knowledge about effective communication, working in teams, making quality decisions as well as a range of skills that implies soft skills. Incrementin human capital, which occurs as a consequence of the development of skills and abilities of individuals and teams, would contribute in maximizing the quality of work. Training engineers in the direction of soft skills enlargement involves developing personal and social competencies that are a prerequisite for the implementation and development of professional knowledge.

Competence is a proven ability to use knowledge, skills, personal and / or methodological abilities in various business situations. It does not mean that a competent person is also qualified person, but a qualified person should be competent.

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