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**TRANSFORMATION OF POSITIONS, COMPETENCES AND
SKILLS IN THE DIGITAL ECONOMY INDUSTRY**

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Abstract

As digital transformation dramatically changes business practices, the success of digitalization is most dependent on one factor above all others. This crucial element is people: talented professionals who can use existing digital technologies and quickly adapt, using new methods and approaches. Without these people, it would be difficult for companies to fully realize the potential of the latest technological developments: Industry 4.0, robots, artificial intelligence, advanced data analysis methods, virtual reality and new digital business models. The digital transformation of a company can be successful only if there are people in the company who can competently carry it out. It is those people who can make technology work for the benefit of the company and create new business opportunities with the help of new ideas. These professionals will be the most sought-after and scarce in the job market. It is necessary not only to acquire new, outside talent to specific positions, but also to develop the digital skills of employees that are already working within the company. The most important thing to understand is how digital professionals think. The article analyzes the human resource component of business digitalization and explains the key questions that are connected to it: who is needed, how to attract competent personnel, how to raise the digital knowledge level of all employees.

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Keywords: Digital transformation, digitalization, CDO, digital competencies, digital profiles, digital skills.



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1. Introduction

The world is undergoing a global transformation of a traditional economy into a digital one, and from high-tech industry into digital industry: Future factories are being created in the form of smart, virtual and digital factories; digital platforms, Smart Digital Twins of real objects / products (DT-1), factory production processes (DT-2), industries (DT-3), Smart Digital Shadows and digital threads; the development of expert “intelligent assistant” systems as an early stage of progression towards the widespread use of artificial intelligence; the development of automation, robotization and intellectualization industries; the transition to cyber-physical systems is underway, the material and digital (virtual) worlds are merging. These global changes are accompanied by the creation of new business processes at all levels (Khmeleva & Egorova, 2016).

In the framework of a Fourth Industrial Revolution, the industry leaders will be the companies that, while following global trends in the digital economy, shift their focus to the fields of digital design and modeling, computer and supercomputer engineering, along with the methods for multicriteria, multi-parameter, multidisciplinary optimization, topological and topographic optimization, bionic design, additive manufacturing, robotization, etc.

2. Problem Statement

In April 2018, the experts at BCG identified six areas where digital talent can bring about the most significant and effective change. These areas include digital business, digital marketing, digital development, in-depth analytics, Industry 4.0 and new work methodology. Experts in the field of digital business put forth innovative ideas that become the basis for new digital business models. Marketing experts know how to use the entire range of digital channels to interact with customers. Developers help build these channels. Analysts use data to help understand what consumers want. Industry 4.0 experts work closely with production units and create new products, and methodology developers use innovative processes and approaches in order to increase efficiency and transform an organization's culture (Table 01).

In these six areas, experts identified twenty major digital profiles that a company requires, in order to ensure the sustainability of its digital transformation in any industry. Despite some exceptions, these profiles cover most of the organizations' needs in the area of digital talent. Below are several profiles of the six most significant areas:

- A digital strategy specialist provides leadership at all stages of development in a digital business model, regardless of whether such a specialist works in a separate digital division, in a digitalization department, in a strategic division or some other position.
- A marketing automation specialist supports the perpetuation of digital marketing by using artificial intelligence-based bots that used for online customer interaction.
- User interface (UI) and user experience (UX) designers specialize in developing interface design as well as creating the user experience in applications.
- Data analysis specialists are part of an in-depth analytics team and perform the analysis and interpretation of data. They are able to identify hidden connections and interesting patterns in the data.

- A robotics and automation engineer design, configures, and tests robots (primarily for industrial use).
- Scrum masters have the latest project management techniques and knowledge in the field of the Agile methodology and its implementation.

Table 01. Primary digital profiles categorized by fields

Digital business	Providing leadership at all stages of digital business model development	Digital transformation manager	Digital strategy specialist			
Digital marketing	Digital content creation, interaction with consumers and digital brand management	Social media community manager	Marketing automation specialist	Marketing profile 3		
Digital development	Development of advanced digital products and services and their management with the help of Agile teams	Digital project manager	UI/UX-designer	Developer profile 3	Developer profile 4	Developer profile 5
Advanced analytics	Collection, organization and analysis of data to determine key conclusions	Business analytics specialist	Data scientist	Analyst		
profile 3 Industry 4.0	Analyst profile 4					
	Implementation of Industry 4.0 to improve production efficiency	Production virtualization engineer	Robotics and automation engineer	Profile 3 for Industry 4.0	Profile 4 for Industry 4.0	Profile 5 for Industry 4.0
		Automation engineer	Robotics software engineer	Automation testing and control engineer	Human-robot interaction architect	Machine recognition engineer
			Environment recognition engineer	Robotics recognition systems engineer	Automatic systems and sensors engineer	Machine vision specialist

Note: Source: developed by the authors using materials from (Strack et al., 2018)

It is necessary not only to attract new digital specialists from the outside to specific positions, but also to develop the digital skills of employees that are already working within the company.

The most important thing to understand is how digital specialists think. Employees with digital thinking are entrepreneurial and tend to make decisions based on data. They specialize in developing products and services that take the needs and preferences of users into account. They really like to design and create. They have experience working in interdisciplinary teams that focus on cooperation and Agile methods. For digital professionals, a portfolio of products and projects that they created is more important than a prestigious job title or linear career growth. Additionally, they react better than “ordinary” employees to non-standard forms of compensation, such as stock options or shares in intellectual property. Many of them also strive for real-world change and to make the world a better place. In summary, we can say that digital talents are a special category of candidates, requiring new attraction and selection methods.

3. Research Questions

Digital transformation is primarily a business transformation that creates new services, products, services for users and, as a result, allows the company to generate new financial flows. Under the conditions of digital transformation, the following occurs:

- a new business policy is formed: data becomes one of the company's key assets;
- an organization that is driven primarily by data and analytics, is formed.

4. Purpose of the Study

The purpose of the study is to analyze and develop applicable theoretical and practical tools for the transformation of competencies and skills in a digital economy.

5. Research Methods

Today, the digitalization ideologist in a company is the director of digitalization, the CDO (Firth, 2017; Süße et al., 2018; Davison & Ou, 2017; Fryman et al., 2017). A CDO also serves as the director of the digitalization programming office and project manager for the implementation of digital solutions.

A CDO is a strategic business partner in the following areas: development, price formation, risks, compliance; reports directly to the CEO. A key partner to the CFO, CRO, COO, CIO.

Among the global trends in the formation of a CDO are the following. 19% of companies in the world today have a CDO. In the EMEA regions, 38% of companies have CDOs, in North America, 23%. The highest CDO ratio is in financial and consumer-oriented companies. 60% of all CDOs in these industries were hired during 2016 and 2015. The largest companies have the highest CDO indicator (33%).

An essential competency of a CDO is the ability to manage change. A skill that provides the ability to organize project activities based on modern methodologies, the ability to program development and customize the organizational design of a company in accordance with new tasks and challenges.

The primary competencies of a CDO are the following: data management, as well as company management, based on data. It is imperative to understand the technological and organizational aspects of

data collection, processing and circulation in a modern organization, to be aware of the technological frontier and to be able to solve corresponding problems.

In manufacturing companies, the position of CDO is not yet widespread, due to insufficient progression in terms of digitalization. Other industries, such as FinTech, retail, insurance, and telecom are, by contrast, ready for change. In such companies, the CDO position has already predominantly appeared.

The origin of the CDO position has its basis in working with consumers and building communication paths with the client. Today the most important element of a CDO is technical competence. The differences in the profiles of the Director of Informatization (CIO) and the Director of Digitization (CDO) are presented in Table 02.

Table 02. Differences in the profiles of the Director of Informatization (CIO) and the Director of Digitization (CDO)

Characteristic	CIO Director of informatization	CDO Director of digitalization
Purpose	Increased company productivity, operational efficiency	Ensuring the launch of software and analytical products for commercial sale, new cash flow
Performance parameters	Production efficiency, productivity, cost reduction	Commercialization of new products, profit
Areas of responsibility		Development of new technologies, innovation
KPI	Cost reduction index	Number of new products and services, profit

Note: Source: Verhovsky (2018)

6. Findings

The CDO, as a technical specialist, focuses on building interconnected technological ecosystems through the assessment and comparison of channels between different business structures; the CDO evaluates and invests in corporate platforms and licenses, such as visualization tools; controls complex heterogeneous configurations, reduces Service Level Agreement errors (SLA) and risks of failure, optimizes services; makes changes to information technologies through close collaboration with other CxOs in order to implement scalable technologies.

The CDO, as a methodological scientist, heads the data development and analytics program in an organization; develops and implements technologies, tools, approaches and methodologies for the monetization of the company's dataset; provides strategic and operational management of data, provides data quality and other controls to ensure the integrity of company data; serves as a reliable partner for key customer-oriented business leaders, regulates risk management, oversees regulatory compliance and finances; stimulates innovation through the use of Big Data technologies and analytics.

The CDO as an innovator, provides a deep understanding of customer pathways, supply chains, employee workflow and how it can be improved with digital technology; has a clear idea of how to transfer traditional processes to mobile technologies, social networks, sensors, etc.; has a natural propensity for innovation and development, including the ability to train and inspire other stakeholders in

the organization; able to put the company on the path to digital transformation, both internally and externally.

The CDO as a strategist, assesses the most appropriate operational models and methods to monetize data for the company; defines and regulates the all of the analytics management of an enterprise, including strategy, people, processes, data, and technology; actively aids business transformation, changes and education that are necessary for the introduction of analytics into the company's culture; the CDO is at the forefront of data development and risk, manages future internal programs of the organization.

7. Conclusion

In the short term, traditional companies can allocate digital specialists into a separate division - the main company's subsidiary (Dong, 2018; Ghezzi & Cavallo, 2018; Janssen et al., 2013; Ramírez-Montoya et al., 2017). However, companies quickly discover that they need significant changes in their corporate culture as a whole. Digitalization cannot remain the task of a separate unit. In order to make digitalization the driving force of development in the whole company and ensure change sustainability, it is necessary to go beyond the initial push (Nyikes, 2018; Hatlevik et al., 2015; Tømte et al., 2015).

To create a truly digital culture, it is necessary to introduce new forms of cooperation and adapt to them, transfer more tasks to project format and manage these projects more flexibly. A company should introduce new methods of work, for example, Agile, and customer-oriented planning, experiment more and be more creative, give up many hard and fast rules and be less afraid of risks.

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