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## DIGITAL TRANSFORMATION: CHALLENGES FOR COMPANIES IN SERBIA\*

Digitalna transformacija – izazovi kompanija u Srbiji

*“We live today, as you know very well, not in the digital, not in the physical, but in the kind of minestrone that our mind makes of the two.”*

Paola Antonelli, MoMA – Museum of Modern Art in New York

### Abstract

Serbian ICT industry has been the fastest growing sector in the last decade after the recession, accounting for 6% of the country's GDP. This provides scope for companies operating in different economic sectors to transform their business, products, and services using digital technologies and, thus, to build their competitive position on knowledge and innovations. However, data show that Serbian companies are investing five times less into ICT than the global average and that the cooperation between the ICT and other sectors in the country is quite low. This paper explored this topic at a company level based on a survey conducted among 218 respondents from companies operating in various economic sectors in Serbia. Data show that digital transformation is recognized as important across all industries and employee levels and is mostly viewed as an opportunity that transforms companies to a large extent. Majority of the companies have implemented at least one project in the area of digital transformation, and more than half of them are developing their own digital products and/or services. Digital transformation in Serbia is implemented by leaders who do not necessarily have a technical background. The survey also shows that domestically-owned companies develop digital aspects of their products internally, in contrast to foreign-owned ones. As skill levels have been recognized as the quality of the Serbian ICT sector and are also key to building a digital economy, this paper assesses the difference between various available and needed skill sets in Serbian companies.

**Keywords:** *digital economy, digital transformation, innovations, competitiveness, Serbia.*

### Sažetak

Deset godina nakon recesije, srpska IKT industrija je najbrže rastući sektor u prethodnoj deceniji, zaslužan za 6% BDP države. Za kompanije iz različitih sektora privrede otvara se prostor da korišćenjem digitalnih tehnologija transformišu svoje biznise, proizvode i usluge, i na taj način grade svoju konkurentsku poziciju na znanju i inovacijama. Ipak, istraživanja ukazuju na to da srpske kompanije u IKT ulažu 5 puta manje od svetskog proseka i da je saradnja između IKT i drugih sektora na prilično niskom nivou. Ovaj rad bavi se ovom temom na nivou kompanije na osnovu upitnika u kome je učestvovalo 218 ispitanika iz kompanija koje posluju u Srbiji u različitim sektorima. Podaci pokazuju da je digitalna transformacija prepoznata kao važna u svim sektorima i od strane zaposlenih svih nivoa, kao i da se na nju gleda kao na priliku koja transformiše kompanije u velikoj meri. Većina kompanija su već implementirale bar 1 projekat u oblasti digitalne transformacije, a više od polovine razvija svoje digitalne proizvode i/ili usluge. Digitalnu transformaciju u Srbiji sprovode lideri, koji ne dolaze nužno iz tehničkih oblasti. Rezultati nam ukazuju i na to da kompanije u domaćem vlasništvu u većoj meri razvijaju digitalne aspekte svojih proizvoda interno, za razliku od kompanija u stranom vlasništvu. Dodatno, s obzirom na to da su dostupna znanja i veštine prepoznate kao kvalitet srpskog IKT sektora, a ujedno su i veoma važne za stvaranje digitalne ekonomije, ovaj rad procenjuje i razlike između dostupnih i potrebnih veština u srpskim kompanijama.

**Ključne reči:** *digitalna ekonomija, digitalna transformacija, inovacije, konkurentnost, Srbija.*

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## Introduction

Tumultuous development of digital technologies has not yet generated widespread economic growth and rise in productivity. The emerging digital economy, as a combination of mobile technologies, broadband, and cloud computing, includes a series of disruptive innovations whose full effect on business results is yet to be generated. It is essential that companies develop innovative potential in this process. Therefore, Daniel Newman and Olivier Blanchard emphasize that digital transformation, based on innovativeness and agility, enables acquisition of significant competitive advantages [18, p. 13]. And, in its essence, digital transformation implies the creation of a new business model using IT technologies [29, p. 94, p. 23, p. 131].

Like never before in history, data gathering is now unlimited and its cost is minimal. However, the real challenge is how to rapidly transform data into quality information and, further on, into knowledge. The digital economy caused a significant change, which is reflected in the substantially empowered position of consumers. Attention diverted to the demand side, as opposed to the hitherto tendencies dominated by the supply side.

This paper has two goals: (1) to confirm the importance and characteristics of the process of digital transformation as a significant path of companies in the digital economy and (2) to discover the necessary directions, challenges, and opportunities of companies operating on the domestic market during the implementation of digital transformation. The main conclusions in the paper are based on the survey of more than 200 company managers in Serbia.

## Theoretical fundamentals of the digital economy – a key phenomenon

In the present era, which can be defined as the second machine age [2, pp. 119-121], [3, pp. 4-7], organization of production in companies changed [2, p. 79]. Production is less dependent on physical equipment and much more on intangible assets which consist of the following four categories: intellectual property, organizational capital, user-generated content, and human capital. Precisely, this has been in the focus of the conducted survey into

the companies doing business in Serbia and forms a significant part of this paper.

Intellectual property includes patents and copyrights, while probably the largest category of intangible assets is organizational capital that covers new business processes, production techniques, organizational forms, and business models. A change in the functioning method of production models was triggered to a significant extent by the use of new technologies. Effective use of new technologies inevitably requires changes in the organization of work.

User-generated content is a smaller, but fast-growing category of intangible assets. This category is gaining in importance because the users of Facebook, YouTube, Twitter, Instagram, Pinterest and other types of online content use free content and also form it. Every day, tens of thousands of hours of new YouTube videos are created, and hundreds of millions of new images are uploaded to Facebook and Instagram. Companies can use these numerous channels, as well as create their own channels and put user-generated content at the service of creating value added and transforming their products and services — from exchange of experiences and advice about the use of products to promotion.

The fourth and largest category relating to the dependence of production of intangible assets is the value of human capital. With a change in the production model, the skills companies need are also changing. In other words, companies' demand for employees performing routine tasks shifts to the demand for creative employees whose creativity enables the creation of innovative and higher value-added products. This trend is also observed in Serbia given the fact that 30% of respondents have stated that their companies organize their own projects and programs, thus promoting creation of innovation. According to a research conducted by the World Economic Forum [31, pp. 28-33], current accelerated technological development creates new business models which affect the labor market. In Manpower Research [16, p. 2], it has been concluded that employers face challenges in searching for employees with the skills they need. This is mainly observed concerning jobs that require higher qualifications, for which the demand has significantly increased over the past few years. Hanushek et al. [7, p.

24] have established that the possession of cognitive skills contributes to the 18% increase in earnings. On the other hand, labor markets are also recording an increase in the demand for unskilled workers, but without a rise in their earnings. This can be explained by the shortage of skilled workers which is why companies try to attract and retain them by raising their earnings, which is possible thanks to their higher productivity.

According to Sofronijević et al. [25, pp. 273-279], digital transformation can be defined in three ways, depending on the breadth of observation. In the broadest possible context, digital transformation can be described as the change caused by digital technologies or influenced by them in all aspects of human life. In a narrower sense, digital transformation refers to business transformation and is defined as the use of technology to radically improve the performance and achievements of companies. In the narrowest sense, it refers to the use of digital technologies at the service of creating innovations, creativity and promoting significant changes in the professional sphere or the sphere of knowledge. For this paper and analysis, we will focus on digital transformation in a narrower sense or, in other words, on the digital business transformation from the perspective of a company.

Apart from changing the business model of the company, digital technologies exert influence on market transformation in general. In contemporary economy, the crucial role in shifting the emphasis from supply to demand is held by some new phenomena linked to the digital economy. These phenomena extend from the position of a buyer, through the cost structure and character of the product, to the newly emerging market structures, differing from the hitherto dominant ones. In further text, we will analyze only some of the most dominant ones.

### From a physical product to digital product and services

Today, the consumer rarely comes upon a supply of a pure physical product. The nature of purchasing has changed in such a way that, before any purchase, consumers are informed about the characteristics of the product and buyers' experiences thanks to the existence of online platforms. For example, IKEA has integrated its physical

catalog with a mobile application. The use of the catalog and mobile application together enables obtaining more details and interactive information about an item. This is the process of digital infusion that allows the transformation of traditional retailers with specialized in-store experience, like IKEA, into retailers with online experience.

According to the survey conducted in Serbia and information obtained from the questionnaire, 34% of companies integrate digital products into company products, nearly 50% of them integrate digital products into company's processes, and as much as 57% of all surveyed companies create new digital services. These data just show something that has also been confirmed by the World Economic Forum [32, p. 3]. Namely, the role of digital technologies has significantly changed – from an instrument for marginal efficiency improvement these technologies have become crucial for innovation development [32, p. 3].

The post-industrial economy is shifting its focus from selling the physical product to helping the buyer satisfy their needs. While physical products are tangible, digital product or service also includes experience gained by numerous touchpoints [27]. A good example is air flights. The customer's experience begins with buying a ticket, either over the phone or via website; it continues with the arrival at the airport, luggage check-in, boarding the plane, etc. The flight for which you have the ticket actually begins now. It is followed by some other services, such as landing, disembarking, luggage claim and so on. The flight itself, as the basic service paid for with the ticket, is only a small part of the service included in the overall trip. Such a digital product, in the form of air carrier's service, includes various interactions between the physical product or service (the flight in this case) and series of other services and radically changes the value offered to the customer by this product or service. What we have here is shifting one's business from classical products to service-based models – the process known as “from product to a service-based model”. To successfully implement this process in companies, it is necessary to have a long-term strategy which enables adding digital processes to company's products, thus expanding the possibilities for product usage and consumer satisfaction.

One of the crucial phenomena, directly linked to the strengthening of the role of demand, is the development of customer experience, which is derived from the interaction between firms and customers [24]. This interaction consists of three components: the customer journey, the touchpoints the customer interacts with, and the environment the customer experiences. Whether all customers' expectations will be met depends on the respect shown for the significance of customer experience and all points of contact. Therefore, a very strong emphasis is placed on customer experience management [28].

Newly created digital products differ from traditional physical products because their multiplication is much faster and cheaper. Digital products are bit-based, not atom-based, which is why it is possible to make perfect copies of digital products that are completely identical to originals, which is not the case with physical products. Such replicas are practically identical with the originals, can be made at no cost (or at minimum cost) and transmitted almost instantaneously anywhere on the globe. The newly created situation is characterized by "winner-take-all markets". Explaining this phenomenon, Erik Brynjolfsson and Andrew McAfee [2, pp. 154-157] point out that digital goods have much lower marginal costs than physical ones, which results in the emergence of "winner-take-all markets". Digital goods have huge economies of scale, thus enabling the market leader to enjoy a huge cost advantage, coupled with a competitive advantage [9, p.167]. Once fixed costs are covered, production costs of each marginal unit are very low. Very low marginal costs make mass production cheaper. A scaling phenomenon in the digital economy has emerged purely on this basis. A good example of this phenomenon includes disruptive innovations and Alibaba, Netflix, Airbnb and the like. Low marginal costs on the supply side create economies of scale, while widely used networks create "demand-side economies of scale". As was the case with low marginal costs, network effects also create "winner-take-all markets" [1, p. 21].

Bearing in mind the changes brought about by digital transformation and referring to a complete change of product and business model, the process of digital transformation has become imperative. To be competitive over the long term and use advantages of this process, companies must adjust to the changed business paradigm.

## Digital economy in Serbia

ICT in the Serbian market was estimated at EUR 1.73 billion in 2016 and has been the fastest growing sector in the last decade, accounting for 6% of the country's GDP. The Serbian ICT sector is strongly export-oriented with exports hitting a record EUR 900 million in 2017, and approximately 25% year-over-year growth rate, putting the industry in the highest ranking [14, p. 7]. ICT service export encompasses more than 40% of all service exports, which puts Serbia among the top European countries with only five EU countries ahead – Ireland (67%), Belgium (48%), Finland (46%), Sweden (45%) and Germany (41%). Additionally, Serbia's relative growth of the ICT service exports in relation to all service exports in the last ten years (26.7%) was only the second highest to Belgium (33.29%).

According to the World Economic Forum's 2017 Global Information Technology Report, Serbia reached a Networked Readiness Index value of 4.0 out of 7, the index measuring how well an economy is using information and communications technologies to boost competitiveness and well-being [14, p. 7]. Serbian index value is equal to the Western Balkans average and similar to that of Albania, Bulgaria, Greece, Romania, and Turkey. The biggest Serbian strengths identified in this report are available ICT skills and affordability. The most notable weakness is seen in the segment of business usage of ICT, which is essential for the digital economy.

While some authors claim that the development of ICT sector has created a push for the growth of other sectors as well [6, pp. 17-18], [11, p. 298], available data show that Serbian companies are not investing enough in ICT. Namely, Serbian companies invest only 0.7% of their profits in ICT, which is five times less than the global average (3.5%) [34, p. 41].

These low values are consistent with the conclusion from the most recent study analyzing the potentials of ICT in Serbia that the degree of collaboration among the growing ICT sector and other industries in the country is low [14, p. 9].

Based on the patent analysis [14, p. 13], ICT-related patent applications make approximately 15% of all domestic patent applications, which is a higher share than in Croatia (12%), but lower than in Hungary (21%), Bulgaria (32%)

and Romania (33%). By the count of ICT PCT patent applications per million population, Serbia performs far better than other Western Balkan countries. With Serbia having this indicator at 1.94 in 2016, the closest performance in the Western Balkan region came from Montenegro with 0.80 patent applications per million inhabitants [World Bank data 14, p. 13]. Serbia went up by 52 in rank regarding the ICT PCT patent applications per million inhabitants from 2012 to 2016. Its latest rank is 44 out of 103 countries for 2016.

Innovation potential, ICT capacities and collaboration between ICT and other business sectors are important elements in digital economies. In this paper, special focus is placed on digital transformation of companies, which should provide us with more details behind these macroeconomic numbers.

## Description of the questionnaire

The questionnaire contains 26 questions, which are mostly closed-ended with predefined answers or rating scales by which respondents rated the challenges and needs of their companies. The questions were designed according to the relevant surveys conducted in the world. The questionnaire was distributed via the Typeform online platform to 218 respondents, namely, employees in companies of varying size and operating in different sectors, which remained anonymous for this survey.

The survey covered companies of varying size. Considered by the number of employees, survey participants consisted of about 2% of micro and 18% of small enterprises, about 24% of medium-sized enterprises and about 56% of large firms. The dominance of large companies in the sample is intentional, and the reason lies in the very topic of this survey – digital transformation is the process referring mostly to mature companies which need to transform and adapt to the digital economy. The majority of the surveyed firms operate in the IT sector (25%), production (13%), banking (12%) and professional consulting services (11%). The highest share of the IT sector is also intentional to potentially observe any differences between companies that already operate in the field of new technologies and companies operating in other sectors.

Respondents were individuals holding managerial positions in their companies. The majority of respondents, as much as 30%, held managerial positions, while the positions of the chief executive officer (CEO) and department manager were represented with the share of 14% each.

The companies that participated in the survey differ regarding the dominant market, their form of ownership and level of representative office in Serbia. The companies have mostly been observed, and the relevant conclusions have been derived, according to these criteria. In fact, the majority of these companies include representative offices in Serbia of the companies operating on more than 30 different markets (24%), while domestic companies operating on the regional and world markets account for 33% of the total number of companies, that is, 18% and 15% of surveyed companies respectively. The lowest percentage of respondents accounts for the employed in domestic companies operating on the domestic market (about 8%) and regional representative offices of the companies doing business on less than 30 markets (4%).

In the following sections, we will focus on the most important conclusions reached in the process of digital transformation in the companies doing business in Serbia.

## The importance of digital transformation

Digital transformation is the process which is viewed as an opportunity by most companies in Serbia and which most of them have consciously already started to implement. However, preparation for the process of digital transformation, which offers a wide spectrum of potentials, is not a simple task for a company and implies the need to incorporate digital transformation goals into its development strategy.

Companies have recognized the importance of digital transformation, regardless of their form of ownership or size. Also, in almost all of them digital technologies change the industry in which they operate very intensively. Nevertheless, even though digital transformation is a very important business segment, which significantly changes the industry in which companies operate, they have mostly associated the responsibility for digital transformation to an already existing team. Only 5% of all companies have

formed teams dealing exclusively with digital transformation and bearing responsibility for this process.

The results show that companies in Serbia participate in digital transformation and that this is not an isolated case or characteristic of only some of them. Digital transformation is the process that involves both companies operating predominantly in the IT sector and those operating in more traditional economic sectors. Almost 50% of all surveyed companies hold that they are innovative in comparison with their competitors. At the same time, 70% of them implement one or more digital transformation projects. A significant number of respondents hold that their companies are successful relative to the ideally transformed organization, bearing in mind that one-third of them have assigned a rating of 7/10 to their organization against the ideal one (Figure 1).

Despite considering digital transformation important, only 20% of all companies have a clearly defined vision of digital transformation, which is below the global trends according to which 50% of companies have created a digital vision of their future [8, p. 4]. The situation is similar when it comes to the defined business decision strategy. Namely, about 20% of surveyed companies have defined their digital transformation strategy; this percentage is lower than the global indicator (37%). Respondents consider adjustments to the company rules to be a major challenge in the process of digital transformation of their companies, which can be attributed to the company's lack

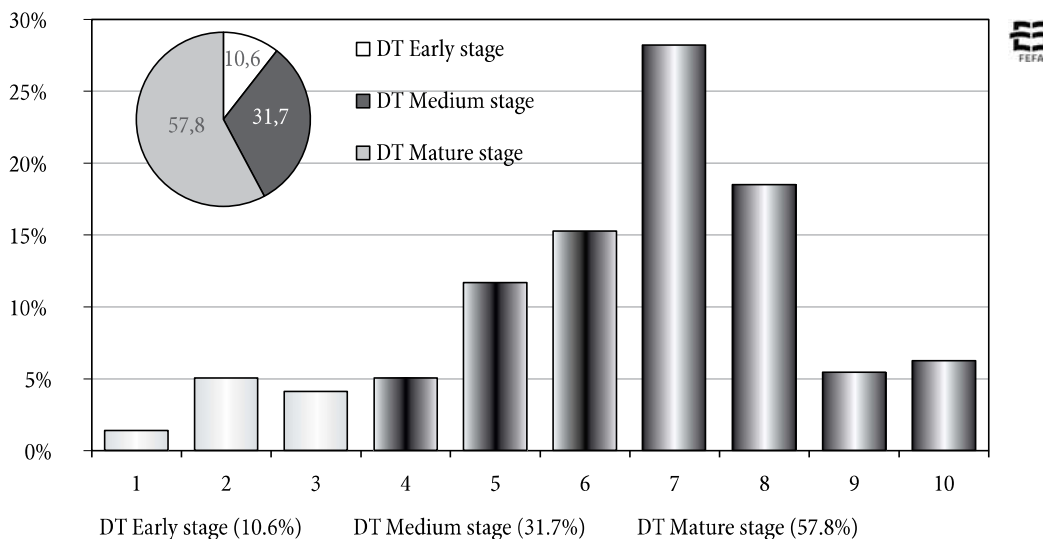
of vision and strategy. Also, the management's lack of understanding for the process of digital transformation, entrepreneurial spirit and financial resources are also considered as major challenges.

Digital transformation is the process that is viewed as the opportunity that should not be missed by more than a half of companies, while again over a half of them are satisfied with the way in which the digital transformation process is internally managed. Over 50% of surveyed companies seek to successfully use digital transformation as an opportunity, which is why invest in the education and training of their employees and management and work on the creation of new digital services and the development of their innovative products. Efficient management of the process of digital transformation in a company is just the result of investing in the competencies of employees at all hierarchical levels, which enables 50% of companies to integrate digital products into their business processes and products.

### Differences in approaches to digital transformation in relation to the form of ownership

Considering the form of ownership, domestic companies and representative offices of companies are equally satisfied with the way in which their companies manage the process of digital transformation. Those companies predominantly implement one or more digital transformation projects, while a considerably lower percentage of them have not

Figure 1: Rates are given to the company compared to an organization that has been ideally transformed (1-10)



Source: Survey results.

yet implemented any digital transformation project (8% of companies in each surveyed group).

Regardless of the form of ownership, the surveyed companies hold that digital transformation changes their industry very intensively. At the same time, they mostly believe that they are more innovative than their competitors on the market.

As regards the views on intensity with which digital transformation changes the industries in which companies operate, it is important to note that companies efficiently manage the process of digital transformation and implement digital technologies in all parts of the value chain (Figure 2).

Although both groups of companies develop their innovative products and create digital services, there are differences between the two surveyed groups concerning the dominant way in which companies create digital aspects of their products. In other words, domestic companies doing business on the domestic market and those operating on the international market create about 85% of digital aspects of their products in the company, while domestic companies working on the regional market create nearly 70%. On the other hand, only regional representative offices of the companies operating on less than 30 markets mostly create their digital products internally, while in other representative offices this activity is predominantly performed by the head office or representative offices in other countries.

The creation of digital aspects of products in companies in Serbia is important because it creates a

knowledge base that will contribute to the productive use of resources, that is, to competitiveness over the long term. Product development in the company and the inclusion of a broader spectrum of organizational units and people in this process enhance the development of innovations to a greater extent than in an isolated business unit or entity [5, p. 4].

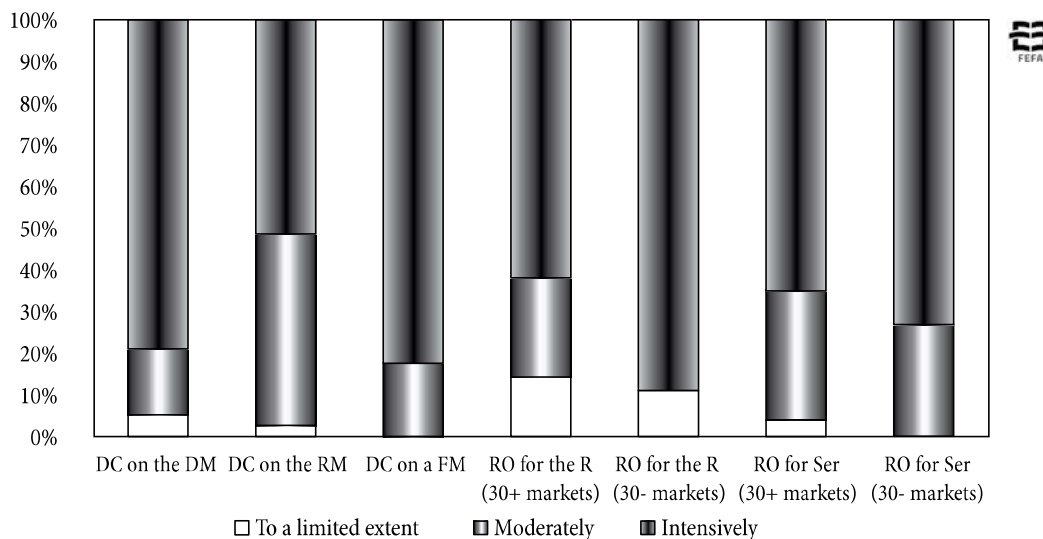
The creation of higher value-added products in the company provides the basis for its competitiveness because its employees and management face challenges which, after being successfully surpassed, turn into the creation of innovative products and services.

As previously determined, company's strategy and development trends must be clearly defined, so that it can retain a competitive position on the market after catching up with digital transformation. Although only 19% of all domestic companies and 22% of all representative offices have defined their digital transformation strategies, a large part of this process is still the segment of the company's existing strategy.

### The significance of strategy and related activities

The 2015 Digital Business Global Executive Study identifies strategy as the key driver in the digital arena. In other words, the possibility of digital technologies to transform business depends in large measure upon the clearly defined strategy which is implemented by the leaders capable of

**Figure 2: The extent to which digital technologies are changing the industry of the company**



Source: Survey results.

changing the existing organizational culture and creating a new one [13, p. 1].

According to the new Global Competitiveness Report 2018 [33], Serbia ranks 87th regarding the strategy and operational efficiency of its companies. According to this ranking, Serbia is not competitive or, in other words, it does not use its available resources in a sufficiently productive way.

However, low percentage of clearly defined strategies does not a priori rule out the fact that companies can be successful in catching up with the digital era. Although the percentage of companies having a defined digital transformation strategy is low, there is a high percentage of companies in which digital transformation is an important segment of their current strategies. Such a synergy can enable a productive use of the potentials and opportunities offered by digital transformation, needed to attract, develop and retain talent in the company.

In its study, Deloitte defines organizations with digital culture as organizations which are not risk-averse and which experiment, invest in talent and develop managerial skills. The results of the survey show that companies in Serbia do precisely that and that such companies represent the environment in which highly qualified individuals wish to develop their career [12, p. 5].

Regardless of their age, the majority of employees wish to work in organizations catching up with digital technologies [13, p. 1]. A similar result has also been confirmed on the Serbian market. Around 70% of respondents who consider digital transformation to be an opportunity are of the opinion that it has a positive impact on employer branding of the company.

Digital transformation has become an imperative process in which companies use new technologies for their products and processes. In a dynamically changing environment in which companies operating in different economic sectors are trying to catch up with this process, a sustainable competitive advantage depends on the ability of a company to innovate. Only 6% of all companies view digital transformation as a risk. Risk appetite unlocks the possibility of companies to innovate – a half of them create digital products, while over 57% of them create new digital company services.

## The significance of a leader

Survey results show that in the past years digital technologies were mostly used to make some business segments more efficient, including the use of technologies for monitoring operational efficiency, sales trends, etc. Today, digital technologies penetrate all business aspects and form an integral part of company products and services.

Considering high intensity with which digital technologies transform the surveyed companies, it is important to have leaders with a vision for digital transformation. The results of our survey show that it is not necessary for leaders to have a technical background.

In nearly 40% of companies, the responsibility for digital transformation rests with the chief executive officer (CEO); on the other hand, the CTO is responsible for this process only in 9% of surveyed companies. In the companies where the CEO is responsible for digital transformation, respondents mostly view this process as an opportunity and these organizations also have a defined digital transformation vision and strategy. Respondents also believe that digital transformation changes their organizations very intensively. However, a large number of them hold that one of the major weaknesses of companies is lack of agility, that is, slow decision-making processes. The correlation between the CEO running the process of digital transformation and higher perceived significance of the process does not answer the question about cause and effect. Namely, if the highest-ranking individual in a company is also responsible for the process, this signals its significance to all company levels. On the other hand, the reason for the CEO taking direct control of the process can be the fact that this process is perceived as important for a given company, industry, market and business environment (Figure 3).

## Skills and competencies

As we have previously stated, based on the Networked Readiness Index, Serbia has the highest rating for available skills [14, p. 7], which is why they take up a significant part of the conducted survey. As regards the leaders responsible for the process of digital transformation, the majority of



respondents gave their companies a rating of 3-5 in the context of skills necessary for digital transformation. Although there is evident need for additional skills in companies, only one-fourth of them organize training programs for employee skills improvement, while about 15% of all surveyed companies have embarked on the process of recruiting individuals with the skills required in this field.

Digital transformation is often wrongly perceived as the challenge which refers only to technological development and requires new people who possess knowledge in the field of information technologies and data analysis to overcome it [20, p. 31]. It requires not only the implementation of the latest business-related technological achievements, but also digital thinking and a completely new approach to problem-solving, business decision-making and risk management.

Digital transformation is a complex and demanding process in which the digital component must exist in all spheres of business that include, among other things, one very important segment – employee development.

As for the skills and competencies of companies vis-à-vis the ideal organization that underwent digital transformation, this research analyzes how respondents view their organizations in terms of knowledge, skills and competencies which are linked to artificial intelligence, blockchain technologies, cloud computing, big data analytics, integration of digital products and services, business process management skills, competencies of the top management

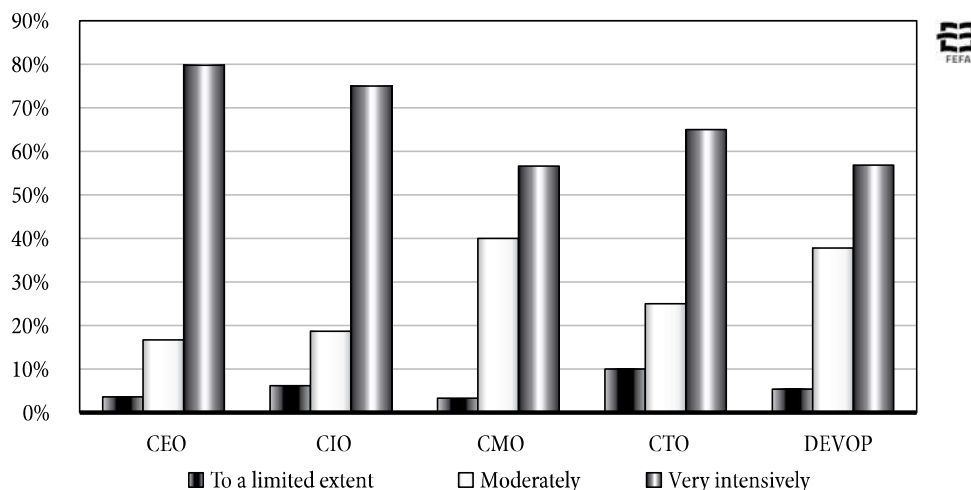
for the process of digital transformation, including the related competencies of employees at the company level.

When we analyze respondents' views on their competencies in the fields of blockchain technologies and artificial intelligence vis-à-vis the ideal organization that successfully implemented the process of digital transformation, we can state that all respondents, regardless of the form of ownership of the company or the sector to which it belongs, think that their skills are not at the satisfactory level; they gave blockchain technologies and artificial intelligence a rating of 2.2 on a 5-point scale, although they assigned different weight to these technologies for the process of digital transformation – 3.2/5 and 3.7/5 respectively.

On the other hand, business process management skills have been highly rated by all respondents. This leads us to a conclusion that all companies consider their management efficient, which is certainly due to investments in training and education of the management. As for the possession of skills for the integration of digital products and services, the situation is identical, which is in a positive correlation with the abovementioned successful integration of digital technologies into business processes and products.

Respondents also believe that the top management in their companies possesses the knowledge required for a successful process of digital transformation. It is interesting to note that over 80% of the total number of companies do not hire consultants in the process of

**Figure 3: The extent to which digital technologies are transforming the company of the respondent based on the person responsible for digital transformation in the company**



Source: Survey results.

digital transformation, which is especially true of domestic companies. This is in a positive correlation with the view that the existing management possesses the skills needed for the transformation of their organization.

All of this also leads to the conclusion that the process of digital transformation in companies relies on internal sources. This is especially evident in the case of domestic companies, which is also confirmed by the fact that about 20% of domestic companies have set up digital transformation teams. Also, domestic companies do not lag behind foreign ones concerning their training programs for employee skills improvement in the field of digital transformation (25%). As for the satisfaction of domestic companies with the number of employees who possess the skills needed for digital transformation, 30% of all companies gave it a rating of 3 on a 5-point scale. In this connection, it is evident that there is enough room for improvement and that domestic companies, being aware of the challenges and opportunities offered by digital transformation, hold that they have not yet sufficiently developed internal skills for these processes.

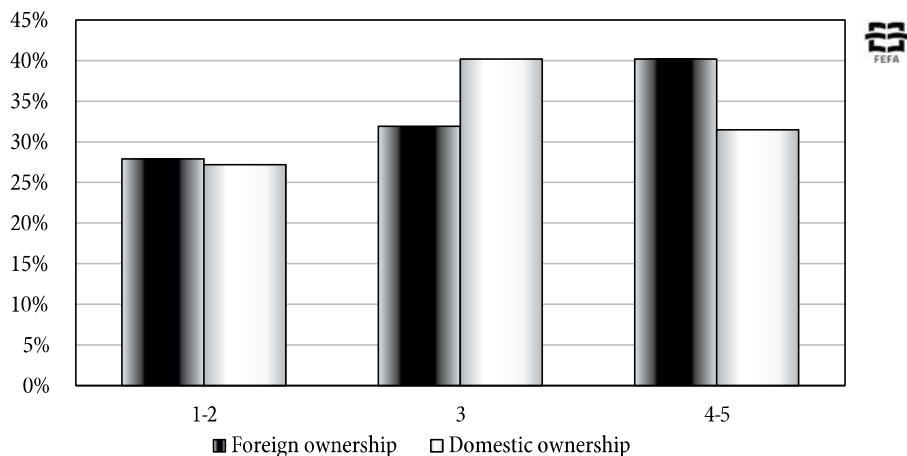
Foreign companies gave a similar average rating, but in the context of domestic companies this is more important because we have already seen that they rely much more on their capabilities in the process of digital transformation, while foreign-owned companies mostly rely on outsourcing, their head office or company or some other representative offices of these companies outside Serbia. The survey data clearly show that in the process of digital transformation

domestic companies rely mostly on their employees, implement projects within this process by themselves and directly face all risks associated with these projects.

On the other hand, foreign companies have a more pronounced view on the fact that they possess the skills needed for the process of digital transformation as opposed to domestic companies. The reason must not necessarily lie in the fact that they have higher-quality personnel; rather, it lies in the fact that, in most cases, digital transformation projects are not elaborated in companies in Serbia which is why the skill levels are lower. Therefore, skills development in the context of digital transformation on the domestic market is not so important for foreign companies, which is also confirmed by the fact that they more often hire external consultants having expertise in this field (Figure 4).

A different approach to skills development in the company is also observed in the way in which companies having a different form of ownership work on skills improvement. In percentage terms, a large number of foreign companies do not perform any of the mentioned activities to improve employee skills. The jobs of the future will require people to think, communicate, organize and perform non-routine tasks. Employees will have to adjust to new ideas, methods, and techniques, and be open to continuous learning and adoption of new knowledge. Employers will request these skills at all levels and for all types of tasks, but to a varying degree. For this reason, the existence of activities influencing employee skills improvement is of crucial importance [31, pp. 28-32] (Figure 5).

**Figure 4: Ratings of companies concerning the possession of sufficient number of employees with the skills needed for the process of digital transformation according to ownership**



Source: Survey data.

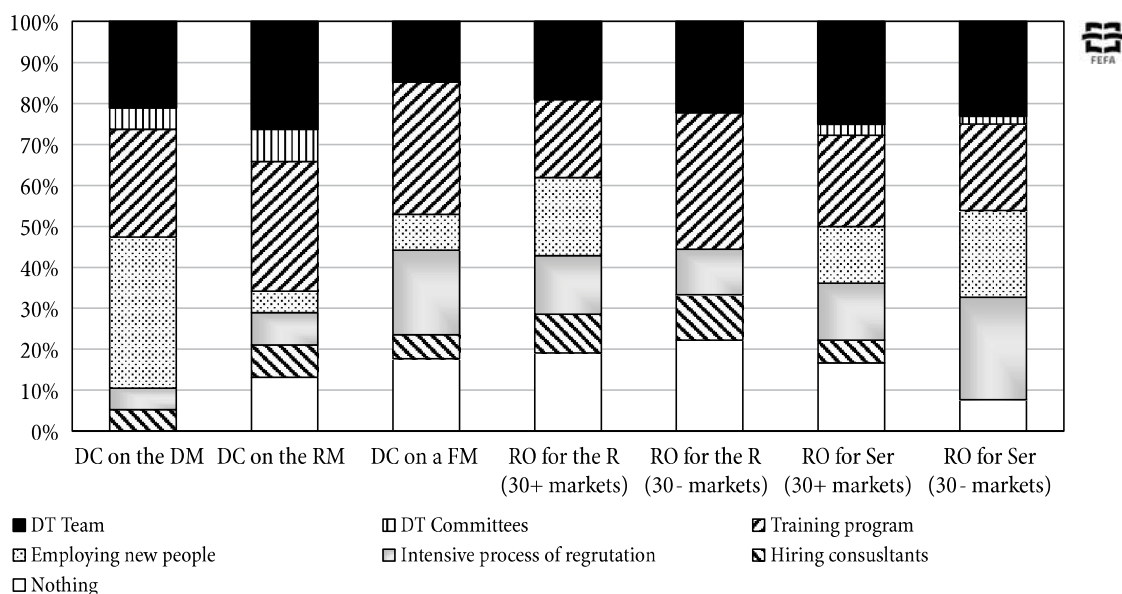
In comparison with foreign ones, a larger number of domestic companies face skills shortages in the field of big data analytics in percentage terms. Intelligent and efficient analysis of these data is of crucial significance for managing the process of digital transformation in the situation when managers and leaders in a company cannot rely on their intuition and experience anymore [17, p. 63]. Therefore, the development of skills in this field is especially important for domestic companies. The situation concerning the development of cloud computing skills is the same. It is necessary to work on the development of these skills because they are considered to be the basic competencies needed for a successful implementation of the process of digital transformation. In the survey conducted by Deloitte, it has been emphasized that over 30% of respondents think that the technology in the field of big data analytics is the most important resource in their companies and that over the next five years an increasing focus will be placed on the development of the technology and skills linked to the Internet of things [12].

As for the companies covered by this survey, almost all of them face shortages of skills and competencies in this field. This especially refers to domestically-owned companies operating in foreign markets – 46% of them have pointed out that they face significant skills shortages in this field. This can also be explained by the fact that these skills are simply more necessary because they operate on

a much larger market. About 20% of domestic companies operating on the domestic market, 25% of companies operating on the regional market and 32% of companies having regional representative offices and operating on more than 30 markets face shortages of skills and competencies related to computer programming processes. As for foreign companies, the shortages of these skills are not significant in percentage terms, which can partly be explained by the fact that they develop few projects internally. However, a shortage of programmers is felt not only in Serbia. For example, the European Commission forecasts that until 2020 Europe will have a shortage of 500,000 individuals having this expertise [15, p. 4]. The problem with the shortages of skills and competencies in the field of artificial intelligence is very pronounced and exists in companies regardless of their size or form of ownership. This problem will also be pronounced in the times to come since artificial intelligence will increasingly gain importance. It is also interesting to note that all surveyed companies hold that they have enough skills and competencies in the fields of digital marketing and digital security for the process of digital transformation.

Although this survey has primarily dealt with the significance of different technological skills and knowledge needed for the process of digital transformation, parallel development of the so-called soft skills is equally important. From a global perspective, 18% of managers

Figure 5: The way in which companies with different ownership patterns work on skills improvement



Source: Survey results.

think that technological skills are crucial for overcoming digital disruption and that forward thinking, creative thinking, the vision of transformation and change-oriented digital attitude, coupled with the standard possession of leadership and organizational skills, are equally important for achieving success in the digital age [12, p. 7]. Also, in their paper on the employee skills needed for the process of digital disruption, Jose Sousa and Rocha [10, p. 258] have also concluded that in order to overcome this process successfully, it is very important to possess three categories of skills: innovation skills, leadership skills, and management skills. In Serbia, respondents' answers comply with those abovementioned, given the fact that they gave business change management skills the rating of 4.5, while the significance of entrepreneurial skills in the company has been rated 3.9. At the same time, we can see that companies also need to improve these skills: respondents gave the business change management skills in their companies a rating of 3.75, while their entrepreneurial skills have been rated even lower – 3.4.

## Conclusion

The conclusions of this paper are mostly based on the results of the survey conducted among 218 respondents from companies operating in various economic sectors in Serbia, with a third of them being C-level managers. Even though Serbian companies are investing in ICT far below the global average, the survey shows that the significance of digital transformation is recognized across all industries and employee levels.

Above all else, it is important to note that digital transformation is an ongoing process in which companies operating in different economic sectors participate. For this process to be successful over the long term it is necessary to have a clearly defined strategy implemented by visionary leaders who are ready to have a corresponding organizational culture.

On the Serbian market, digital transformation is mostly viewed as an opportunity that transforms companies to a large extent and is implemented by leaders who do not necessarily have a technical background and who have a vision of how the organization should look like. Most

of the companies do not have a digital strategy, but have incorporated the element of digital transformation in their main strategy. In most cases, the process of digital transformation is the responsibility of the company CEO, but still, most companies do not have a designated team responsible only for this process. Nevertheless, half of the companies are creating their digital products and/or services.

The survey also shows that domestically-owned companies develop digital aspects of their products in the company in Serbia, in contrast to foreign-owned ones which usually do that outside, in the headquarters, other offices of the company abroad or through subcontracting. This internal product development is important for achieving long-term productivity, that is, competitiveness. This way the company can develop the skills and knowledge needed for this process and build the knowledge-based part of the economy. This is further visible in the perception of skills needed for the company to further advance in the process of digital transformation, with domestically-owned companies requiring higher skill sets in various segments.

Having this in mind, we can confirm that the skills available among the working population are crucial not only for further development of the ICT sector, but also for building a strong digital economy. Based on this research, we see that non-tech companies require skilled employees to continue to develop in-house digital projects, which will help them in building and keeping a competitive position. This is an additional argument for the state to support the development of digital and entrepreneurial skills in the country at various levels, because it will help strengthen domestic companies across various sectors.

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