

Sanja Popović-Pantić

University of Belgrade
Institute Mihajlo Pupin
Science and Technology Policy Research
Center

Dušica Semenčenko

University of Belgrade
Institute Mihajlo Pupin
Science and Technology Policy Research
Center

Nikola Vasilčić

University of Belgrade
Institute Mihajlo Pupin
Science and Technology Policy Research
Center

THE INFLUENCE OF DIGITAL TRANSFORMATION ON BUSINESS PERFORMANCE: EVIDENCE OF THE WOMEN-OWNED COMPANIES*

Uticaj digitalne transformacije na poslovne performanse
- Iskustvo iz firmi u ženskom vlasništvu

Abstract

Taking into account that female-owned companies are an emerging economic force, this paper is discussing the phenomena of digital transformation from the gender perspective. In the first part, we present the definition of digital transformation and overview of literature that was used. In addition to this, the stages of the digital transformation process are highlighted, as well as potential biases which companies could face, but also the benefits arising from the process of digital transformation and the tools used to identify the existing digital gap in companies. Furthermore, certain key characteristics of women-led businesses that we consider, at the same time, to be factors that enable faster digitization are presented. The third part is a discussion of the results obtained by statistical analysis. The paper uses a simple OLS regression analysis to test the impact of digital transformation on women-owned companies' performance, as well as a T-test of independent samples to identify potential differences in business indicators, depending on the number of years a company has been undergoing digital transformation. Research indicates that there is a positive impact of digital transformation on the performance of women-owned businesses. Also, it was confirmed that there is a significant difference in the level of product and service quality, product and service development capacity, productivity, and overall performance levels between enterprises undergoing digital transformation for less than two years and those who have been in the process for more than two years in favor of the latter. Finally, we summarize the findings of the research, concluding that digital transformation is a chance to

improve the business performance of a group of businesses that are considered to have limited access to markets and sources of funding, such as women-owned businesses.

Keywords: *digitization, digitalization, digital transformation, women-owned companies, female entrepreneurship, business performance.*

Sažetak

Uzimajući u obzir da kompanije u vlasništvu žena predstavljaju ekonomsku silu u razvoju, u ovom radu biće razmatran fenomen digitalne transformacije iz rodne perspektive. U prvom delu rada predstavljena je definicija digitalne transformacije i pregled dosadašnjih istraživanja na ovu temu. Takođe, istaknute su faze procesa digitalne transformacije, potencijalne koristi i prepreke u ovom procesu, kao i alat za identifikovanje digitalnog gepa u kompaniji. U drugom delu predstavljene su neke ključne karakteristike ženskih kompanija za koje smatramo da su istovremeno i faktori koji omogućavaju efikasniju digitalnu transformaciju. Treći deo tiče se rezultata empirijskog istraživanja, dobijenih primenom odgovarajuće kvantitativne metodologije. U radu je korišćena prosta regresiona analiza za ispitivanje uticaja digitalne transformacije na performanse firmi u ženskom vlasništvu, kao i T-test nezavisnih uzoraka za identifikovanje potencijalnih razlika u indikatorima performansi u zavisnosti od broja godina koje je kompanija provela u procesu digitalne transformacije. Rezultati pokazuju da postoji pozitivan uticaj digitalne transformacije na performanse firmi u ženskom vlasništvu. Takođe, potvrđeno je da postoje signifikantne razlike u nivou kvaliteta proizvoda i usluga, kapaciteta za razvoj proizvoda i usluga,

* Research presented in this paper was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, under the project "Research and Development of the Platform for Science-Based Management of the Scientific and Technological Development of the Republic of Serbia", reg. no. III 47005.

produktivnosti i ukupnih performansi između firmi koje su u procesu digitalne transformacije manje od dve godine i firmi koje su duže od dve godine u ovom procesu, u korist firmi iz druge grupe. Na kraju, sumiramo nalaze istraživanja, zaključujući da je digitalna transformacija šansa za poboljšanje poslovnih performansi grupe preduzeća za koja se smatra da imaju ograničen pristup tržištima i izvorima finansiranja, kao što su preduzeća u vlasništvu žena.

Ključne reči: *digitizacija, digitalizacija, digitalna transformacija, kompanije u ženskom vlasništvu, žensko preduzetništvo, poslovne performanse.*

Introduction

The accelerated development of digital technologies, as one of the main features of the 21st century, has made the business environment much more turbulent and unpredictable, where not only prosperity but also the continuation of the enterprise is rather uncertain. Any business in such conditions needs to be flexible and adaptable to keep up with everyday changes in order to survive, and also to use the changes caused by the rapid development of technology as a chance for progress. All of this, combined with problems of the contemporary business environment such as lack of resources, tougher competition and increasing customer awareness, calls for a rethinking of the current business philosophy and ways of communicating and cooperating with key stakeholders. The rapid development and penetration of digital technologies in all segments of society has led many businesses to think and actively explore the methods by which digital technologies can be exploited productively to raise the quality of all aspects of business. The concept of digital transformation is emerging not as one of the possible solutions, but as a prerequisite for companies striving for business excellence and expansion.

Digital technology is central for designing a new and more competitive business model. However, digital technology alone is not enough to help an enterprise improve its market position and business performance. It requires constant, adequately guided and directed integral use of modern digital technologies in the activities of changing products, processes, organizational structure, organizational culture, in the business model as a whole, focusing on the optimal satisfaction of the consumer needs.

These characteristics form the basic idea of the concept of digital transformation. In the last two decades, the concept of digital transformation has received considerable attention in the academia, but only in recent years the implementation of this concept has become effective in commercial practice. Digital transformation is a global phenomenon that economic policymakers, businessmen, the intellectual elite speak about every day. It is a term that is increasingly being prioritized due to the fact that it is a global trend, but also because of the real advantages and opportunities that this concept brings to the entire society. A review of the literature addressing the topic of digital transformation has revealed that there is no generally accepted, uniform and comprehensive definition of the term digital transformation. In addition, it is often heard in public appearances and read in the press or in scientific publications that the terms digitalization and digitization are used as synonyms for digital transformation. Fitzgerald, Kruschwitz, Bonnet and Welch [13] define digital transformation as the use of modern digital technologies (mobile devices, analytics devices, social media, etc.) in the process of improving the experience of users of products and services, simplifying operational business activities and transforming the traditional business model. Martin [31] believes that digital transformation signifies the use of information and communication technologies, which is not a function of trivial automation, but contributes to enhancing the existing ones, and also to creating new capabilities in business and people's lives. According to Collin et al. [7] and Kane, Palmer, Phillips, Kiron and Buckley [25], digital transformation and digitalization are terms used interchangeably to describe a concept that influences policy, business and other important social issues. In the paper of Schwer, Hitz, Wyss, Wirz and Minonne [40], the literature review begins with the sentence: "Digitalization, also called digital transformation,..." Foerster-Metz, Marquardt, Golowko, Kompalla and Hell [14] and Hausberg, Liere-Netheler, Packmohr, Pakura and Vogelsang [20] use digitalization and digitization as synonyms for digital transformation. Some authors make a distinction between digitization, digitalization, and digital transformation. Digitalization, as an application of digital technologies, precedes digital transformation, which

is an endless process [12]. Kwon and Park [28] consider that digital transformation also involves digitalization, but that there is a certain difference between the two concepts. Digital transformation means the conversion of analogue information to digital or process automation using ICT, which will initiate changes in the business model, organizational structure, products, processes and other aspects of business. Osmundsen, Iden and Bendik [35] point out that digital transformation is a consequence of continuous digitalization and digital innovation over time, which will lead to transformation of the company or the entire industry. For Matt, Hess and Benlian [32], digitalization manifests itself in the form of integration of digital technologies, thus making things digital, while digital transformation also implies changes in products, processes, organizational structure and management concepts. Savić [37] points out that there are differences between digitization, digitalization and digital transformation in terms of focus, goals, activities, tools and challenges. Digitization refers to the creation of a digital representation of an object that has a material form [37], that is, the conversion of analogue into digital information [9]. For example, scanning the invoice and saving it as a digital document. Digitization by itself is of no value, but it provides the basis for those activities that require the use of digital data, which ultimately has the effect of creating a new value. Digitalization is a broader category, which includes digitization. Transforming and improving a business using digital technologies and digital data is called digitalization. Unlike digitization, digitalization involves the automation of business processes and operations, as well as the processing of information [37]. Receiving and processing digital invoices in appropriate software is an example of digitization. However, Savić [37] emphasizes that digitalization does not result in digital transformation. Digital transformation means that things are done differently, creating a whole new business model based on modern digital technologies. Specifically, digital transformation signifies the use of existing knowledge in order to make radical changes in the organization, so that all activities and decisions that are made are customer-focused. Simply put, digital transformation means that in the company “Everything is electronic, from registration

to content delivery” [37] in order to increase the level of customer satisfaction. According to Bockschecker, Hackstein and Baumol [4], the term digitization is linked to changes in the technical system, while digitalization encompasses changes in both the social and technical system of the organization [4], [29], from which it can be concluded that digitization is an integral part of digitalization. Digital transformation is a more comprehensive category than the previous two, and it is interpreted as a process that enables organizations to fully embrace social and technical change. In fact, digital transformation is a complex and ongoing process of profound change across all segments of the organization, which should contribute to enhancing the capacity to absorb new technologies almost immediately, thereby significantly enhancing the technical and social elements of the business. Apparently, digitization, digitalization, and digital transformation are three completely different concepts in their complexity, content, activities and goals, and that is why the authors of future research in this field should be cautious when using these terms, which has not been the case so far.

Although it results in radical changes, it should be emphasized that the digital transformation process is of an evolutionary character, starting from equipping workplaces and all parts of the organization with digital technologies, through the digitalization of the back-end and front-end processes, to creating a new business model, which enables integration into the digital ecosystem, an extensive network of participants trying to deliver the best quality through collaboration. However, this does not mean that the digital transformation ends the moment when the current way of doing business has been radically changed. Digital transformation is a continuous process of change within the company and in relationships with stakeholders, which will last as long as new technologies emerge, since it requires the company to constantly monitor the emergence of new digital technologies and incorporate them into its operations, putting them in the function of day-to-day operations. That is why it is important for the concept of digital transformation to become the kind of model that businesses will follow, because only this way can they survive in a strong competitive game and improve their performance.

So far, research looking into the field of digital transformation has been largely descriptive. The authors have been concerned with identifying differences between the concepts of digitization, digitalization and digital transformation [37], [4], defining and analyzing a digital transformation strategy [25], [32] and the role of chief digital officer in this process [45], [22], assessing digital maturity, and thus the willingness to continue the digital transformation process [48], [47], the digital transformation of the business model [39], [27], and assumptions about the potential effects of digital transformation on business operations [13], [24], [34]. In Serbia, Pitić, Savić and Verbić [36] address the country-wide digital transformation strategy. There is a lack of empirical research in this area which would enable reliable verification of theoretical assumptions that were developed so far, which is a significant gap that will be covered to some extent by this research. However, the influence of digital transformation on the business performance of the companies managed and owned by women has been even less discussed in the literature and practice. The authors have decided to analyze digital transformation from a gender perspective because this particular group of enterprises seems to have an increasing contribution to GDP. The European Commission [10] recognizes that “policies to promote gender equality will be needed to increase labor force participation thus adding to growth and social cohesion”.

However, the findings of the European studies warn continuously that the share of women in STEM is underrepresented. Furthermore, “figures indicate that women’s participation in the ICT and digital sector does not improve significantly comparing to 2011 survey. If the existing biases are not addressed, rapid economic advances achieved by digital transformation will not take into account the existing gender gap in the sector” [23]. However, digital transformation is a considerable opportunity to boost female entrepreneurs and therefore, the focus of the paper is to analyze the current position of female entrepreneurship in Serbia regarding digital transformation. Our interest for this target group and its behavior in the process of digital transformation comes from the fact that certain research into female entrepreneurship in Serbia indicates that women-owned companies with

increasing profit place a significantly higher importance to catching up with new technologies [41]. Also, it seems that, unlike the female students in the EU, the share of Serbian female students who graduated in STEM is quite higher, amounting almost to half of the total graduates – 45% [42]. Having in mind such encouraging data, this paper explores the influence of digital transformation on the performance of Serbian women-owned companies in order to learn if there is significant influence of the current level of digital transformation on the women-owned companies’ performance.

According to the abovementioned aspects of digital transformation, and considering the context of this research, we will define digital transformation as follows: Digital transformation is a complex, dynamic, continuous and in the digital era necessary process of reforming all organizational aspects, supported by a strategically designed integral application of modern digital technologies, which should result in the creation of a new business model and putting the customer at the center of all actions and decisions that the company makes, all with the aim of creating conditions for enhancing innovation, better positioning in the market, and thus improving overall business results.

Characteristics and potential implications of the digital transformation process

Digital transformation is manifested in the form of continuous improvement of the existing and rapid absorption of new technologies, which will be put into function to affect all activities in the company. The constant emergence of new and powerful digital technologies enables the continuity of the digital transformation process. Therefore, when asked what is the main driver of digital transformation, many of us would probably mention technology as the core engine of this process. However, we would be wrong. Digital technologies (social, mobile, analytics, cloud) are important, but their strength and power is not in their individual use, but in whether the company has the knowledge to transform itself and its business through the integrated application of digital technologies. A well-thought-out digital transformation strategy is

something that initiates and is the basis for success in a company's digital transformation process. The strength of the digital transformation strategy lies in its goals and aspects that will be the focus of the process. From a business perspective, the digital transformation strategy aims to transform products, processes and organizational aspects by using digital technologies. In connection with this, it is necessary to emphasize that this strategy is trans-functional (cross-functional), because it affects all activities and functions in the enterprise. This fact requires the conception of a new, meta strategy, called digital business strategy, which would incorporate under its roof the digital transformation strategy, functional and operational strategies of the company. The importance of the digital strategy is also reflected in the results of a study conducted in collaboration with the MIT Sloan Management Review and Deloitte Company. Specifically, this study shows that 15% of the respondents from the early-stage digital companies believe that their company has a clear, coherent and comprehensive digital strategy, while this percentage exceeds 80% among companies positioned in the higher stages of digital maturity [25].

The success of the management and employees in designing a high-quality digital business strategy, as well as its implementation, greatly influences the current level of digital maturity of the company. Digital maturity reflects the level or stage of the digital transformation the company is currently in, as well as the existing digital gaps that will pave the way for the company to continue this process. Digitally mature are those companies where the business process automation is at the highest level, so there is no repetition of work, operating costs are minimal and can be easily planned and predicted, there is a logical sequence and correlation between business functions, so that the output of one function is used as input in another function, contacts with all stakeholders are automated, the risk of human error is minimized, work is done in a reliable company information system etc. Digitally mature companies are focused on the integrated application of modern digital technologies in changing the way they do business, as opposed to less digitally mature companies, which seek to solve individual problems encountered in business through individual digital technologies.

Although many point out to the radical character of digital transformation, it should be mentioned that it is a phased, evolutionary process, in which each phase must be fully completed in order to succeed in the next one. According to Chalons and Dufft [6], digital transformation consists of three phases. In the first phase, it is necessary to equip workplaces with smartphones, tablets and other mobile devices, as well as collaboration tools such as video conferencing and chat. This phase is best described by the term consumerization, which implies a change in technology in a business under the influence of technologies originally intended for the consumer market but which, because of their different opportunities and options, find their place in the business world, as well. In the second phase, as Chalons and Dufft [6] point out, the focus shifts from employees to consumers. The goal is for the consumer to experience the optimal digital experience, which is why the emphasis must be on comprehensive digital transformation. This means that digital transformation must be equally carried out on the processes directly confronted by the consumer, such as marketing, sales, customer support, but also on back-end processes that are not visible to consumers and which have an equal impact on their experience in company relations (accounting, warehousing, logistics, etc.). The last, third phase, embraces new sales models, products and a whole new business model, all of which results in a new digital ecosystem [6]. Namely, the concept of the digital ecosystem is especially important in the conditions of globalization where, as a result, there is an increased competition and inability of many companies to withstand and survive in such conditions. By pooling the strengths of actors from different sectors, while sharing the necessary information, there is a chance to offer consumers better options compared to their competitors whereas, in return, the overall value that companies are appropriating is increased.

The dynamics of the digital transformation process and thus the level of digital maturity varies from one company to another. There are a number of obstacles companies face while trying to be effective in this process. The system of values, assumptions and beliefs shared by the employees of a company greatly influences not only the success, but also the decision to initiate the

digital transformation process. Important features of an organizational culture that would benefit from digital transformation are innovation, trust, collaboration, risk appetite, and tolerance in case of failure [19]. Lack of knowledge about digital technologies and their application capabilities can make it difficult to manage the digital transformation process. That is why it is important for an organization to hire an expert or to appoint one of its existing employees to the position of chief information officer. Employees are often inclined to have a deep aversion even to minor changes, and especially when it comes to the radical, big changes that digital transformation brings. For this reason, a new chief digital officer function is emerging in organizations, and their main task is to direct and actively engage employees whose jobs and workplaces are affected by the digital transformation process, which should alleviate resistance to change and thus ensure full digital transformation capacity. Apart from that, SMEs in particular have additional difficulties, which are slowing down the digital transformation process. An aggravating circumstance for the SMEs, compared to large firms, may be the lack of high-quality people in management positions and limited financial resources, and in particular the propensity of the SMEs to adopt dynamic, informal, non-proactive strategies [16].

The concept of digital transformation has gained in popularity in the recent years as a subject of research in numerous scientific publications, but above all with a focus on the theoretical explanation of the concept, characteristics, strategies and possible implications of this phenomenon. The authors generally predict and assume on a logical basis what implications a digital transformation would have on the enterprise itself, on its innovation, organizational structure, processes and overall business performance, but in most cases without any empirical verification of theoretical assumptions.

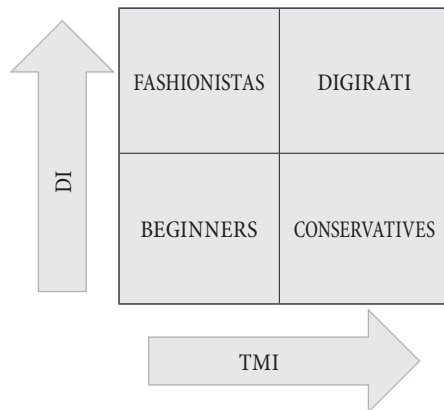
The intensive use of fast-growing digital technologies is a major mean of reducing costs, increasing the efficiency and effectiveness of business processes, increasing customer satisfaction through overall collaboration with the company, thereby enhancing the market position and competitive power of the company [13], [1]. Companies that have undergone intense digital transformation are

rapidly reaching a high level of digital maturity, thus becoming more able to use their digital technologies more efficiently and productively to improve their performance [34] and to occupy a leading position in the market. Also, by applying an integrated digital strategy, such companies can improve business processes and perform modularization more easily, which further strengthens their capacity to adopt and implement new business practices and initiate innovation. Organizations that use digital technologies in order to initiate changes, enhance business processes and operations are much more innovative [34] compared to those which do not behave according to the postulates of the digital era. Kagermann [24] concludes that digital transformation drives innovation and change, regardless of the type of industry, due to the increasing approximation of the real and virtual worlds. Originally conceived of the business philosophy and logic underlying the business of the company from its inception, it will experience some form of modification or complete restructuring through the digital transformation process, creating the conditions for the development and commercialization of new products and services [44]. The implementation of new digital technology incites growth of company productivity through appropriate improvements and changes in the production process [15]. According to Urbach and Ahlemann [46], digital transformation means the use of technological innovations in business with the intention to increase productivity, sales and establish new forms of cooperation with customers.

All of these authors conclude that digital transformation will significantly improve a company's business through increasing innovation, productivity, streamlining business operations, stimulating consumer satisfaction, etc. Generally speaking, it is true. But whether and to what extent digital transformation provides an improvement in business performance depends largely on the current stage of digital transformation in which businesses are positioned. In order to prove that not all companies have the same level of benefit from digital transformation, Westerman, Tannou, Bonnet, Ferraris and McAfee [47] developed a digital maturity assessment model. The model itself is a combination of two dimensions: digital intensity and transformation management intensity (Figure 1), based

on which the company falls into one of four categories: beginners, fashionistas, conservatives and digirati. The categories below indicate the stage of digital transformation the company is currently in according to the estimated level of digital intensity (DI) and transformation management intensity (TMI)¹.

Figure 1: Matrix of digital maturity



Source: Adapted according to [47].

Beginners are companies that have just started out their digital transformation or are still not aware of the consequences of low DI and low TMI. Companies that use different digital technologies but lack the vision, unity and knowledge of how to integrate and deploy them to achieve a synergistic effect are called fashionistas (high DI and low TMI). Conservatives, on the other hand, are characterized by a thorough, stable and slow approach based on cultural uniformization and effective management, but with a high dose of skepticism towards modern technologies (low DI and high TMI). The most advanced digital transformation companies are concentrated in the last quarter of the quadrant, the digirati, and are known as the digital elite (high DI and high TMI). They have a comprehensive digital strategy that combines vision, a strong digital culture and willingness to adopt current and upcoming digital technologies

The developed model was implemented in practice on a sample of 184 companies in the USA, to test the effects

¹ The digital maturity rating is performed over 10 statements, 5 statements for DI estimation and 5 for TMI estimation, on a scale of 1 to 7. The minimum value that can be achieved at the DI and TMI level is 10, and the maximum is 70. Ranking is performed in a way so that companies that have earned between 10 and 40 points for both DI and TMI are ranked as low digital maturity companies. Companies that have earned more than 41 points for both dimensions are categorized as high digital maturity companies [48].

of current digital maturity levels on business performance [47]. The results of the study show that conservatives and fashionistas perform better than the beginners, digging far ahead of all other companies. The authors used the following as indicators of business success: the amount of income, profitability and market value. The digirati had a 9% increase in revenue compared to the average fashionistas or conservative companies [47]. The results also show that companies with low TMIs, regardless of the DI (beginners or fashionistas) levels, achieve a significantly lower level of profitability compared to companies with high TMIs and independently of the DI levels (conservatives or digirati). The digirati and digital conservatives are 26% and 9% more profitable, respectively, than the other two categories of companies [47]. Companies with high levels of TMI (digirati and conservatives) also have a higher market value than other companies. Of course, companies that are capable of recognizing, adopting and implementing current digital technologies are the most successful, with a clear, strategic vision, cultural uniformity and active involvement of employees at all levels of the organization in the digital transformation process.

Some current characteristics of female entrepreneurship – Do they differ from the male?

Female entrepreneurship contributes significantly to economic growth and poverty reduction not only in less developed economies, but also in economically developed countries. In addition to their contribution to the growth of employment, female entrepreneurship improves diversification of jobs through different innovation processes, different management and marketing practices. In the EU countries, the average number of women-owned enterprises is around 30%, as is in Serbia. However, in the United States, women own about 40% of SMEs. Although it is an upward trend regarding percentage of female entrepreneurs, there are still plenty of facts which put this economic group in a less favorable positions than men.

There are specific difficulties, including accessing finances, which women face when it comes to establishing and running a business. Other barriers include (1) lack

of role models, (2) entrenched stereotypes, (3) weaker business networks, (4) stronger perceived difficulties for reconciling business and personal life, and (5) gender differences in the sector of activity. Fear to fail seems to be an important socio-cultural factor influencing both genders, but women to a greater extent [3].

The starting point of our research (and a hypothesis approved in a number of papers so far) is that there are certain differences between men and women who are doing business, and accordingly also differences in the digital transformation of enterprises. What characterizes the differences between men and women doing business? In fact, networking is a way to enhance business expertise, get support regarding access to funds, establish suitable partnerships or find qualified employees, among other things. 93% of female entrepreneurs think that business networks are essential for their professional development.

The number of women who use entrepreneurial workshops/support meetings is higher compared to their male counterparts, 55% vs. 44%. Men prefer incubators, mentoring programs or initiatives to workshops and meetings. Family obligations and responsibilities related to children and caring for the elderly are important factors associated with the number of female entrepreneurs.

Female businesses tend to be smaller and with lower loans and initial capital levels, which usually implies lower returns for equity and debt financiers. In general, most women start new businesses in sectors that are traditionally female-dominated and which seem to be less attractive and profitable for private investors. Women prefer to set up their business in specific industries, particularly in the health care, social care or the education sector. The sectors where women prefer to set up businesses tend to be considered by investors as less profitable, which in turn influences the capacity of women to raise funds [3].

Digital transformation and female entrepreneurship in the European Union

A study conducted in 2018 on the participation of women in ICT in the EU (and some other countries, among them a few respondents from Serbia, as well) and its dynamics and analyses of the practices enabling women's participation

in the digital world, stated in the final conclusion that "although 57% of tertiary graduates in the EU are women, only 24.9% of them graduate in ICT-related fields, and very few enter the sector" [23]. Furthermore, figures indicate that women's participation in the ICT and digital sector has not improved significantly compared to the survey published in 2011. If the existing biases are not addressed, rapid economic advances achieved by digital transformation will not take into account the existing gender gap in the sector which will simply amplify and, possibly, perpetuate gender stereotypes [23].

Data trends and qualitative analysis suggest that gender inequality in the digital sphere exists. Differences in the personal preferences that men and women have regarding technology have generally been considered as a factor influencing their educational and professional choices, and partially explains the lack of women in STEM studies and ICT careers. Gender differences are not visible only in career options but also in citizens' attitudes towards technology and innovation. A recent Eurobarometer survey asked Europeans about their perceptions of the impact of digital technologies on their lives. The results show the existence of differences based on gender. Women have a more negative view of the impact of digital technologies in all spheres, particularly in their quality of life [11].

The digital economy contributes with up to 8% to GDP in the G20 countries (in Serbia with 6% [26]) and shows an upward-growing trend.

Digital transformation is a considerable opportunity to boost female entrepreneurs, particularly for the younger generations which have grown up in close interaction with digital technologies. Focused on the high-technology industry in Europe, almost half of the start-ups nowadays belong to the digital economy: 48.9% of start-ups are related to innovative technologies and/or business models. Nevertheless, out of the 2,515 start-ups and 6,340 founders analyzed by the 2nd European Start-up Monitor, only 14.8% of the founders were female, which is an increment of 0.1 percentage points in comparison to 2015 [23].

In 2015, the Female Entrepreneurship Index [30] analyzed the situation of female entrepreneurs in a total of 77 countries and scored them from 0 to 100. They did this in accordance with an evaluation of factors

related to entrepreneurial environment, ecosystem and aspirations in order to identify those factors that boost high potential for female entrepreneurs. Six countries in the European Union are among the top ten when it comes to female entrepreneurs: the UK, Denmark, the Netherlands, France, Sweden and Finland. Serbia was not included in this survey due to the lack of accurate official statistical data. All of the EU countries involved in the study were ranked among the top forty positions. The evidence suggests that the European countries (included in the survey) have a stimulating environment to boost female entrepreneurship and consequently, a higher share of them in the total number of SMEs. Their findings for the European region in particular have pointed out to high levels of education and access to learning programs for women to improve business skills through SME support and training. Conversely, findings also show that self-perception of females on their start-up knowledge and skills, as well as the identification of good opportunities to start a business in Europe, were identified as points that need to be improved. But, similar to the U.S. survey, female entrepreneurs in the EU encounter their most prominent challenge in accessing funding. These weaknesses might explain the scarce number of new businesses. According to the Global Entrepreneurship Monitor [21], Europe in 2016 recorded not only the lowest female involvement in early-stage activity of all the regions analyzed (6%), but also the lowest gender parity. Furthermore, it stated that European women were half as likely to be engaged in the total early-stage entrepreneurial activity (TEA) as men.

Some demographic characteristics of female entrepreneurs in Serbia relevant to the survey on digital transformation

Before we present the analysis stemming from our research, it will be reasonable to become more familiar with demographic characteristics of female entrepreneurs in Serbia. In 2014, we conducted a survey with a purpose to investigate the need for training (TNA) in Serbian women-owned firms. The research was conducted on a representative sample of 203 female entrepreneurs from

Serbia, which provided a fairly reliable picture of the demographic characteristics of women's entrepreneurship in Serbia [41].

The size of enterprises from the sample corresponds to the general indicators of women's entrepreneurship in Serbia when it comes to SMEs [2], namely a maximum of 65% of companies are in the micro category (1-9 employees), 25% are small (10-49), and 10.3% medium-sized. The majority of women entrepreneurs from Serbia participating in the survey (77%) hold a university diploma and/or a master's degree and a PhD, which is approximately the case in the entire sample in South-East Europe – 72.2%, while 49% of the respondents hold a secondary education degree.

The largest number of survey participants is at the age group of 35-39 and/or 45-49. Women in the category of 55+ years are engaged in the manufacturing industry (17%), sales and trading (14%), professional and other service activities (11%) and the health care sector (11%). On the other hand, young women entrepreneurs are active in sales and trade (22%), professional and other service activities (15%), arts, entertainment and recreation (13%) and manufacturing (12%). Women under 29 years of age made up the smallest share in the whole sample, and almost with the same percentage were women over the age of 60.

Serbian female entrepreneurs started their businesses in order to become independent (36%) or to take advantage of the business benefits (30%). This data is in conformity with the data for the total SEE sample where 33% of women started their own business in order to become independent, while 27% wanted to take advantage of the business benefits.

61% of female entrepreneurs estimated that the state of their business is good, and only 6% of them barely survives. There is no significant difference compared to the assessment which is given by men about their businesses' performance in another survey on TNA with a mixed gender sample [41].

Only 25% of women entrepreneurs were trained for start-ups before entering the entrepreneurial world. Women entrepreneurs which organized some kind of training for their employees did it by combining their internal resources (employees with specific skills) and paid services – training, consultants, seminars and other.

The most important reasons for undertaking training are: 1. increasing the quality of services and products, 2. expanding the business, 3. keeping up with new technologies and trends. Organizers of the training that they opt for are usually private consultants. Only 12% of SMEs in Serbia have an annual budget dedicated to training with an average amount of 9.9% of the total revenue. As many as 79% of companies in Serbia fund training from their own resources. This is probably why they have kept investment in human resource development at the same level for the last three years.

Results showed that there are significant differences in the reasons for organizing training between firms with an increasing profit trend and the firms whose profit is without changes. Companies with an increasing profit trend place a significantly higher importance to virtually all the reasons for organizing training: 1. staying in business, 2. catching up with new technologies, 3. expanding the business, 4. increasing the quality of services or product, 5. improving the company’s image, and 6. improving the skills of new employees.

If we add that 58% of graduate students in 2017 in Serbia were women (and 56% of the students) [42], of which approximately 45% were women in STEM sciences (Figure 2), and about 35% of employed researchers in R&D

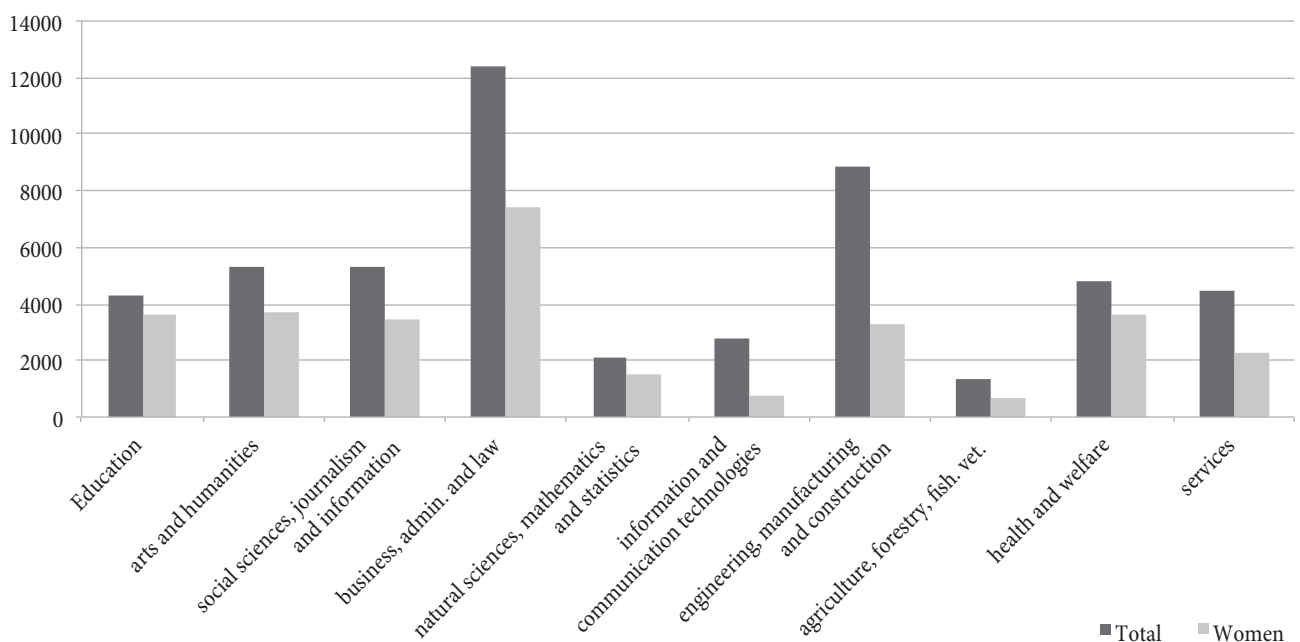
organizations in the field of technical and technological sciences were women, we can get a more accurate picture of women’s professional potentials which can help to an extent to enter the process of firms’ digital transformation in an adequate way.

At this moment, there is no recorded survey on digital transformation in women-owned companies which can be compared to ours.

A recent research carried out in Serbia [38] in which there are a few similarities to our research objectives, although it applied different methodology and implemented a much larger sample that was not gender-disaggregated was conducted during 2018. Respondents were employees and managers at all levels in companies from different sectors, foreign and domestically owned, operating in Serbia. This means that the results obtained in this particular research are only partially useful for comparison with our own research.

A more detailed research for the purpose of obtaining an accurate idea about the current level of digital transformation reached by the companies in Serbia and their potentials, as well, is taking place on the website of the Center for Digital Transformation of the Chamber of Commerce and Industry of Serbia [5]. After selecting a particular enterprise, the objective of

Figure 2: The number of graduated students at all university levels and fields of study in Serbia in 2016/2017



Source: Statistical office of the Republic of Serbia [43] and authors’ calculations.

this data collection is to introduce them into a training process that will contribute to their expertly guided, and thus more efficient, digital transformation. Since the results of these surveys are not published, we are not able to use them to compare with those obtained in our research. The only general conclusions that are presented publicly are as follows: 60% of enterprises in Serbia do not have a digital transformation process planned; 90% of companies that are planning digital transformation are purchasing basic software or a website, in 40% of the companies there is no responsible person for the process of digital transformation, and 5% of the annual turnover is planned for digital transformation [5].

Methodology

Sample and questionnaire

The empirical part of the research is based on the primary data collected through the questionnaire. The questionnaire is divided into three parts and consists of a total of 28 statements. The first part of the questionnaire consists of 18 statements, which were used to evaluate the degree of digital transformation, and one statement to confirm for how long the companies have been involved in the process of digital transformation. The second part consists of five statements for assessing business performance (financial and non-financial) adapted according to Gunday, Ulusoy, Kilic and Alpkan [18] and Naidoo and Hoque [33]. In the last part of the questionnaire, there are statements for assessing the demographic characteristics of the company. The questionnaire was created in accordance with previous research in the field of digital transformation [5], [8], [49], [50], where the statements were more concretized and substantiated by examples, in order to make it easier for respondents to understand what was required from them. Within the defined timeframe, 46 correctly completed questionnaires were received and included in the analysis. The sample characteristics are shown in Table 1.

Micro companies account for 61.4%, small companies 22.7%, and medium-sized companies for 15.9% of the total sample of the companies. About 62.3% of the companies have been in the process of digital transformation for a period of two to three years, 24.4% for one to two years,

while 13.3% of the companies are in the initial stage of digital transformation. Questionnaires were filled in by (co)owners of companies, regardless of whether they owned majority (71.4%) or minority (28.6%) shares in the capital of the company. The sectoral structure of the companies is diverse, with the largest number of companies in the professional, scientific and technical sectors (13.2%), the creative industry (13.2%), the financial sector (13.2%), the food industry (10.5%), the metal industry (10.5%), trade (7.9%), tourism (7.9%) and others.

The research revealed that as many as 41.86% of the micro companies have been in the digital transformation process for more than two years, 11.63% for one to two years, and 9% are in the initial stage of this process. About 9.30% of the small companies have been in the digital transformation process for more than two years, and the same percentage of these companies is in the middle phase of digital transformation (one to two years), while 4.65% of the companies have just started this process. Medium-sized companies (11.63%), which also make up for the smallest part of the sample, have been implementing digital transformation for more than two years.

Table 1: Demographic characteristics of the sample

Number of employees	%	Start of digital trans. (year)	%
1-9	61.4	<1	13.65
10-49	22.7	1-2	20.93
50-250	15.9	2-3	62.79
Industry		%	
Professional, scientific and technical activities		13.2	
Creative industry		13.2	
Financial sector		13.2	
Food industry		10.5	
Metal industry		10.5	
Commerce		7.9	
Tourism		7.9	
Pharmaceutical and medical industries		5.3	
Textile and leather		5.3	
Construction industry		5.3	
Transport		2.6	
Utility services		2.6	
Organic production		2.6	
Missing		4.67	

Research hypotheses

The aim of the paper is to explore the impact of the achieved level of digital transformation on the overall business performance of the company, based on the available theoretical knowledge. An additional goal is to examine the existence of differences in the indicators of business performances among companies which have been in the process of digital transformation for less than two years and companies which have been in that same process for more than two years. This goal was set under the assumption that the companies involved in the process of digital transformation for more than two years were more successful in the said process in terms of qualitative changes and the stage of digital transformation they are in, which should ensure better performance in comparison to companies which have been involved in this process for a shorter period of time.

In accordance with the goals of the research based on the previously defined subject of analysis, the empirical part of the paper will focus on testing the following hypotheses:

- H₁: Companies that have made significant progress in the process of digital transformation can expect to improve overall performance.
- H₂: There are significant differences in the performance indicators between firms which have been included in the process of digital transformation for less than two years and those undergoing digital transformation for more than two years.

Results

Table 2 shows the values of Cronbach's alpha (CA), mean, correlation analysis and normality tests. The calculation of the CA coefficient determines the reliability, that is, the internal consistency between the statements used to create the variables. The recommended CA value is over 0.7. All variables have a CA value that is over 0.7 and range from 0.804 to 0.882. Based on these results, it can be concluded

that the variables are reliable for use in further analysis. The next step is to determine the average values of the variables used. Companies in the sample are characterized by a relatively high level of digit-trans, with an average score of 2.33 (on a scale of 1 to 3). Average score of the perf is M=3.82 on a scale of 1 to 5. Normality tests, skewness and kurtosis range within the allowed scope for all variables (-2 to +2) [17], implying that the data were normally distributed. Based on this, it was decided to continue with the Pearson correlation. Correlation analysis shows a significant, positive and strong relationship between digit-trans and perf (r=0.516; sig=0.000).

The test results of the defined hypotheses are presented in Table 3 and Table 4.

The T-test of independent samples compared individual performance indicators and overall performance between enterprises undergoing digital transformation for less than two years and those that have been in the process for more than two years (Table 3). The value of Levene's test shows that the F statistic is not significant except for productivity, where the results which did not assume equal variances are presented. The difference in the profitability level between companies implementing digit-trans for up to two years (M=3.647) and those in the process for more than two years (M=3.828) is very small ($\eta^2=0.01$) and statistically insignificant (sig=0.492). Similar conclusions are reached when using turnover ($M_{\text{LessThanTwo}}=3.588$; $M_{\text{LongerThanTwo}}=3.828$; $\eta^2=0.02$; sig=0.379) and customer satisfaction ($M_{\text{LessThanTwo}}=3.941$; $M_{\text{LongerThanTwo}}=4.138$; $\eta^2=0.01$; sig=0.442) as performance indicators. Significant but moderate differences were identified with the productivity indicator ($M_{\text{LessThanTwo}}=3.529$; $M_{\text{LongerThanTwo}}=4.138$; $\eta^2=0.09$; sig=0.05) and product & service development capacity ($\eta^2=0.11$; sig=0.05). Product and service quality is significantly different ($\eta^2=0.14$; sig=0.011) between companies that have been in the digit-trans process for more than two years (M=4.379) and companies that are in the initial stages of digit-trans (M=3.706). When looking at overall performances, the

Table 2: Reliability test, descriptive statistics, correlation analysis and normality tests

Variables	CA	Mean	Digit-trans	Perf	Skewness	Kurtosis	Shapiro-Wilk
Digit-trans	0.804	2.329	1	0.516**	0.048	-0.921	0.973 ^{ns}
Perf	0.882	3.822	0.516**	1	-0.208	-0.130	0.961 ^{ns}

Note: **Result is significant at the level of 1%; ns – not significant. a. CA for the questionnaire as a whole: 0.862

results confirm the accuracy of the first hypothesis H₂. The difference in overall performances between companies which have been implementing digit-trans less than two years (M=3.614) and companies exceeding two years (M=4.015) in the process is significant and moderate ($\eta^2=0.07$; sig=0.05) and is in favor of the companies from the second group.

The impact of digit-trans on business performance was analyzed using a simple OLS regression analysis (Table 4) method. The results imply that digit-trans has a significant, positive and strong impact on perf ($\beta=0.516$; sig=0.000). An improvement of 1% in the digit-trans process affects the perf enhancement by 0.52%. A value of adjusted R²=0.25 means that digit-trans accounts for 25% of perf variability, while the rest of the variance is accounted for by factors not included in the model tested. There are no autocorrelation problems in the model (Durbin-Watson=2.262).

Robustness check

To test the robustness of our results, an additional analysis (Table 5) related to examining the impact of company size on the relationship between digital transformation and

company performance was conducted. It is considered that smaller companies lack high-quality personnel more often than larger ones, especially in the managerial department, and that they have a restricted access to financial resources [16]. In order to successfully implement the process of digital transformation, it takes skilled, qualified, highly motivated personnel with leadership skills, capable of managing an enterprise and leading its employees through a process of change based on the use of digital technology. Apart from that, financial resources are vital for the modernization of the existing technology and the procurement of new digital technology which should, with all the other factors, ensure success in the process of digital transformation, especially if the company has aspirations to reach a leading position in the market. On the other hand, it is possible that digital transformation would be easily and more successfully implemented in smaller companies. Firstly, there are companies with simple organizational structures, where it is easier to coordinate the activities of those employed in the midst of a process of change. Secondly, in smaller companies there is a greater possibility of the employees sharing the same value system, attitudes and assumptions, which is of great importance for success in the process of digital

Table 3: Are there any differences in performance indicators depending on how many years the companies have been in the process of digital transformation?

Performance indicators	No. of years in the process of DT	Mean	Levene's test	η^2	Sig
Profitability	Less than two	3.647	Not significant	0.01	0.492
	More than two	3.828			
Turnover	Less than two	3.588	Not significant	0.02	0.379
	More than two	3.828			
Product and service quality	Less than two	3.706	Not significant	0.14	0.011
	More than two	4.379			
Productivity	Less than two	3.529	Significant	0.09	0.05
	More than two	4.138			
Customer satisfaction	Less than two	3.941	Not significant	0.01	0.442
	More than two	4.138			
P&S development capacity	Less than two	3.412	Not significant	0.11	0.022
	More than two	4.069			
Overall performance	Less than two	3.614	Not significant	0.07	0.05
	Longer than two	4.015			

Note: When the Levene's test was not significant, we used the results which assumed equal variances.

Source: Calculated by authors.

Table 4: Simple OLS regression

Variable	β	Sig	F	R ²	Adjusted R ²	Durbin-Watson
Digit-trans	0.516	0.000	15.971**	0.266	0.250	2.262

Note: **Result is significant at the level of 1%. a. Dependent variable: Performance.

Source: Calculated by authors.

transformation. Furthermore, digital technology required for a smaller consultant agency or a trading company not only differs in its complexity of use, i.e., integration in the business, but also in price as opposed to the technology needed for a metal company or a food company. Companies owned by women are usually in the SMEs category and are located in traditional sectors, whose activities are usually characterized by a low level of novelties regarding the use of complex digital technology.

The moderation effect of company size has been analyzed using hierarchical regression analysis. All three models have been well set ($R^2 > 0.25$; $F_{sig} = 0.000$; $VIF < 10$; $1.5 < DW < 2.5$). After including the company size moderator variable (Model 2) and the moderation effect (interaction between digit-trans and company size) in Model 3, the results are still robust. This means that there is no moderation effect of company size. There is no significant influence on the core results of the digit-trans and perf in women-owned firms (moderation effect: $\beta = -0.004$; $sig = 0.979$). The obtained results indicate that hypothesis H_1 can be accepted.

Discussion and conclusion

The main objective of the research is to analyze the effects of digital transformation on the performance of women-owned businesses. The results of the applied statistical analysis methods show that there is a relatively high degree of digital transformation in the created sample, and the assumption about the positive implications of digital transformation on company performance (H_1

is accepted) is confirmed. This result is in line with the study conducted by Westerman et al. [47] and Nwankpa and Roumani [34]. Significant differences were also observed in the level of product and service quality, product & service development capacity, productivity, and overall performance in favor of companies that have been undergoing digital transformation for more than two years compared to the companies in the initial stages of digital transformation. In contrast, no significant differences were found in profitability, turnover, and customer satisfaction levels. However, having in mind that hypothesis H_2 places focus on overall performance, it can be stated that the hypothesis is accepted, noting that there are differences when considering individual indicators.

The conducted research has significant implications in theory and practice. Considering the fact that the field of digital transformation is new and rather unexplored, especially when the gender aspect is included in the context, where only two papers with similar goals have been identified in the literature, the conducted analysis stands as a significant contribution to expanding and complementing existing theoretical knowledge. A new definition of digital transformation has been conceived in line with previous research and the context of this paper, which is acceptable regardless of the gender aspect of the enterprise. Research can be helpful to owners and managers in terms of learning about the features of the digital transformation concept, the importance of digital transformation for improving business performance, as well as a tool for measuring digital maturity. The survey provides insight into women-led businesses and ownership

Table 5: Hierarchical regression analysis

Variable	Model 1			Model 2			Model 3		
	β	Sig	VIF	β	Sig	VIF	β	Sig	VIF
Digit-trans	0.516	0.000	1.000	0.535	0.000	1.040	0.535	0.000	1.047
Company size				-0.097	0.468	1.040	-0.096	0.485	1.082
Moderation effect							-0.004	0.979	1.055
F statistics	15.971**			8.169**			5.320**		
R ²	0.266			0.275			0.275		
R ² change	0.266			0.009			0.000		
Adjusted R ²	0.250			0.242			0.224		
Adjusted R ² change	0.250			-0.008			-0.018		
Durbin-Watson				2.289					

Note: **Result is significant at the level of 1%. a. Dependent variable in all models: Performance. b. Before calculating the moderation effect, the digit-trans and company size variables were standardized to avoid the occurrence of multicollinearity problems. c. Company size is a dummy variable – 1 (up to 20 employees) and 0 (otherwise). Source: Calculated by authors.

over companies which are in the digital transformation process, which is also an under-researched area, pointing out that women's businesses, which are mostly micro and small, see digital transformation as an important tool for achieving better business results, and that as many as 41.86% of women-owned micro enterprises have been in the digital transformation process for more than two years. If we know that 60% of enterprises in Serbia do not have a planned digital transformation process, then we can conclude that digital transformation is at the same time a chance for groups of enterprises with difficult access to finance and the market, such as those owned by women, to achieve better business performance. It is symptomatic that the level of customer satisfaction, as an essential generator of profitability, does not greatly differentiate between companies undergoing a digital transformation for less than two years and those that have been in the DT process for more than two years. This result can be explained by the fact that the passage of time did not bring about significant progress in the DT process in terms of transition to multiple stages of the DT, and that the DT process mainly covered activities that do not provide direct benefit to consumers or are invisible to them, which did not lead to significant changes in their satisfaction level. This is also indicated by the fact that over 76% of enterprises use eGovernment services, 51.5% are qualified to receive e-invoices, 73.9% use accounting software, 63.1% perform e-invoice processing and the like. In contrast, in a small number of companies, digital technologies have been used to better meet the wishes and needs of modern consumers. Only 31.8% of the companies managed to innovate their business model according to consumer needs (free basic product/service and sale of additional product/service, rental instead of sale, advertising space, license, data sale, free capacity sale), while 45.5% of companies point out that digitization has generated additional benefits for consumers (easier use of the product range, optional location, greater choice, etc.). All of the above indicates that in the coming period, companies should shift their focus to consumers, i.e. to a more productive use of digital technologies, which will be in the function of modernizing relations with consumers and generating an optimal digital experience for consumers.

Despite its significant theoretical and practical implications, this research faces certain limitations from which recommendations for future research work may arise. The research was conducted at one point in time. This kind of problem requires conducting a longitudinal study that would provide a more objective insight into digital transformation over time because, as stated, it is an ongoing process. Second, the analysis includes companies managed and (co)owned by women, which gives an insight into the gender aspect of digital transformation, but at the same time imposes the need for a comparative analysis in some subsequent research with the SMEs run and own by women as well as men. Third, the limitation is exogenously determined and concerns the absence of similar studies, which diminishes the possibility of comparing the results obtained and drawing more complete conclusions.

References

1. Aboelmegeed, M. G. (2014). Predicting e-readiness at firm-level: An analysis of technological, organizational and environmental (TOE) effects on e-maintenance readiness in manufacturing firms. *International Journal of Information Management*, 34(5), 639-651.
2. Babović, M. (2012). *Polazna studija o preduzetništvu žena u Srbiji*. Beograd: Program Ujedinjenih nacija za razvoj.
3. Bank of America. (2018). *Women business owner spotlight – Letter from Sharon Miller*. Retrieved from https://newsroom.bankofamerica.com/system/files/2018_Women_Business_Owner_Spotlight_0.pdf.
4. Bockschecker, A., Hackstein, S., & Baumol, U. (2018). *Systematization of the term digital transformation and its phenomena from a socio-technical perspective – A literature review*. Retrieved from <http://ecis2018.eu/wp-content/uploads/2018/09/1312-doc.pdf>.
5. Centar za digitalnu transformaciju Privredne komore Srbije. (2018). *Upitnik za firme*. Retrieved from <https://cdt.org.rs/index.php/upitnik-za-firme/>.
6. Chalons, C., & Dufft, N. (2017). The role of IT as an enabler of digital transformation. In F. Abolhassan (Ed.), *The drivers of digital transformation why there's no way around the cloud* (pp. 13-22). New York: Springer International Publishing.
7. Collin, J., Hiekkanen, K., Korhonen, J., Halen, M., Itala, T., & Helenius, M. (2015). *IT leadership in transition – The impact of digitalization on Finnish organizations*. Retrieved from <https://aaltodoc.aalto.fi/bitstream/handle/123456789/16540/isbn9789526062433.pdf?sequence=1&isAllowed=y>.
8. Cuevas-Vargas, H., Estrada, S., & Larios-Gómez, E. (2016). The effects of ICTs as innovation facilitators for a greater business performance - Evidence from Mexico. *Procedia Computer Science*, 91, 47-56.
9. Ernst & Young Company. (2011). *The digitisation of everything*. Retrieved from <https://www.ey.com/Publication/vwLUAssets/>

- The digitisation of everything - How organisations must adapt to changing consumer behaviour/\$FILE/EY_Digitisation_of_everything.pdf.
10. European Commission. (2010). *Europe 2020, A European strategy for smart, sustainable and inclusive growth*. Brussels: European Commission.
 11. European Parliament. (2018). *Parlemeter 2018. Taking up the challenge – From (silent) support to actual vote*. Retrieved from <https://www.europarl.europa.eu/at-your-service/files/be-heard/eurobarometer/2018/parlemeter-2018/report/en-parlemeter-2018.pdf>.
 12. Fichman, R., Dos Santos, B., & Zheng, Z. (2014). Digital innovation as a fundamental and powerful concept in the information systems curriculum. *Mis Quarterly*, 38(2), 329-353.
 13. Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2013). *Embracing digital technology: A new strategic imperative*. Research report. Retrieved from <https://sloanreview.mit.edu/projects/embracing-digital-technology/>.
 14. Foerster-Metz, U. S., Marquardt, K., Golowko, N., Kompalla, A., & Hell, C. (2018). Digital transformation and its implication on organizational behaviour. *Journal of EU Research in Business*, 1-14.
 15. Fuentelsaz, L., Gomez, J., & Palomas, S. (2009). The effects of new technologies on productivity: An intrafirm diffusion-based assessment. *Research Policy*, 38, 1172-1180.
 16. Ghobadian, A., & Gallea, D. (1997). TQM and organization size. *International Journal of Operations and Production Management*, 17(2), 121-163.
 17. Gravetter, F., & Wallnau, L. (2014). *Essentials of statistics for the behavioral sciences* (8th ed.). Belmont, CA: Wadsworth.
 18. Gunday, G., Ulusoy, G., Kilic, K., & Alpkan, L. (2011). Effects of innovation types on firm performance. *International Journal of Production Economics*, 133, 662-676.
 19. Hartl, E., & Hess, T. (2017). The role of cultural values for digital transformation: Insights from a delphi study. In *AMCIS 2017 Proceedings*, 1-10.
 20. Hausberg, P., Liere-Netheler, K., Packmohr, S., Pakura, S., & Vogelsang, K. (2018). *Digital transformation in business research: A systematic literature review and analysis*. Paper to be presented at DRUID18 Copenhagen Business School. Copenhagen: Denmark.
 21. Herrington, M., & Kew, P. (2016). *Global entrepreneurship monitor*. Retrieved from <https://www.gemconsortium.org/report/gem-2016-2017-global-report>.
 22. Horlacher, A., & Hess, T. (2016). What does a chief officer do? Managerial tasks and roles of a new c-level position in the context of digital transformation. In *Proceedings of the 49th Hawaii International Conference on System Sciences*, 5126-5135.
 23. Iclaves, S.L., & the Universitat Oberta de Catalunya. (2018). *Women in the Digital Age*. Final report. Brussels: European Commission DG of Communications Networks, Content & Technology.
 24. Kagermann, H. (2015). Change through digitization – Value creation in the age of Industry 4.0. In H. Albach, A. Meffert, A. Pinkwart, & R. Reichwald (Eds.), *Management of Permanent Change*, 23-32.
 25. Kane, G., Palmer, D., Phillips, A., Kiron, D., & Buckley, N. (2015). *Strategy, not technology, drives digital transformation*. Retrieved from <https://www2.deloitte.com/cn/en/pages/technology-media-and-telecommunications/articles/strategy-not-technology-drives-digital-transformation.html>.
 26. Kleibrink, A., Radovanović, N., Kroll, H., Horvat, D., Kutlača, D., & Živković, L. (2018). *The potential of ICT in Serbia: An emerging industry in the European context*. Luxembourg: Publications Office of the European Union.
 27. Kotarba, M. (2018). Digital transformation of business models. *Foundations of Management*, 10, 123-142.
 28. Kwon, E. H., & Park, M. J. (2017). Critical factors on firm's digital transformation capacity: Empirical evidence from Korea. *International Journal of Applied Engineering Research*, 12(22), 12585-12596.
 29. Legner, C., Eymann, T., Hess, T., Matt, C., Bohmann, T., Drews, P., Maedche, A., Urbach, N., & Ahlemann, F. (2017). Digitalization: Opportunity and challenge for the business and information systems engineering community. *Bus Inf Syst Eng*, 59(4), 301-308.
 30. Lloyd, A., & Terjeseen, S. (2015). *Female entrepreneurship index (2015). Global entrepreneurship & Development index*. Retrieved from https://www.researchgate.net/publication/280531562_Female_Entrepreneurship_Index_2015_Global_Entrepreneurship_Development_Index.
 31. Martin, A. (2008). Digital literacy and the "digital society". In C. Lankshear, & M. Knobel (Eds.), *Digital literacies: Concepts, policies and practices* (pp. 151-176). New York: Peter Lang.
 32. Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business and Information Systems Engineering*, 57(5), 339-343.
 33. Naidoo, I. P., & Hoque, M. (2018). Impact of information technology on innovation in determining firm performance. *African Journal of Science, Technology, Innovation and Development*, 1-11.
 34. Nwankpa, J. K., & Roumani, Y. (2016). IT capability and digital transformation: A firm performance perspective. *ICIS 2016 Proceedings*, 1-16.
 35. Osmundsen, K., Iden, J., & Bendik, B. (2018). Digital transformation: Drivers, success, factors, and implications. *The 12th Mediterranean Conference on Information Systems (MCIS)*, 1-15.
 36. Pitić, G., Savić, N., & Verbić, S. (2018). Digital transformation and Serbia. *Ekonomika preduzeća*, 66(1-2), 107-119.
 37. Savić, D. (2019). From digitization, through digitalization, to digital transformation. *Information Discovery, Technology, Strategies*, 43(1), 36-39.
 38. Savić, N., Lazarević, J., Kukić, Z., & Marinković, E. (2019). Digital transformation: Challenges for companies in Serbia. *Ekonomika preduzeća*, 67(1-2), 101-114.
 39. Schallmo, D., & Williams, C. (2018). Digital transformation of business models – Best practices, enablers and roadmap. In *Proceedings of the XXVIII ISPIM Innovation Conference – Composing the Innovation Symphony*, 1-13.
 40. Schwer, K., Hitz, C., Wyss, R., Wirz, D., & Minonne, C. (2018). Digital maturity variables and their impact on the enterprise architecture layers. *Problems and Perspectives in Management*, 16(4), 141-154.
 41. Semenčenko, D., Popović-Pantić, S., & Živković, L. (2015). Training as the indicator of female entrepreneurship development and training needs analysis. *Journal of Women's Entrepreneurship and Education*, (1-2), 18-36.

42. Statistical Office of the Republic of Serbia. (2017a). *Bilten – Naučnoistraživačka delatnost u Republici Srbiji*. Belgrade: Statistical Office of the Republic of Serbia.
43. Statistical Office of the Republic of Serbia. (2017b). *Visoko obrazovanje 2016/2017*. Belgrade: Statistical Office of the Republic of Serbia.
44. Stief, S., Eidhoff, A. T., & Voeth, M. (2016). Transform to succeed: An empirical analysis of digital transformation in firms. *International Journal of Economics and Management Engineering*, 10(6), 1833-1842.
45. Tumbas, S., Berente, N., & Bocke J. V. (2017). Three types of chief digital officers and the reasons organizations adopt the role. *MIS Quarterly Executive*, 16(2), 121-134.
46. Urbach, N., & Ahlemann, F. (2016). *IT-management im zeitalter der digitalisierung: Auf dem weg zur it-organisation der zukunft*. Heidelberg: Springer.
47. Westerman, G., Tannou, M., Bonnet, D., Ferraris, P., & McAfee, A. (2017). *The digital advantage: How digital leaders outperform their peers in every industry*. Retrieved from: https://www.capgemini.com/wp-content/uploads/2017/07/The_Digital_Advantage__How_Digital_Leaders_Outperform_their_Peers_in_Every_Industry.pdf.
48. Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Harvard Business Review Press: Boston, Massachusetts.
49. Westerman, G., Tannou, M., Bonnet, D., Ferraris, P., & McAfee, A. (2012). *The digital advantage: How digital leaders outperform their peers in every industry*. Cambridge, MA: MIT Center for Digital Business and Capgemini Consulting.
50. Yu, Y., Dong, X. Y., Shen, K. N., Khalifa, M., & Hao, J. X. (2013). Strategies, technologies, and organizational learning for developing organizational innovativeness in emerging economies. *Journal of Business Research*, 66(12), 2507–2514.



Sanja Popović-Pantić

Her professional interests are entrepreneurship, innovation management, association's development, and research & development. She obtained her PhD degree in female entrepreneurship in 2013 from the Faculty of Economics, University of Belgrade. She has been chairing Woman's Entrepreneurship Group within Enterprise Europe Network since May 2015. Sanja Popović-Pantić is the leader of the biggest national association of female entrepreneurs in Serbia. She has been running the Association since 1998. During that time, nearly 200 projects have been implemented in the field of strengthening female entrepreneurial initiatives, projects, start-ups and establishing companies. She also has a strong academic background, as she is employed as scientific associate in Science and Technology Policy Research Center at the Institute Mihajlo Pupin. Over the last two years, she has been managing a Danube Transnational project in Serbia aimed to establish innovation laboratories within the municipalities in seven Danube region countries as the main focal points for the development of the entrepreneurial skills among young people. In Serbian consortia of the Enterprise Europe Network, she has been managing the project within the Institute Mihajlo Pupin, as one of the partners, since 2016. She is author of two books on entrepreneurship and a number of scientific papers published in national and international journals and proceedings. Her greatest passion is creating a female-friendly businesses environment with a "can do" attitude. Mrs. Popović-Pantić is the most respectable national consultant in female entrepreneurship, specialized for innovation in the SME sector. The US Embassy in Serbia nominated her for The World of Difference 100 Award, which was presented to Sanja by The International Alliance for Women in 2012. In the same year, she was awarded with a respectable national award "PLANETA BIZNIS" and a regional one for her contribution to the development and promotion of entrepreneurship in the Western Balkans "Creators for Centuries"



Dušica Semenčenko

Her broadest professional interest relates to the research of internal laws of the development of science and technology and their impact on the development of society. Her most significant contribution to the development of science in Serbia has been provided through a theoretically developed model of action and interaction of investigated factors influencing the state and development of the National Innovation System of Serbia. The national innovation system, as a theoretical concept, remains the basic subject of her work, with particular emphasis on the historical and cultural condition of technological development. Among the narrower fields she specializes in are research and support for the development of female entrepreneurship and education of women entrepreneurs. She specialized professionally in the field of national technology foresight organizations and the role of governments in science-technology-innovation policies design. She is lecturer at postgraduate doctoral studies at the University of Belgrade, within the program History of Philosophy, Science and Technology, teaching a course in Technology and Transition Since 2013. She is also innovation consultant in basic methods for innovation introduction to different types of organizations, and cofounder and Secretary General of the association Technology and Society. She published more than 100 scientific and professional papers and four books.



Nikola Vasić

is Junior Researcher at the Institute Mihajlo Pupin, Science and Technology Policy Research Center. He is PhD candidate at the Faculty of Economics, University of Kragujevac, Department of Macroeconomics. His primary areas of interest are science and technology development, innovation, applied econometrics, female entrepreneurship, SMEs. He is currently involved in the project Enterprise Europe Network financed by the European Commission, which helps SMEs innovate and grow on an international scale.