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Blagoje Paunović
University of Belgrade
Faculty of Economics
Department of Business Economics and Management

Zorica Aničić
University of Belgrade
Faculty of Economics
Department of Business Economics and Management

IMPACT OF THE COVID-19 CRISIS ON SMES AND POSSIBLE INNOVATION RESPONSES

Uticaj kovid 19 krize na MSP i mogući inovativni odgovori

Abstract

The aim of this paper is to analyze the impact of the COVID-19 crisis on the business operations of small and medium-sized enterprises (SMEs) in Serbia as well as to identify the best ways to overcome the crisis effects and stimulate further SME growth. On a sample of 689 SMEs in Serbia, in the present paper we study the impact of the COVID-19 crisis on both the overall business of firms and certain aspects of their business (demand, logistics, organization of business activities, collection of trade receivables, and access to financing). The results of our research suggest that the crisis effects vary across the SME sector depending on the business activity, size, region an SME operates in, and the extent of achieved business digitalization and networking during the pandemic. Lastly, based on the effects of the COVID-19 crisis on the business operations of SMEs in Serbia and taking into account the experiences of other economies with the COVID-19 crisis as well as the lessons learned from previous crises, in this paper we highlight the significance of innovation and possible innovation responses of SMEs to the crisis effects as the ways to overcome it.

Keywords: *COVID-19, SMEs, innovations, innovation responses of SMEs, Serbia*

Sažetak

Cilj rada je analiza uticaja kovid 19 krize na poslovanje sektora malih i srednjih preduzeća (MSP) u Srbiji, ali i identifikovanje načina za prevazilaženje efekata krize i podsticanje njihovog daljeg rasta. Na uzorku od 689 MSP u Srbiji u radu su posmatrani efekti kovid 19 krize na ukupno poslovanje preduzeća, ali i na njihove pojedinačne aspekte poslovanja (tražnja, logistika, organizacija, potraživanja i finansiranje). Rezultati istraživanja ukazuju da efekti krize variraju u sektoru MSP u zavisnosti od njihove delatnosti, veličine, regiona u kome posluju, kao i nivoa postignute digitalizacije i umrežavanja tokom pandemije. Konačno, polazeći od efekata koje je kovid 19 kriza izazvala u poslovanju MSP u Srbiji, zatim od iskustava drugih privreda u pogledu kovid 19 krize, ali i lekcija naučenih iz ranijih kriza, u radu se ukazuje na značaj inovacija i mogućih inovativnih odgovora MSP na efekte krize kao načina za njeno prevazilaženje.

Ključne reči: *kovid 19, MSP, inovacije, inovativni odgovori MSP, Srbija*

Impact of the COVID-19 crisis on firms' business operations

The research of the short-term COVID-19 pandemic impacts conducted by the World Bank Group [2] on over 100,000 businesses in 51 countries shows that the Coronavirus crisis has had a severe impact on business operations, manifested as a widespread sharp drop in sales (on the average by 49% year-on-year), employment decrease, rather through decreased hiring intensity (granted leaves, reduced working hours and reduced salaries) than through lay-offs, with various liquidity restrictions in some countries, but generally with intensified negative effects of financial restrictions on smaller businesses. The research reveals that the most significant response of the firms to the crisis is their increased use of the internet, social media and digital technologies (34% of the respondent firms), but that such increased use of digital platforms is significantly less among smaller businesses, as well as that in this respect there are notable differences among countries, and that 17% of the firms have made investments in new equipment, software or digital solutions in response to the pandemic. A quarter of the surveyed firms have made some product innovation by introducing a new product or service into their product and service mix, or by improving some of the existing products or services.

According to the research conducted in Serbia in May 2020 by the World Bank Group and Center for Advanced Economic Studies [39], it is estimated that during the lockdown SMEs experienced an average revenue decline of 18-44%, and the smaller the firm, the sharper the revenue drop. However, the surveyed firms showed extraordinary resilience given that only 1% of the respondents believe that they will need some form of debt forgiveness to maintain their business if the business should resume the normal course after the lockdown. The most severe revenue plummet was caused by falling demand, particularly in the lockdown sectors due to their shutdown or blocked operations. Outside of the lockdown sectors, the highest restrictions on the supply side were caused by reduced working hours as the curfew was introduced. The government measures to counteract COVID-19 compelled almost all firms to make some operating adjustments, but when those adjustments were implemented, the authors have concluded that those seem not to pose significant restrictions in the future business operations outside of the lockdown sectors.

The Supply Chain Digital Report (2020) shows that 94% from the Fortune 1,000 companies believe that COVID-19 has brought about a supply chain disruption, 75% of them have experienced a negative or a very negative impact on their business and 55% of the companies are planning, or have already done so, to downgrade their growth outlook. Supply chain disruptions in the COVID-19 crisis were caused by inefficient logistics operations which resulted in piling up of orders and extended deliveries, for several weeks at times, difficult procurement due to transport disruptions and shutdown of capacities for the production of raw materials and semi-finished products, and operational disruptions, particularly in labor-intensive industries due to the necessary compliance with the healthcare and safety measures, falling orders due to uncertainty, deferred payment of liabilities due to financial difficulties of the customers, etc. [34] A lack of transparency and resilience of supply chains and unsustainable just-in-time manufacturing are additional causes of supply chain disruptions [35]. In a case study of the face mask value chain in the United States, Gereffi shows that misalignments between the priorities of U.S. federal government officials and the strategies of leading U.S. multinational producers of face masks resulted in exceptionally costly delays in terms of health outcomes due to delays in the supply of that personal protective equipment product, and that such delays were more a policy failure than a market failure [15].

Beenee investigated the impact of the COVID-19 disaster on the resilience of local food systems in low and middle-income countries. The author highlights that the struggle against the pandemic led to the isolation and movement restrictions imposed by governments or local governance, which consequently caused a decline in income and purchasing power, thus affecting people's food security, particularly among the poor. The adverse COVID-19 impact reflects directly on the food security of various local food system participants, such as farmers and producers, transporters, wholesalers and retailers,

and consumers. The author suggests that in overcoming the negative COVID-19 crisis effects on local food system resilience, some principles considered in the literature on the climate change adaptability or value chains could be significant, such as diversification, substitution, entrepreneurship, cooperation, competition, etc. [3]

The Report of OECD demonstrates that COVID-19 has imposed shocks on all segments of food supply chains, simultaneously affecting farm production, food processing, transport and logistics, and final demand. Farm production has been affected by bottlenecks for inputs, most notably labor as well as seed, pesticides, fertilizers, and energy. On the other hand, food processing industries have been most affected by the rules on social distancing, labor shortages due to sickness, and lockdown measures to contain the spread of the virus. Bottlenecks in transport and logistics have generally made the movement of products along supply chains more difficult, but the disruptions varied depending on the mode of transport, with air freight most severely affected. There have not been major losses in bulk shipments, while disruptions to container and truck transport fall somewhere in-between. In consumer demand, there has been a drastic shift away from restaurants, food service and other types of "food away from home" towards food consumed at home, accompanied by an equally drastic soar in retail food demand, with particularly dramatic increase in sales of frozen and packaged foods [28].

Hao et al. examine the COVID-19 impact on the hotel industry in China and propose a conceptual COVID-19 management framework for counteracting the crisis in the post-COVID-19 period, comprised of phases (before, during and after the disaster), principles and strategies (leadership and communication strategies, HR strategies, service provision strategies, CSR strategies, financial strategies). The proposed framework involves all the hotel industry stakeholders (i.e. investors, property owners, customers, employees, communities, and the government). The study suggests that the pandemic will have significant and lasting effects on the following four major aspects of the Chinese hotel industry: multi-business and multi-channels, product design and investment preference, digital and intelligent transformation, and market reshuffle [18].

The evidence that the COVID-19 pandemic has had harmful effects not only on tourism and hotel industry, passenger transport and the service sector in general, but on manufacturing and logistics as well, is demonstrated in the study of Hilmola et al. The authors present the results of the research conducted in Northern Europe, particularly in Finland, based on the data obtained through surveys of large, medium and small enterprises involved in manufacturing, and secondary data on their imports-exports, revenues and the like. The surveys were conducted during the first wave of the pandemic. The data on foreign trade show that COVID-19 had a significant downward impact on Finland's exports and imports (a 20-30% decrease compared to December 2019), while the survey results reveal that most of the companies surveyed (75.4%) were able to successfully meet their customer demand requirements, that most of the companies did not have increased transportation costs due to the pandemic (although 44.3% respondents expected transport costs to rise), and that the pandemic might lead to higher inventory holdings, but in the longer term the respondents expected the inventories to return to the previous levels. This research shows that the pandemic has had asymmetric effects on manufacturing and logistics as some companies (particularly SMEs and some foreign markets) were more affected than the others [20].

Lutfi et al. demonstrate that social distancing as a measure to prevent the coronavirus spread, has affected SMEs in Indonesia, causing falling demand and revenue, increased costs of raw materials and production costs due to supply chain problems, but not resulting in reduced employment owing to stimulating economic policies [24]. According to Foss, social distancing due to COVID-19 has led to a number of changes in firms' organizational design. The author highlights two significant short-run organizational changes: one is manifest in the transformation of work from on-site work to mediated work via online platforms and the other means that companies were compelled to transfer decision competence to local managers [11].

Many researchers investigate the impact of the COVID-19 crisis on the financial position of companies, significance of asset management in times of crisis, financing in times of crisis, and importance of financial contingency planning

[4], [5], [8], [27], [36]. Zimon & Dankiewicz analyze the pandemic impact on the trade credit management strategy in Polish construction industry SMEs working together as part of group purchasing organizations during the period March and April 2020. Their analysis of the following financial indicators: receivables turnover ratio in days, the share of short-term receivables in current assets, credit position and the share of short-term investments in current assets, shows that during the first wave of the pandemic, compared to the pre-pandemic period, a shift occurred in trade credit management from moderately conservative and conservative to highly conservative policies. Changes in the ways these firms use trade credits are reflected in more prudent and reserved purchase of goods, stricter monitoring and control of all trade receivables, and a shift to cash sales or more limited long-term credit sales [36].

Based on the data on various types of businesses that were increasing their cash holdings in the pre-COVID-19 period, Cowling et al. estimate what types of SMEs will be most at risk of running out of cash if the crisis extends for a lengthy period of time. The significance of the precautionary saving practice for improved resilience of SMEs in times of crisis is heightened by the fact that, despite the implementation of several UK government-backed loan schemes designed to provide access to finance during the crisis, most SMEs typically respond to extreme uncertainty by avoiding additional borrowing in case they default on new loans. The analysis findings show that only 39% of the businesses were bolstering their cash balances leading up to COVID-19, which suggests that 61% of businesses may run out of cash. The authors estimate that there are potentially 118,639 UK businesses at immediate risk of a liquidity crisis if they cannot generate a revenue stream for a few months, and if the crisis should extend into the medium term (12 months or more), the number of businesses exposed to this risk may exceed 800,000. The majority in both these scenarios are micro businesses [8].

Analyzing database information on equity financing in the UK for Q1 and the first two months of Q2 2020, Brown et al. find that the volume of new equity transactions in the United Kingdom has declined markedly since the outbreak of the COVID-19 pandemic, with the sharpest drop in seed finance [4].

Carletti et al. forecast that a three-month lockdown in Italy in mid-COVID-19 pandemic will lead to an aggregate yearly drop in profits of about 10%, resulting in a 17% profit decrease for the sampled firms (80,972 firms), with more severe profit falls and financial distress for firms with high pre-COVID-19 leverage and those belonging to the manufacturing and wholesale trading sectors [5].

Impact of the COVID-19 crisis on business operations of SMEs in Serbia

Based on the results of the empirical research conducted in the wake of the first wave of the COVID-19 crisis (during July and August 2020), in this section of the paper, on a sample of 689 Serbian SMEs, we analyze the impact of the COVID-19 crisis on SMEs in Serbia.

In order to assess in what way the COVID-19 crisis has affected different aspects of business in SMEs in Serbia, in this section of our research we examine the nature, intensity and consequences of this impact. Our sample includes micro-sized entities (23%), small (58%) and medium-sized entities (19%). Manufacturing firms comprise about 29% of the sample and, in parallel to the country's economy structure, the service industry firms are more numerous (71%). Out of the total firms sampled, 42% of them operate in the domestic market only, while the remaining 58% operate in foreign markets irrespective of whether they do or do not operate in the domestic market as well. The sample also reflects the country's regional distribution of SMEs with the largest share of SMEs from the most developed region of Belgrade (33%) and the smallest share of SMEs from the poorest region of South and East Serbia (16%), while the firms from the remaining two regions have equal shares both in the country's economy and in our sample. The sample shares of SMEs involved in certain industries largely reflect the country's industry structure of the economy.

The sampled SMEs responded to the questions in the survey questionnaire, where they were asked to evaluate in what way the COVID-19 crisis affected their overall business as well as different individual aspects of their business such as logistics (procurement of materials, distribution of products, etc.), organization of business

activities (organization of processes, organization of the production process and work of employees, etc.), demand for their products/services (quantities of products/services sold, numbers of customers interested in their products/services), collection of trade receivables, and access to financing from external financial sources (banks, friends, etc.). As it is important to consider the type of SME when assessing the level of exogenous shock caused by the crisis [22, p. 501], we analyzed the overall impact of COVID-19 on SME business and its impact on the five aforesaid business segments along several significant features such as business activity, size, region, the extent of networking, and business digitalization (see Table 1 and Table 2 in Appendix).

Table 1 shows that, throughout the entire sample, the overall impact of COVID-19 on the business of SMEs and its impact on the five individual business segments were both perceived as negative, on the average. The most severe negative impact was on the product/service demand and customer acquisition segment, which is followed by the impact on the collection of receivables and then by equally negative impacts on logistics and the organization of business activities, while the least negative impact was recorded in the segment of obtaining financing. The last finding and the fact that, despite difficulties in the collection of receivables, few of the sampled firms applied for and used liquidity loans suggest that over the observed period the surveyed firms predominantly used a retrenchment strategy by reducing operating costs in the circumstances of falling demand and difficult receivable collection. This is consistent with the conclusion of Cowling et al. [8] that despite the implementation of several UK government-backed loan schemes designed to provide access to finance during the crisis, most SMEs typically respond to extreme uncertainty by avoiding additional borrowing in case they default on new loans. That additional borrowing was of little significance for SMEs is confirmed by the findings of the World Bank research where only 5% of micro-enterprises, and 7% of small and medium-sized ones that had financial difficulties applied for a loan during the lockdown, relying primarily on the their own reserves (62% of micro-enterprises, 64% of small, and 69% of medium-sized enterprises) [39].

When the pandemic impact is observed in manufacturing compared to the service sector, it is evident that the impact of the COVID-19 crisis was more severe on the firms belonging to the service sector than on manufacturing firms, in all three size categories (micro, small and medium-sized entities). Although in all business segments the observed impact was more intense in service than in manufacturing firms, this difference is particularly notable in the areas of logistics and financing. In the group of service sector SMEs, the most severe negative effects were recorded in the demand for services and logistics segments, whereas in the group of manufacturing firms, the demand for products and collection of receivables were most affected.

Regarding the firm size, it can be observed that there are certain differences in the intensity of the pandemic impact as well as in its nature. Table 1 shows that the larger the firm size, the less the intensity of adverse impact. In other words, most and worst affected were the smallest firms (sole entrepreneurs and micro-enterprises), slightly less adversely affected were small entities, and medium-sized firms recorded the least negative effects on their overall business. This is consistent with the view expressed in the research of the World Bank that medium-sized entities were less affected by the crisis in contrast to small and large enterprises probably due to their ability to combine their organizational and productive flexibility with greater ability to obtain resources, while micro-enterprises were more severely affected as they are predominant in the "lockdown sectors" [39]. Based on our detailed analysis of the COVID-19 impact on individual business segments, we may conclude that such an evaluation of the overall conditions is mostly a result of the pandemic impact on the demand for products and services, as in this case the aforedescribed inverse relationship is particularly notable. This could be explained by the fact that medium-sized firms already had long-term contracts executed with some other businesses (most commonly larger) as customers, which allowed them some certainty and production continuity at least for some time, even in a crisis. In addition, as a rule, medium-sized companies have a wider product and service portfolio than the small ones and are therefore less sensitive to the risk of changes in demand and more flexible in meeting new market requirements. The position

of small firms in a crisis is recognized as inferior to that of medium-sized ones by Neise & Diez as well [26]. Analyzing flood adaptation strategies applied by the manufacturing firms in Indonesia, the authors conclude that the adaptation of small firms to flood crisis is less effective compared to that of medium and large companies to their inferior routines and dynamic capabilities.

On the other hand, although all firms cited collection of receivables as a significant problem during the pandemic, Table 1 clearly shows that this problem is more manifest in medium-sized than in small and micro firms. This may be a consequence of the fact that, unlike sole entrepreneurs, which usually collect receivables for their products/services instantly, larger companies provide their customers with longer payment terms so that they had more serious problems to collect those receivables with the onset of the crisis. Shorter collection periods are significant according to the research of Zimon & Dankiewicz [36], who highlight that, due to the crisis, changes occurred in the use of trade credits, and that those changes entail, inter alia, a shift to cash sales or more limited long-term credit sales. Further, in the segment of business activities organization, a more adverse effect can be observed in medium than in micro-enterprises, which may be a direct consequence of the introduced government measures. A relatively significant COVID-19 impact on the organization of business activities is to a large extent dependent on the employees' commute problems due to the suspended intra-settlement and inter-settlement public transport during the observed period. This is consistent with the World Bank research where it is pointed out that smaller firms were able to organize employee transport to work and their shortened working hours more easily [39]. Moreover, the compulsory measure of restricting the number of people per square meter of workspace, i.e. the prescribed physical distance between the employees, and the switch from on-site work to remote work via online platforms posed additional difficulties in organizing daily business activities and allowed for more opportunistic behavior of employees. Associating these organizational changes resulting from the physical and social distancing due to the COVID-19 crisis with the economics-based organization design theory, Foss [11] explains that such changes will induce further changes in employee reward systems towards more performance-dependent salaries, as well as a higher degree of formalization as organizations seek to maintain control under conditions of distance and reduce the moral hazard problems caused by a higher level of informational asymmetry. Although the aforesaid measures had a negative impact on the organization of business activities in all sampled SMEs, it was much harder for companies with larger headcount (50 to 250 employees) to implement these activities.

The pandemic effects were far less pronounced in the segment of obtaining financing from external sources in all three size groups of companies, particularly in larger enterprises. This is a result of the predominant focus of all firms on internal sources of financing (by reducing assets, deferring liability settlement, etc.) on the one hand, and on the other, of the government measures to support companies, which were mostly financial in nature.

It is interesting that, although the COVID-19 crisis impact was designated as negative or extremely negative in all regions, the most severe adverse impact was recorded in the most developed (Belgrade) and most underdeveloped (South and East Serbia) parts of the country, while the remaining two regions (Vojvodina and Central and West Serbia) experienced more moderate adverse effects. The uneven pandemic impact is related to the regional economic structure of manufacturing and service companies[1].

The greatest differences in the pandemic impact are manifest among individual industries. Table 1 shows that the most severe adverse pandemic effects were experienced by the following industries: arts, entertainment and recreation, accommodation and food service activities, mining and quarrying, transportation and storage, and education. Analyzed by business segments, although the said industries were most affected in all the segments, the strongest negative impact was recorded in the demand for products and services. The lockdown introduced in the observed period and complete suspension of work in

1 Viewed by the region, the largest numbers of employees in the processing industry (the most significant portion of the manufacturing sector, which has suffered much less adverse COVID-19 impact than the service sector) have the Vojvodina Region (31.0%) and Šumadija and West Serbia Region (31.9%). Statistical Yearbook, Statistical Office of the Republic of Serbia (available at: https://publikacije.stat.gov.rs/G2019/Pdf/G20192052.pdf)

museums, cinemas and theaters account for the highest negative effects in the arts, entertainment and recreation industry. Significant negative effects were recorded in the accommodation and food service activities and in the transportation and storage industry. In addition to the effects of the lockdown, shortened working hours, and other internal safety and protection measures, the biggest losses incurred in these industries were due to the closing of international borders. The closing of international borders significantly affected the transportation and storage industry, which is evidenced by the fact that among larger companies, which suffered a much more severe impact than micro-enterprises in this industry, more numerous are those that operate in foreign markets. Moreover, the closing of international borders dealt a severe blow to the accommodation and food service activities, which reduced the number of foreign tourists, and led to extremely low occupancy rates. A huge blow was struck to the education industry, which was expected since in the first wave of the crisis educational institutions were forced to completely change their previous business model. The two industries that comprise most of the country's economy, wholesale and retail trade and manufacturing industry recorded negative effects as well, yet slightly less severe than average. Finally, the least affected industries include real estate activities, administrative and support service activities, human health and social work activities. In terms of impact on the individual business segments, some of these industries even recorded positive pandemic effects. Lim et al. [23] also suggest that the pandemic has had twofold effects, analyzing both positive and negative impacts of the COVID-19 pandemic on the growth of SMEs. In our sample, there were no negative effects on the organization of business activities in the education industry. Although suffering the most intensive stresses due to the business model change, this sector saw this change in the business model leading to digitalization and, consequently, more efficient organization of the work modes, as is found by Ebersberger & Kuckertz [10]. Although it is assumed that universities are inert in times of crisis, the authors conclude otherwise and demonstrate that universities and research institutions had the responses to the COVID-19 crisis that did not differ much from those of the established incumbent firms. Positive COVID-19 effects on the organization of business activities in medium-sized enterprises were seen in the electricity, gas, steam and air conditioning supply industry. Although the COVID-19 pandemic caused falling demand in most industries, it had a positive impact on the demand in the real estate micro firms.

The importance of networking and digitalization in crisis is highlighted by the finding that the firms most severely affected by the pandemic searched for help through networking and digitalization of their business. As the question about networking in our questionnaire is asked so that the response indicates whether the firms asked for assistance and advice from other entities after the onset of the COVID-19 pandemic, based on Table 2 we may conclude that, regardless of their size, the firms that suffered the most severe adverse pandemic impact on their overall business were most engaged in networking, exchanging experiences, and seeking advice and help form other companies. Another observation here is that an increase in the size of firms correlates with increased share of firms engaged in networks of other entities, on the one hand, and decreased severity of the COVID-19 impact, on the other. This suggests that networking and exchange of experiences with others were significant during the crisis, and that a greater extent of networking contributed to a decrease in the intensity of COVID-19 effects. A good example of the role collaboration had in overcoming the crisis are SMEs in Bogo Village, which, through collaboration at the individual, community and institutional levels, managed to turn their fall in sales of 70% at the onset of the pandemic (March 2020) into a growth in sales of 200% in July 2020 [33].

In parallel with the foregoing conclusion, the firms that experienced more severe COVID-19 impact on the overall business applied business digitalization to a greater extent (i.e. used at least one of the following three forms of digital business: digital sales, digital marketing and/or digital procurement of resources). Since the industries that suffered the most severe adverse effects in most cases were forced to apply at least one of the aforesaid forms of digital business (e.g. online theatre plays and gallery exhibitions, a shift from in-house to online food ordering and delivery in restaurants, a shift from traditional to online lectures

for schools and universities, etc.), it is reasonable that the firms with digital business made up the vast majority of all the sampled firms as well as the vast majority in each category of the firms sampled. Moreover, the increase in the size of the firms correlates with the increase in the extent of their business digitalization and lesser severity of the COVID-19 impact, which is evidence of the contribution of digitalization to counteracting the pandemic. This is consistent with the conclusions of Apedo-Amah et al. showing that the most significant response of firms to the crisis is increased use of the internet, social media and digital technologies, yet that such increased use of digital platforms is significantly less observed in smaller firms [2]. If we observe only those of our sampled firms that used digitalization to a great extent (i.e. used all three forms of digitalization), their number is still low (16%), which implies that in Serbian SMEs digital literacy is still low.

Innovation responses of SMEs to the Covid-19 crisis

In the struggle against the crisis effects, a prompt, yet at the same time a well-thought-out strategy is the first step in overcoming the crisis. Regardless of the varying crisis effects on different types of firms, business activities and segments, each of those firms must find an adequate response to the crisis in order to adapt to a new normal. Although crises in general restrain innovation activities, it is quite common that crises bear the potential for new entrants to cater to new needs [10, p. 126], yet they can trigger significant changes in incumbents facing the crisis.

Experiences of most countries and economies after the global financial crisis (GFC) show that investments in R&D contributed considerably to the mitigation of the crises effects and that it is innovation that moved the entire economic order forward. Given that there are similarities between the GFC and COVID-19 crisis (firstly, both are cases of a sharp exogenous shock and secondly, in both crises the most severe effect on firms is reflected in their reduced liquidity – in the case of the GFC in reduced availability of commercial financing, and in the case of the COVID-19 crisis in reduced turnover [31, p. 510]), experiences of firms from the GFC and other crises may provide a basis for the creation of strategies for overcoming the COVID-19 effects. For example, according to Roper & Turner, companies that were able to maintain adequate R&D investments during and after the GCF not only survived the crisis with less difficulty, but also achieved higher growth and profitability [31]. Further, relying on the data from the post-GFC period, Devece et al. conclude that innovation and opportunity recognition are more relevant as success factors during periods of recession than during periods of prosperity [9]. Hausman & Johnston [19] underline a significant impact of innovation on the economy and its critical role in pulling the economy out of a financial crisis. In addition, in their study, these authors recommend both the management and external stakeholders how to stimulate innovation and enable easier overcoming of exogenous disasters. Consequently, innovation will be the key factor of the firms' recovery in the case of COVID-19 crisis as well, and the hub of economic and social recovery of the entire country.

On the other hand, innovation activities are by their nature expensive for all companies, risky and always uncertain in terms of their outcomes. A limiting condition in instances of SMEs is a lack or difficult access to resources, which puts this group of companies into an even more disadvantageous position in terms of overcoming the effects of the COVID-19 crisis through innovation. Companies that entered the crisis with more financial slack have a greater ability to respond to the crisis effects by undertaking more risky and radical innovation than those with substantial financial constraints [31, p. 511]. Therefore, firms must search for new and cheaper ways of creating innovation.

One way to overcome this type of constraint and manage innovation in SMEs entails their greater openness. Analyzing how openness as a response to a crisis contributes to mitigation of the crisis adverse effects on the economy and the entire community, Chesbrough (2020) highlights an even greater significance of opening up in innovation management during the crisis recovery periods [6]. Opening up mobilized knowledge from many different places, brought major advances in our learning and accelerated our progress against the virus (e.g. the Gates Foundation, Chan-Zuckerberg Foundation and the

White House Office of Science and Technology Policy joined forces to publish all of the known medical literature on the coronavirus, in machine-readable form; GITHUB and the Humanitarian Data Exchange each have an accumulating series of datasets on the geography of the spread of the disease) [6, p. 410]. Openness and joint efforts of scientists, pharmaceutical companies, governments and foundations all over the world have led to the most valuable innovation of all – the discovery of a COVID-19 vaccine. Adoption of such behaviors by business firms can stimulate their innovativeness and add to their faster and easier recovery and overcoming of the crisis adverse consequences.

Chesbrough & Bogers [7, p. 12.] define open innovation as a "distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model". Openness may stimulate value creation, thus allowing SMEs access to a greater and more diverse pool of knowledge and abilities [13, p. 27]. SMEs involved in open innovation activities are much more innovation-productive and will consequently record more significant entrepreneurial growth than those with a closed strategy [38]. According to Gassmann & Enkel, there are three core open innovation processes [14]. Firstly, the knowledge flow across the company boundaries may refer to the external knowledge inflow, where, relying on the achievements of others, a company may enrich its innovation capacities. Although this most commonly entails the acquisition/purchase of knowledge and innovative solutions from other firms in the environment, the external knowledge inflow does not necessarily require the possession of financial resources. By deploying the search strategy, SMEs may explore external sources of knowledge and information in order to strengthen or, more importantly in this crisis, accelerate their internal R&D capacities [32]. Here firms scan their environment, communicate with their customers, suppliers, distributors and others in order to gain access to novel ideas, knowledge and expertise to innovate. The access to missing technical knowledge, equipment, premises, laboratories and the like may greatly stimulate innovative capabilities of SMEs. In addition, cooperation with universities and access to well-trained students represent another source of external knowledge, which may contribute to the identification and deployment of innovation capabilities [21, p. 5]. For instance, Parida et al. [29] demonstrate that different inbound open innovation strategies may result in different innovation outcomes (incremental and radical innovations), but what they have in common is the fact that any form of openness leads to increased innovativeness of SMEs. Analyzing the change in innovation activities of firms caused by the globalization effects, Narula points out that SMEs tend to have higher R&D productivity, and this is largely due to their ability to innovate by exploiting the knowledge created outside the firm. The author explains this by the fact that, unlike large firms which have material advantages in creating and undertaking innovation, SMEs have the so-called "behavioral advantage" [25, p. 154]. Secondly, openness is also reflected in leveraging internal knowledge through external commercialization processes via putting ideas to market, licensing intellectual property (IP) and/or multiplying technology by idea transfer to other companies or stakeholders in the ecosystem [21, p. 5]. This means that ideas that have not been realized within a firm needn't be left lying in the drawer, but the firm may find an adequate way for their commercialization externally. Internally developed innovation or an idea for which there are no sufficient financial resources, or which is simply not related to a firm's core business activity, may be used by other companies in the market. Although such openness is more dominant in large companies, primarily due to their more substantial R&D capabilities and hence a large number of unused innovative solutions, some SMEs may also benefit from their own unused innovations (technological solutions no longer in use, ideas that have never been commercialized, etc.). Those are SMEs that operate in highly innovative industries where human capital excellence is the key source of innovation. The third and for SMEs an equally important process of achieving greater openness and, as a result, increased innovation, is that of coupled innovations. It includes joint value creation through alliances, synergies, cooperation and joint ventures, realized through both internalizing external knowledge and externalizing internal knowledge [21, p. 5]. Cooperation is based on a deep and long-term

relationship with stakeholders (customers, suppliers, competitors, universities, state authorities, etc.), whereby give and take of knowledge is the key to success for both sides [14, p. 12]. Pustovrh et al. demonstrate that SMEs involved in various forms of open collaboration will achieve higher innovativeness and thus a greater ability to commercialize innovation [30]. SMEs may build such collaboration with both other SMEs and large enterprises. Large companies often seek to enter into alliances with SMEs in order to exploit their flexibility and innovativeness, but the caution that SMEs exercise when it comes to choosing alliance partners is a major barrier to collaboration [25, p.154]. Therefore, introducing SMEs to the benefits and savings that they may realize by creating innovations with others is a big step toward a more innovative ecosystem. It is important to note that the aforementioned different forms of openness of SMEs require the different ways of organizing innovative activities that are manifested as differences in resource commitments, managerial commitment, reciprocity and the importance of trust [13, p. 8], as well as that the significance of an individual form of openness to a particular firm will depend on the firm's characteristics [14]. Thus, for instance, Hinteregger et al. [21, p. 21] emphasize that although inbound open innovation is important for the creation of innovation in all SMEs, its effects for small-sized enterprises are higher than for medium-sized ones, while the effects of coupled open innovation are significantly higher for medium-sized enterprises than for smaller ones.

In assessing whether a firm should engage in creating innovation independently or in collaboration with a partner, it is necessary to consider the firm's currently available resources. If a firm has sufficient own resources and capabilities to undertake innovation independently, it should do so without collaborating with others. However, a lack of own resources compels firms to join their resources with complementary resources of other companies, i.e. to undertake co-innovation activities with their partners. On the other hand, when deciding whether an innovative activity (independent or in collaboration with others) should be focused on the improvement of the existing business or the development of new areas of business, a company ought to take into account the magnitude of the COVID-19 crisis impact on its business. If the crisis has had severe adverse effects on its business, a company will focus on addressing the current pressing issues and retaining the existing customers in order to restore its business to the pre-crisis condition. In contrast, companies less or not at all affected by the crisis will use their position and search for the new opportunities created by the crisis, through which they may expand their businesses, attract new customers and create a long-term competitive advantage. How critical it is to assess these two dimensions prior to the selection of the most adequate innovation strategy, is explained by Wang et al. [37] in their research of the COVID-19 crisis effects on Chinese companies. Using two dimensions: (a) motivation for innovation, which reflects the magnitude of the COVID-19 crisis on the business (where a problemistic search entails a severe adverse effect, while a slack search refers to a minor or no effect of the crisis on the firm's business) and (b) the level of collaborative innovation (which reflects the extent of the firm's resources available for innovation and, consequently, a selection between independent innovation and collaborative innovation), the authors identify four innovation-based strategies. The first responsive strategy is focused on problemistic search and independent innovation, and it is deployed when a company suffers severe adverse effects of the COVID-19 crisis but at the same time has sufficient resources and internal capabilities to create innovation and improve the currently existing business (e.g. transition from offline to online marketing channels). In other words, a company will be able to implement this type of innovation successfully if it is able to reconfigure its previous offline resources and train them to work in an altered environment (e.g. Peacebird [37, p. 216], clothing manufacturer and sales company embraced the advantages of fast-growing internet platforms and, having switched from traditional to online sales, even improved its contact with consumers through its virtual store). Other examples are those firms that, in the circumstances of insufficient demand for their current product mix, used their resources and introduced new products whose demand was growing due to the crisis (e.g. due to the closing of restaurants and hotels, a UK gin distillery [40] used its technology and commenced

the production of disinfectants; Airbnb [17, p. 4] offered its users a completely new service of introducing other cultures from around the world to them). The collective strategy is also useful for the firms that experienced severe adverse COVID-19 crisis effects (problemistic search), yet do not have sufficient capacities to respond to the crisis independently or their business is not suitable for the online environment (collaborative innovations). In such cases, based on their own and their partners' resources, companies enter new business ventures to counteract the crisis effects, but at the same time, by remaining in the market, they maintain and revive the current business activities that have become less attractive due to the crisis (e.g. Sinopec Corp. [37, p. 216] entered into collaboration with local fruit and vegetable farmers and offered its customers a contactless supply of fresh groceries in its wide network of gas stations). The proactive strategy is characterized by slack search and independent innovation, which means that it is suitable for the firms that suffered little or no impact of the crisis and could use their capabilities and resources to create new businesses, thus expanding their current customer/user base and ensuring a long-term competitive advantage. Numerous companies used their accumulated slack resources of internet technologies as well as their current user bases in order to develop new businesses to satisfy novel needs that the crisis gave rise to (e.g. technology and social media firm Tencent [37, p. 218] developed an additional application – Tencent Conference – which enabled its users to resolve the problem of holding meetings during the lockdown; Cargo used its current customer base and placed the CargoButler service). Finally, the partnership strategy may be deployed in cases of no major adverse effects of the crisis, when a firm can join resources with another firm and enter completely new partnerships, thus using the opportunities created by the crisis. In the event of the COVID-19 crisis, this strategy will be based on the use of the advantages of digital technologies of a firm and complementary resources of its external partners (e.g. internet platform TikTok [37, p. 217] used its capacities in the area of digital technologies and offered completely new services such as online exhibitions, theater plays etc. in collaboration with theaters and museums).

Innovative changes are also important for the companies that are part of a global value chain (GVC), i.e. companies that at least in one of their business segments (whether it be the purchase of raw materials, production, distribution and sales or another segment) depend on defined bilateral or multilateral relationships of the countries they operate in. Although over the last several decades GVCs have been the cornerstone of the global economy, driving the expansion of international cooperation [16, p. 17], numerous trade restrictions among countries and crises such as the one caused by the COVID-19 pandemic lead to their disruption. Some researchers even speak of a "new era of significant isolationism" [1, p. 43]. Companies therefore face the need to find new strategies to organize their GVCs. Based on the historical case studies of three classic GVCs facing different trade restrictions since the 1970s up to date, Gereffi et al. [16] emphasize the significance of two strategies for the firms within GVCs in overcoming the restriction effects. One strategy entails switching production locations, markets and/or suppliers. In other words, companies may adapt to major restrictions imposed on the cooperation with other countries by changing the locations of supply and demand, thus replacing their previous partners within the supply chain with new ones (e.g. U.S. trade ban against Huawei and its suppliers forced Huawei to turn to domestic suppliers [16, p. 18]). Given that the introduction of bilateral restriction leads to relocating certain firms' activities to other countries less or not at all affected by the defined constraints, the restrictions imposed due to the COVID-19 crisis have even more severe effects as they significantly reduce the number of countries for cooperation. Thus, in order to mitigate the crisis effects, the companies that in any segment of their business have relied on the partners from other countries can now turn to partners in the domestic market. This view is supported by Antras [1, p. 37], who highlights that, in contrast to bilateral trade wars, where production is relocated to third countries unaffected by the bilateral trade war rather than being reshored to domestic economies, in the event of multilateral restrictions, deglobalization becomes more significant and the return to domestic market much more likely. The other group of strategies

includes economic upgrading strategies, which entail capturing more value by product upgrading, process upgrading, channel upgrading, integration in supply chain or functional upgrading, e.g. moving into higher value-added segments in GVCs [12]. Companies may pursue switching or upgrading strategies either separately or simultaneously. Such changes often result in the reconfiguration of the geographic and organizational structure of GVCs and in turn can have significant implications for the economic and social upgrading of countries and firms [16, p. 4]. To summarize, restrictions and constraints brought about by the COVID-19 crisis need not necessarily cause a demise of GVCs. Rather, they lead to their reconfiguration, where a key part in such reshaping is played by firms' timely selection of an adequate and innovate strategy.

Conclusion

The aim of this paper is to analyze the impact of the COVID-19 crisis on the business operations of SMEs in Serbia as well as to highlight the significance of innovation for mitigating and/or eliminating the crisis effects.

The main conclusion of the analysis is that that the overall impact of COVID-19 on SMEs' business and its impact on the five individual business segments are both perceived as negative, on the average, throughout the entire sample, with the most negative impact associated with the market operations of firms (product/service demand and customer acquisition), less negative impact recorded in the segments of logistics and business activities organization, and the least negative impact on financing. The COVID-19 crisis had more severe negative impact on service sector firms (particularly those in arts, entertainment and recreation, accommodation and food service activities, transportation and storage, and education industries) than on manufacturing firms, where mining and quarrying, manufacturing and construction industries were most severely affected. The negative impact of the COVID-19 crisis on the overall SMEs' business is inversely related to their size, i.e. micro-enterprises suffered the most severe impact, small-sized entities experienced less severe and medium firms the least severe impact. Such an impact of the crisis on the overall business of the sampled firms according to their size predominantly reflects the negative crisis impact on demand (the most severe impact on micro, less on small and the least on medium enterprises) and, to a smaller extent, the impact on logistics (the most severe impact on small, less on micro and the least on medium enterprises). The negative impact of the crisis on financing is almost the same for all SMEs, while the negative impact on the organization of business activities was the most severe in medium and the least severe in micro-enterprises with a similar distribution of the impact on receivables.

It is important to underline that, despite the average evaluation of the COVID-19 crisis impact on the overall business and individual business aspects of all SMEs in our sample as negative, individual business aspects of SMEs in some industries saw no negative impact of the COVID-19 crisis or its impact was even positive. The positive impact of the COVID-19 crisis was the most notable on the segment of business activities organization of medium-sized firms in the electricity, gas, steam and air conditioning supply industry and on the segment of demand for products/services of micro-enterprises in the real estate activities. The COVID-19 crisis had no negative effects on the organization of business activities in the education industry, where it made digitalization of the teaching process a necessity. Generally, the firms that suffered the most severe negative impact of the COVID-19 crisis on the overall business applied digitalization to a greater extent, where the extent of digital business rises with the increase in size of the firms, while the severity of the pandemic effects decreases. Similarly, SMEs tendency to engage in networking increases with more intense severity of the negative COVID-19 impact on their overall business. This tendency is more noticeable the larger the firms are and, as a result, the negative impact of the crisis is becoming less and less severe.

Lastly, based on the predominantly adverse effects of the COVID-19 crisis on the business operations of SMEs in Serbia and taking into account the experiences of other economies with the COVID-19 crisis as well as the lessons learned from previous crises, in this paper we highlight the significance of innovation responses of SMEs to the crisis effects.

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Table 1: Impact of the COVID-19 crisis on different business segments of SMEs in Serbia (Part 1)

	Overall Impact				Impact on Logistics				Impact on Organization				Impact on Demand				Impact on Receivables				Impact on Financing			
	Micro	Small	Medium	Total	Micro	Small	Medium	Total	Micro	Small	Medium	Total	Micro	Small	Medium	Total	Micro	Small	Medium	Total	Micro	Small	Medium	Total
Services	2.11	2.05	2.07	2.07	2.33	2.22	2.35	2.28	2.44	2.27	2.22	2.31	2.13	2.10	2.11	2.11	2.39	2.19	2.08	2.23	2.72	2.57	2.56	2.61
Manufacturing	2.14	2.18	2.18	2.18	2.19	2.41	2.53	2.41	2.62	2.34	2.21	2.35	2.19	2.21	2.38	2.24	2.19	2.28	2.32	2.28	2.86	2.78	2.79	2.80
Belgrade	2.08	1.96	2.13	2.02	2.34	2.24	2.45	2.31	2.34	2.14	2.21	2.21	2.09	2.01	2.11	2.05	2.29	2.21	2.21	2.24	2.64	2.62	2.60	2.62
Central and West Serbia	2.00	2.20	2.18	2.17	2.14	2.33	2.26	2.28	2.43	2.28	2.24	2.29	2.00	2.25	2.38	2.24	2.43	2.18	2.09	2.19	2.48	2.62	2.65	2.60
South and East Serbia	1.70	2.07	1.95	1.99	2.20	2.32	2.24	2.28	2.30	2.46	2.19	2.36	1.80	2.27	2.00	2.13	2.10	2.15	1.90	2.07	2.30	2.73	2.62	2.64
North Serbia	2.14	2.16	2.24	2.16	2.34	2.28	2.48	2.32	2.57	2.39	2.48	2.45	2.16	2.13	2.36	2.17	2.32	2.20	2.52	2.27	2.82	2.67	2.80	2.73
Accommodation and Food Service Activities	1.00	1.22	1.14	1.16	1.67	2.00	1.86	1.89	1.00	1.78	1.71	1.63	1.00	1.11	1.29	1.16	1.67	1.78	1.29	1.58	1.67	1.89	1.71	1.79
Administrative and Support Service Activities	2.20	2.50	3.00	2.44	2.40	2.50	3.50	2.67	2.40	2.50	3.00	2.56	2.20	2.50	3.00	2.44	1.80	2.50	3.00	2.22	2.20	3.00	3.00	2.56
Agriculture, Forestry and Fishing	2.31	2.35	2.25	2.32	2.23	2.15	2.50	2.22	2.46	2.50	2.25	2.46	2.38	2.35	3.00	2.43	1.92	2.15	2.50	2.11	2.92	2.80	2.75	2.84
Arts, Entertainment and Recreation	-	1.00	1.00	1.00	-	1.25	2.00	1.40	-	1.25	1.00	1.20	-	1.25	1.00	1.20	-	1.50	1.00	1.40	-	1.25	3.00	1.60
Construction	2.21	2.25	2.32	2.26	2.43	2.39	2.41	2.40	2.64	2.32	2.36	2.38	2.21	2.32	2.18	2.27	2.57	2.30	2.09	2.29	3.07	2.61	2.50	2.65
Education	-	-	2.00	2.00	-	-	2.00	2.00	-	-	3.00	3.00	-	-	2.00	2.00	-	-	3.00	3.00	-	-	3.00	3.00
Electricity, Gas, Steam and Air Conditioning Supply	2.00	2.50	2.00	2.38	2.00	2.83	2.00	2.63	3.00	2.00	4.00	2.38	2.00	2.17	3.00	2.25	3.00	2.00	2.00	2.13	3.00	2.67	2.00	2.63
Financial and Insurance Activities	2.17	2.33	3.00	2.36	2.17	3.00	2.50	2.45	2.17	2.67	3.00	2.45	2.00	2.33	2.50	2.18	2.83	2.67	2.00	2.64	2.17	3.00	3.00	2.55
Human Health and Social Work Activities	2.50	2.00	-	2.40	3.00	2.00	-	2.80	2.75	2.00	-	2.60	2.50	2.00	-	2.40	3.25	1.00	-	2.80	2.50	3.00	-	2.60
Information and Communication	1.67	1.88	2.43	2.06	3.00	2.50	2.43	2.56	2.33	2.25	2.43	2.33	1.67	2.13	2.71	2.28	2.67	2.25	2.43	2.39	2.67	2.50	2.57	2.56
Manufacturing	1.86	2.13	2.18	2.12	2.14	2.44	2.57	2.46	2.86	2.33	2.14	2.32	1.86	2.17	2.25	2.17	2.57	2.38	2.32	2.38	2.71	2.81	2.86	2.82
Mining and Quarrying	-	1.67	2.00	1.75	-	2.67	2.00	2.50	-	2.00	2.00	2.00	-	2.00	3.00	2.25	-	1.67	2.00	1.75	-	2.33	2.00	2.25
Other Activities	1.83	2.03	2.26	2.03	2.30	2.27	2.26	2.27	2.17	2.22	2.44	2.25	1.83	2.09	2.26	2.07	2.10	2.12	2.30	2.15	2.20	2.68	2.74	2.60
Professional, Scientific and Technical Activities	2.00	2.07	1.75	2.00	2.13	2.00	2.75	2.15	1.88	2.21	2.50	2.15	1.75	2.36	1.75	2.08	1.88	1.86	3.00	2.04	2.50	2.36	3.00	2.50
Real Estate Activities	3.00	2.50	2.00	2.60	3.00	2.00	3.00	2.60	3.00	2.50	3.00	2.80	4.00	1.00	2.00	2.40	2.50	3.50	1.00	2.60	3.00	2.50	3.00	2.80
Transportation and Storage	1.89	1.85	1.63	1.81	2.44	2.12	2.25	2.21	2.22	2.12	1.88	2.09	2.11	1.73	1.88	1.84	2.22	2.19	2.00	2.16	2.67	2.46	2.63	2.53
Water Supply, Sewerage, Waste Management and Remediation Activities	-	2.50	2.00	2.33	-	3.00	2.00	2.67	-	2.50	3.00	2.67	-	3.00	3.00	3.00	-	2.50	2.00	2.33	-	2.00	3.00	2.33
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	2.15	2.10	2.13	2.12	2.25	2.18	2.25	2.21	2.58	2.37	2.00	2.41	2.16	2.16	2.19	2.16	2.40	2.19	2.06	2.25	2.85	2.75	2.63	2.77
Total	**2.06**	**2.08**	**2.14**	**2.09**	**2.31**	**2.28**	**2.38**	**2.30**	**2.41**	**2.28**	**2.26**	**2.30**	**2.08**	**2.12**	**2.21**	**2.13**	**2.31**	**2.19**	**2.19**	**2.22**	**2.64**	**2.65**	**2.65**	**2.65**

Note: Since the strength of COVID impact on the overall business of SMEs, but also on their specific business aspects (logistics, demand, financing, receivables, organization of production and work of employees) is rated on Likert-scale ranging from 1 (extremely negative impact) to 5 (extremely positive impact), lower values in the table indicate a stronger negative impact of COVID.

Table 2: Impact of the COVID-19 crisis on different business segments of SMEs in Serbia (Part 2)

	Overall Impact				Share in Column Total			
	Micro	Small	Medium	Total	Micro	Small	Medium	Total
No Digital	2.12	2.19	2.22	2.18	41%	40%	34%	39%
Yes Digital (at least one of marketing, procurement and sales)	2.02	2.00	2.09	2.02	59%	60%	66%	61%
Total	2.06	2.08	2.14	2.09	100%	100%	100%	100%
Serbia Only Scope	2.13	2.11	2.13	2.12	52%	42%	29%	42%
International Scope	1.99	2.06	2.14	2.06	48%	58%	71%	58%
Total	2.06	2.08	2.14	2.09	100%	100%	100%	100%
No Networking	2.09	2.11	2.16	2.11	86%	82%	74%	81%
Yes Networking	1.91	1.93	2.06	1.96	14%	18%	26%	19%
Total	2.06	2.08	2.14	2.09	100%	100%	100%	100%

Blagoje Paunović

is Full Professor at the Faculty of Economics, University of Belgrade, and Chairman of the Department for Business Economics and Management. Professor Paunović is author and co-author of twelve books and a large number of scientific articles. During his career, professor Paunović has worked in various types of teams, from government bodies to research teams. He was Assistant Minister at the Ministry of Economy and Privatization (2002-2004), Director of the Scientific Research Centre of the Faculty of Economics, NICEF (2004-2009), and has chaired Managing/Supervisory Boards of the Guarantee Fund, Tipoplastika, Privredna banka Beograd, Clinical Centre Bezanijska kosa, Institute of Economic Sciences, and was member of managing/supervisory boards of several other companies. He participated in international funded projects and provided consultancy services assisting more than 70 private enterprises in different fields, including: business plan development, financial management, accounting, research and economic surveys, policy analyses and recommendations, etc.

Zorica Aničić

is Assistant Professor at the Faculty of Economics, University of Belgrade. She received her PhD degree from the Faculty of Economics, University of Belgrade. She has participated in a number of research projects funded by the European Union, Serbian Government and Serbian private companies in the domain of entrepreneurship, corporate governance, financial analyses, etc. She has had several articles published in international and national journals.