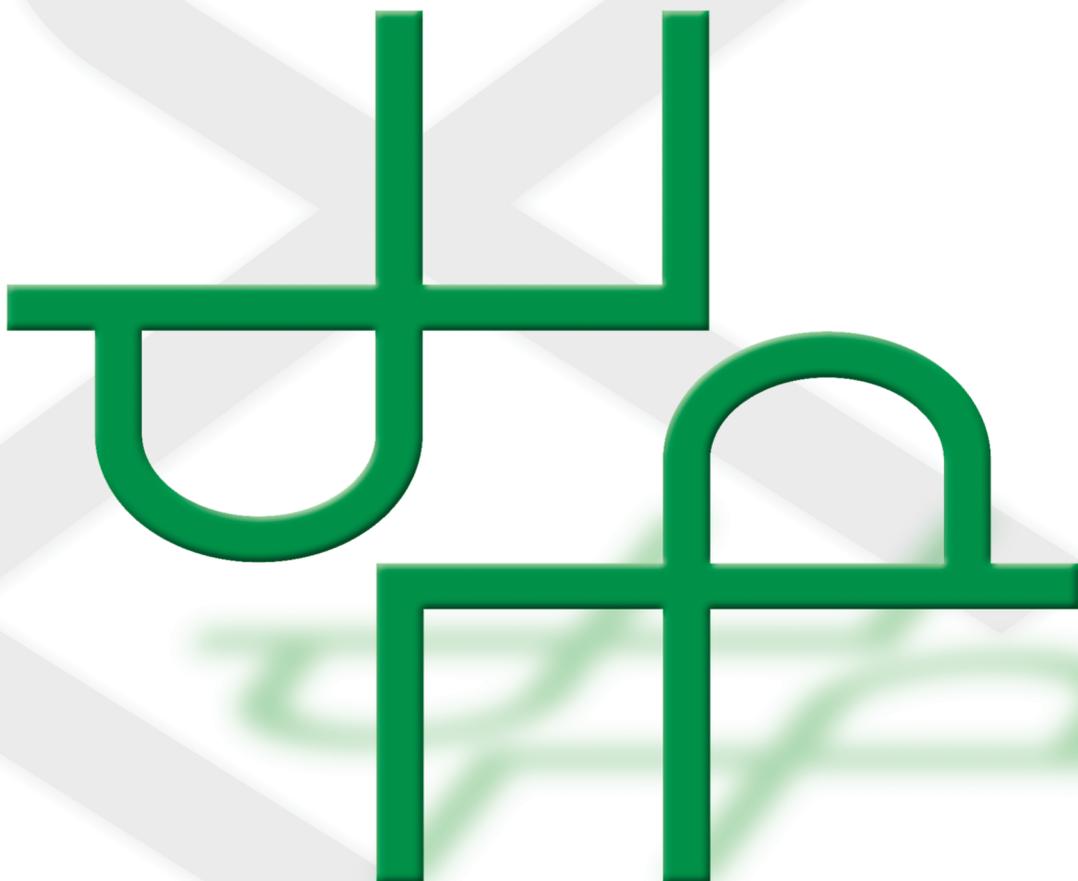


ЕКОНОМИКА

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2



МЕЂУНАРОДНИ ЧАСОПИС
ЗА ЕКОНОМСКУ ТЕОРИЈУ И ПРАКСУ И ДРУШТВЕНА ПИТАЊА



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3. The Republic Secretariat for Information of the Socialist Republic of Serbia, by its Resolution No. 651-126/73-02 from November, 27, 1974, approved of EKONOMIKA's requirement to be introduced into the Press Register. The Assembly of the Society of Economists of Nis, at its session on April 24, 1990, by its statutory resolution, confirmed the legal status of EKONOMIKA. At the session of the Assembly of the Society of Economists, Nis, on November 11, 1999, the resolution was adopted the EKONOMIKA was to open its own bank account.

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THE ROLE OF INDUSTRY 4.0 IN DIGITALIZATION OF PRODUCTION AND SUPPLY CHAINS

Abstract

Industry 4.0 enables intelligent manufacturing that focuses on designing, creating and delivering products and services tailored to individual customer requirements. This industry encourages the integration of various intelligent manufacturing systems and advanced information technologies, such as cyber-physical systems, the Internet of Things and the Internet of Services. The aim of this paper is to prove, on the basis of analysis of selected academic sources and examples from business practice, that Industry 4.0, as a global transformation of production and other business segments based on digitalization and the Internet, increasingly transforms existing supply chains into supply chains 4.0 and affects their business performance. There are three key parts of this paper. The first part presents the conceptual and business framework of Industry 4.0, as well as its dependence on certain digital technologies. The second part points to the business relevance of supply chains 4.0 and the technological conditionality of their adaptation to customer expectations. The last part proves the fact that Industry 4.0 enables the company to be transformed into a digital supply chain (supply chain 4.0) that can successfully respond to changes in the environment.

Keywords: *Industry 4.0, digital technologies, internet, supply chain 4.0, environmental challenges.*

JEL classification: *L86, M11, O33*

УЛОГА ИНДУСТРИЈЕ 4.0 У ДИГИТАЛИЗАЦИЈИ ПРОИЗВОДЊЕ И ЛАНАЦА СНАБДЕВАЊА

Апстракт

Индустрија 4.0 омогућава интелигентну производњу која се фокусира на дизајнирање, креирање и испоруку производа и услуга прилагођених индиви-

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дуалним захтевима купаца. Ова индустрија подстиче интеграцију различитих интелигентних производних система и напредних информационих технологија, као што су сајбер-физички системи, интернет ствари и интернет сервиси. Циљ овог рада је да се на бази анализе одабраних академских извора и примера из пословне праксе докаже да Индустрија 4.0, као глобално трансформисање производње и других сегмената бизниса на бази дигитализације и интернета, у све већој мери трансформише постојеће у ланце снабдевања 4.0 и детерминише њихове пословне перформансе. Три су кључна дела овог рада. У првом делу се презентују концептуални и пословни оквири Индустрије 4.0, као и њена зависност од одређених дигиталних технологија. У другом делу се указује на пословну релевантност ланаца снабдевања 4.0 и технолошку условљеност њиховог прилагођавања очекивањима купаца. У последњем делу се доказује чињеница да Индустрија 4.0 омогућава трансформисање компаније у дигитални ланац снабдевања (ланац снабдевања 4.0) који може успешно одговорати на промене окружења.

Кључне речи: Индустрија 4.0, дигиталне технологије, интернет, ланац снабдевања 4.0, изазови окружења.

Introduction

In the last three decades, there has been a revolutionary development of systems based on information technologies, which has affected all aspects of life. Computer-integrated systems connected to the Internet are increasingly present. Using information from different sources not only expands the possibilities for connecting people and machines in the context of cyber-physical systems, but also the possibilities for direct communication between machines. Such connections and communications are made possible by an Internet-based network. The introduction of this network in production and other business segments is called Industry 4.0.

The basis of Industry 4.0 is a wide range of digital technologies, the application of which enables the digitalization of processes and supply chain activities. Despite the constant spread of knowledge about Industry 4.0 technologies, both by researchers and managers, the real impacts of these technologies on the supply chain, whether positive or negative, are still not fully clear and identified. Aware of this, after presenting the key features of some of the Industry 4.0 technologies and the characteristics of supply chains 4.0, we strive to identify the capabilities of these chains to respond more successfully than traditional chains to the challenges of the environment.

The implementation of digital technologies in supply chains is a complex and challenging process for companies. Companies that are able to minimize or remove barriers to the implementation of these technologies will achieve better results in integrating supply chain processes and activities and meeting growing customer expectations.

Industry 4.0 in modern supply chains

The term Industry 4.0 (German *Industrie 4.0*; English *Industry 4.0*) was first used by *Robert Bosch GmbH* in 2011 at the Hannover Messe 2011 in Hanover. Experts then said that a new industrial revolution had arrived with innovations in production, brought about by the era of information. After the end of the fair in Hanover, the Working Group for Industry 4.0 was formed. In October 2012, this working group, chaired by Siegfried Dyce (CEO of Robert Bosch GmbH) and Henning Kagermann (CEO of SAP AG), presented to the Government of Germany a set of recommendations for the implementation of Industry 4.0 to promote the computerization of production. On April 8, 2013, the working group presented its final report at the Hanover trade fair. Since then, the rapid global expansion of the term Industry 4.0 has begun, as an increasing number of companies in the entire manufacturing sector are beginning to consider the potential of interconnected cyber systems in factories.

Industry 4.0 is characterized by an achieved level of automation, where machines can often largely manage themselves in many ways, using technologies such as: Internet of Things; cyber-physical systems (mechanical devices controlled by computer algorithms) that were created in 2006 by Helen Gill of the American National Science Foundation; technology of Big Data; Cognitive Computing – technology platforms that use artificial intelligence; augmented reality; additive manufacturing – production of a three-dimensional object from a digital model; simulation and modeling; automation and industrial robots; cybernetic security; blockchain technology; semantic technologies; Internet of Data – the concept of a network consisting of data entities that originate from the Internet of Things, i.e. the expansion of the Internet of Things into the digital world, because the amount of data collected is staggering.

Industry 4.0 promotes the use of these technologies. They appeared in the 21st century and were mainly implemented in supply chains by companies in developed countries. Such technologies enable companies to improve flexibility, quality standards, efficiency and productivity, as well as to create values through the constant introduction of new products and services tailored to market requirements. They also affect the supply chain and the context of Industry 4.0 and are sources of its competitive advantage. Some of the listed technologies will be presented in this part of the paper (Choo, October 2010, pp. 1-6).

Strogilopoulos and Tsiouki point out that Industry 4.0 is a “common term for technologies and concepts of value chain organization” which includes: cyber-physical systems, Internet of Things and Internet of Services. In Industry 4.0’s modularly structured smart factories, cyber-physical systems monitor physical processes, create a virtual copy of the physical world, and make decentralized decisions. Through the Internet of Things, cyber-physical systems communicate and collaborate with each other as well as with people in real time, while through the Internet of Service, value chain participants offer and use internal and interorganizational services (Lee, Lapira, Bagheri, & Kao, pp. 38-41).

McKinsey experts state that Industry 4.0 represents the fourth major turnaround in modern manufacturing, after the lean revolution of the 1970s, the phenomenon of outsourcing of the 1990s, and automation that began in the 2000s (Strogilopoulos, & Tsiouki, 2016).

Understood as an intelligent manufacturing system that focuses on the design, manufacture and delivery of products and services tailored to individual requirements, Industry 4.0 encourages the integration of a variety of intelligent manufacturing systems and advanced information technologies. In addition, it represents a radical shift in the way production facilities operate.

As pointed out, the term Industry 4.0 originated in Germany. However, in other European countries it is also known as: Smart Factories, Smart Industry, Advanced Manufacturing or Industrial Internet of Things. Advanced manufacturing is a major aspect of Industry 4.0. It can be defined as a family of activities that depends on the use and coordination of information, automation, computing, software, discovery and networking, and/or uses state-of-the-art materials and new opportunities provided by the physical and biological sciences.

The US National Institute of Standards and Technology uses the term smart manufacturing. These are “fully integrated” collaborative production systems that respond in real time to changing demands and conditions in a smart factory and supply network as well as changing customer needs (Wu, Yue, Jin, & Yen, 2016, pp. 395–417).

In the US, the term Industry 4.0 is often defined as the Internet of All.

Industry 4.0 facilitates the design and creation of smart factories (factories of the future) in which cyber-physical systems monitor physical processes, create a virtual copy of the physical world, and enable decentralized decision-making. Smart factories make it possible to connect machines and people into cyber-physical systems. These systems focus their resources on the introduction of intelligent products and industrial processes that enable the industry to cope with rapid changes in purchasing patterns.

The Capgemini Research Institute described smart factories as “digital platforms and technologies” aimed at significantly improving productivity, quality, flexibility and services. The economic impact of these factories is great, especially in the manufacturing industry. One study by the Institute found that by increasing investment in smart factories and overcoming certain challenges in Industry 4.0 (convergence of information and manufacturing technologies; and acquiring the skills needed to drive digital transformation in smart manufacturing, including multifunctional capabilities, digital talent and “soft” skills), the manufacturing industry could increase the value of the global economy annually from 1.47 to 2.2 trillion US dollars by 2023 (Khanna, 2016, pp. 357–365).

Smart factories create an environment in which smart machines can communicate with each other, not only to enable the automation of production lines, but also to analyze and understand certain problems in production, with minimal employee participation.

Industry 4.0 allows one to increase: flexibility, quality standards, efficiency and productivity. This will enable companies to adapt to customer requirements, through value creation by constantly introducing new products and services to the market.

Industry 4.0 has changed a number of professions. Thanks to this industry, people are getting to know new jobs every day, but they also use high-tech devices that are quickly becoming the most important factor in their working life.

The integration of the supply chain process and the transparency of information between customers and suppliers are key results of Industry 4.0. Without implementing technologies that enable Industry 4.0, it is not possible to optimize business processes in supply chains.

Industry 4.0 is one of the most important research topics, which is increasingly attracting the attention of academics and practitioners. Many scientific papers have been published on this topic. The number of scientific papers related to supply chains 4.0 is also increasing. However, the results of research to date on the very relationship between Industry 4.0 and Supply Chain 4.0 are still modest. Fortunately, there is a growing interest of scientists and practitioners in researching these (Burg, Chattopadhyay, Lam, 2017, pp. 38–60) relationships, as well as the nature of the supply chain 4.0 conceptual framework. Also, a growing number of scientists and practitioners want to learn about the role of Industry 4.0 in integrating supply chain processes and propose guidelines for further research (Tjahjono, Peláez-Lourido, Enrique, 2017, pp. 1175–1182).

Technological support to supply chains 4.0

Supply Chain 4.0 is defined as “...a series of interrelated activities related to the coordination, planning and control of products and services between suppliers and customers.” (<https://www.campaignlive.co.uk/article/amazons-anticipatory-shipping-explained/1228379>). The goal of such a chain is to generate new ways of adding value to customers and suppliers as well as increase revenue through the integration and coordination of its processes such as: forecasting, procurement, production, distribution, sales and marketing.

Wu et al. (Xu, Yu, Griffith, Golmie, 2018, pp. 78238–78259) distinguish six supply chain characteristics 4.0 (Table 1). They are, first of all, the result of the implementation of four technologies (Internet of Things, cyber-physical systems, cloud computing and big data) which are considered to be the technological basis of Industry 4.0 (Martins, Simon, Campos, 2020, p. e5427).

Table 1: Supply Chain 4.0

Characteristics	Description
Equipped with measuring instruments	Systems with sensors, RFID tags, meters and other integrated components, capable of generating data for decision making.
Interconnected	Supply chain members fully connected, including their assets, IT systems, products and other smart facilities,
Intelligent	Intelligent systems capable of making decisions to optimize their global performance by collecting and analyzing large amounts of data
Automated	Numerous automated activities aimed at replacing less efficient resources (including manpower).
Integrated	Integrated supply chain activities, which include cooperation between members, joint decision-making, use of common systems and exchange of information.
Innovative	Able to develop and integrate new values through more efficient solutions.

Source: (Zekhnini, Cherrafi, Bouhaddou, Benghabrit, Garza-Reyes, 2021, pp. 465–501).

Internet of things. The term Internet of Things was first used by Kevin Ashton in 1999 during his presentation to convince the senior management of the company where

he worked (Procter & Gamble) that it is necessary to put an RFID (Radio-Frequency Identification) tag (tag i.e. microchip) on everything it produces (Frederico, Garza-Reyes, Anosike, Kumar, 2019). The simplest Internet of Things can be described as a set of interconnected devices with built-in sensors that can provide data and/or be controlled over the Internet; Cloud technologies that enable backups on a server or medium elsewhere outside the primary server, all for the purpose of data protection.

The Internet of Things connects physical objects on the Internet (Uckelmann, Harrison, Michahelles, (Eds.), 2011) by integrating sensors, actuators, and other devices that collect, transmit, and process data (Ghobakhloo, 2018, pp. 910–936). In the supply chain, this technology connects business and web applications (such as social media) with machines, devices, products, materials and people, and thus enables the creation of an intelligent network that extends through all factory processes of both customers and suppliers (Szozda, 2017, pp. 401–414).

These are billions of physical devices around the world that are connected to the Internet. All are capable of collecting and sharing data.

Thanks to the advent of super cheap computer chips and the ubiquity of wireless networks, it is possible to turn anything (from something small like a tablet to something big like an airplane) into a part of the Internet of Things. Connecting all these objects and adding sensors to these objects increases the level of digital intelligence of the device and provides the ability to exchange data in real time without the involvement of a human (Frederico, Garza-Reyes, Anosike, Kumar, 2020, pp. 262–282). The Internet of Things makes the world around us smarter and more responsive. It connects the physical and digital universes.

Almost any physical object can be transformed into an internet thing (device) if it connects to the internet to manage or communicate information. A light bulb that can be turned on using an application in a smartphone is an internet thing, as well as a motion sensor in the apartment. Such devices can be in the engine of a jet plane, and far more within the project of smart cities where entire regions are filled with sensors that help in understanding and controlling the environment. In 2017, Levi's produced a \$ 350 smart jacket, called Levi's Commuter Trucker Jacket, which is made possible by Google's Jacquard clothing platform (Xu, Yu, Griffith, Golmie, 2018, pp. 78238–78259). On the left sleeve of such a jacket, there is a module that is connected to a smartphone. The user of the jacket can, by simple hand swipe or by tapping the sleeve of a jacket, answer calls while riding a bicycle, standing in a crowded train or carrying groceries, without direct contact with his smartphone.

Technology known as the Internet of Things is generating positive changes in industry, medicine, logistics and households. It also enables: direct communication of machines, i.e. to tell each other what they need and when they need it; growth in the number of everyday items to be controlled remotely and labor market restructuring.

The new trend of digitalization is included in the concept of Retail of Things, which is a specialized component of the Internet of Things. Retail combines hardware and software tailored to retail applications. The key is the technology, i.e. devices and components that enable retail chains to improve customer connectivity and use the collected data to optimize business goals. Research by the American RFID Lab Institute has shown that the use of RFID technology at the level of individual items increases the accuracy of inventory management from 65 to more than 95 percent (Frederico, 2021, p. 49).

The implementation of the Internet of Things and sensors in retail has a key role to play in automating malicious processes such as gathering product information by bar code scanning, application integration, and mobile payments. A 2016 Cisco survey of the Internet of Things found that nearly 48 percent of retail processes can be automated (Tiwari, 2021, pp. 990–1030). The number of retailers implementing technologies such as the Internet of Things and sensors is increasing. This technology allows connected devices to be transformed into smart devices and generate large amounts of business-relevant data.

The value of the global Internet of Things market is constantly growing. In 2019, it amounted to 250.72 billion US dollars, but by 2027 it could reach 1463.19 billion US dollars (da Silva, Kovaleski, Pagani, 2019, pp. 546–562). The following companies play a key role on the global Internet of Things market: *Amazon.com Inc.*, *AT&T Inc.*, *Bosch Software Innovations GmbH*, *Cisco Systems, Inc.*, *IBM Corporation*, *Intel Corporation*, *Oracle Corporation*, *Microsoft Corporation*, *SAP SE* and *Siemens AG*. The global increase in demand for artificial intelligence, digital twin technology and *precision farming* will spur the growth of the global Internet of Things market.

Cyber-physical systems. The term Cyber Physical Systems was first used in 2006 by Helen Gill of the National Science Foundation (Bordel, Alcarria, Robles, Martín, 2017, pp. 156–184). These systems emerged in response to the need to develop a conceptual and efficient framework regarding the growing interactions between cyber computing systems and physical hardware. Cyber-physical systems include machines, storage systems and production facilities that are digitally developed and represent a complete (end-to-end) integration based on information and communication technologies. These are smart complex systems constructed by connecting integrated information processing subsystems and physical subsystems. The characteristics of these systems are: decentralization, adaptation and autonomous behavior. They enable the supply chain to monitor production conditions and logistics activities in real time, and to perform forecasting, remote diagnostics and control based on that (<https://www.zdnet.com/article/google-and-levis-unveil-internet-connected-jacket/>).

Cyber-physical systems, as concepts and technologies of Industry 4.0, are becoming increasingly important for the digital transformation of the supply chain. The use of cyber-physical systems provides the necessary prerequisites for flexible planning and control of supply chains.

Cloud computing. In the last three decades, there has been a shift from computers to smart devices that use infrastructure services based on cloud computing. Cloud computing (abbreviated cloud) (Tseng, Tan, Chiu, Chien, Kuo, 2018, pp. 146–147), which has been on its way since 2006, uses a service delivery model known as SPI (Software Platform Infrastructure) and identifies three key groups of services provided through the cloud: Software-as-a-Service, Platform-as-a-Service and Infrastructure-as-a-Service (Birkel, Veile, Müller, Hartmann, Voigt, 2019, p. 384).

Cloud computing aims to integrate technologies or architectures to provide a platform or solution over the Internet, which would be available anytime and anywhere, and provide unprecedented visibility and flexibility.

The use of cloud computing in supply chains is still in its infancy. In addition, revenues from the sale of supply chain management software exceed \$ 19 billion.

Hybrid supply chain management is increasingly present, which is the result of the coexistence of cloud-based applications and applications enabled by software installed

on a company's computer (on-premise). Management of information hubs and vendor networks is largely cloud-based.

Cloud technology enables precise product monitoring during its life cycle. This technology can significantly reduce product loss, as it allows the shipment to be located during any stage of transport. It also allows supply chain managers to quickly redirect misdirected shipments.

Cloud computing is transforming the supply chain management process. Data integration of suppliers, service providers, etc. in the "supply chain cloud" provides the ability for all stakeholders to manage and decide based on the same facts.

Easyship is one of the most well-known cloud software that enables e-commerce companies to more effectively manage local and international deliveries (Zekhnini, Cherrafi, Bouhaddou, Benghabrit, Garza-Reyes, 2021, pp. 465–501).

Big data. The exponential growth of the amount of available data is primarily the result of the development of information technologies and the Internet, i.e. hardware capacities (data storage and processing capacities) and software capacities (development of new applications). Eric Schmidt, president of Google, points out that since the creation of civilization until 2003, a total of five exabytes (10^{18} bytes) of data has been created, which is the amount of data that is created today in less than two days. This enormous growth in available data is characteristic of almost all areas of life and business, from food, sports and leisure, through trade, finance, medicine and telecommunications, to security system management and environmental protection. Hyperproduction of data requires new approaches in its processing that are based on the use of information technologies that enormously exceed the analytical capacity of people. This has led to the development of a whole new dimension in data analysis called Big Data Analytics.

What does the term Big Data actually mean? In short, it represents the amount of data that exceeds the capabilities of commonly used computer techniques for their storage and processing. It is a large set of data from different sources, both traditional and digital, that can be used to obtain different results using different types of analyses. It is not necessary that all analyses use all data. The term big data, in addition to a large amount of data, also means innovative forms of data processing in order to improve the decision-making process and optimize the business processes of supply chains. The key characteristics of big data are: high database growth rate (Volume), high data diversity (Variety) and extremely high speed at which new data arrives (Velocity).

Big data differs according to five dimensions: (1) scope, (2) diversity, (3) speed, (4) truthfulness, and (5) value. It can be used for descriptive, predictive and prescriptive business analytics (Wang, Hulstijn, Tan, 2016, pp.76–85.).

In the supply chain, big data refers to applications that include material flows (related to: production status; process and quality; inventory management; logistics; research and development and collective solutions in procurement and distribution functions), information flows (related to: demand management, supply chain event management (type of business software for managing events occurring within and between supply chain organizations or partners), negotiations with suppliers, risk management, problem identification, automated decision support and management customers) and financial flows (related to: customer segmentation; demand modeling; designing a new business model; prices and assortment and financial aspect of human resources) (Marwedel, 2021).

In addition to the listed technologies, the following technologies, too, affect the functioning of supply chains in the context of Industry 4.0 and their competitive advantage: additive manufacturing, automation and industrial robots, augmented reality, cybersecurity, blockchain, internet data, people and services, semantic technologies and simulation and modeling.

Thanks to these technologies, their subsystems and devices, it is possible to integrate the entire supply chain (not only customers and suppliers, but also their assets, products and operating environment) and generate a larger amount of higher quality data faster (Uckelmann, Harrison, Michahelles (Eds.), 2011). Such technologies enable companies to reorganize the entire business in real time and thus create conditions not only for the growth of flexibility, productivity and responsiveness, but also for reducing the bullwhip effect and the total cost of the supply chain.

Advantages of supply chain 4.0

Industry 4.0, the technologies that form the basis of that industry, and changing customer expectations require companies to review business practices and adjust their supply chain.

Supply chains are facing increasingly dynamic changes in the environment. One of the most radical changes is the transition from computers to smart devices that use cloud-based infrastructure services. Still, the key changes in the environment are generated by online business, the expansion of which increases customer expectations regarding services and leads to the fragmentation (granulation) of orders. It is the growing expectations of customers that play a key role in supply chain management. In the business environment, the need for individualization and adaptation is growing faster, which requires a constant change of the portfolio of unique products. The Internet increases the transparency of the offer and facilitates access to a multitude of options regarding where and what to buy.

Supply Chain 4.0 can respond successfully to these changes. Compared to traditional, supply chains 4.0 are: faster, more flexible, more responsive to individually smaller orders and more accurate.

Supply Chains 4.0 enable faster delivery of products to customers. Thanks to new approaches to distribution, such supply chains shorten the delivery time of high-performance products to several hours. The basis of fast product delivery is advanced approaches to demand forecasting. One of such approaches is predictive analytics, which enables a very accurate forecast of customer demand not on a monthly basis, but on a weekly basis, and for products that sell quickly, on a daily basis. In the future, there will be so-called “predictive i.e. anticipatory delivery” for which Amazon holds a patent (Abdirad, Krishnan, 2021, pp. 187–201). It is a revolutionary method of delivering products to customers, which means that delivery of the product begins before the customer orders it. The customer’s order is later reconciled with the shipment that is already in the logistics network (transported according to the customer’s region) and that shipment is redirected to the exact destination of the customer. Amazon has been using this delivery method since 2014. At the beginning of its application, it was thought that it would be just an expensive logistical nightmare for Amazon. However, it turned out

that it started a real revolution in retail sales and enabled Amazon to leave many rivals behind. The idea is to predict what customers want based on certain data, and then to have the products delivered to them automatically. Amazon and other online retailers are investing in machine learning to accurately predict customer demand and ship products before customers place an order. In this way, they reduce the costs of processing and delivering orders. Amazon can “predict” orders, because it has plenty of information about its customers and knows when and what to buy.

Compared to traditional supply chains, supply chains 4.0 are more flexible.

Ad hoc and real-time planning of processes and activities enables flexible response of supply chains 4.0 to changes in supply and demand. With supply chain 4.0, planning becomes a continuous process, while planning cycles and so-called frozen periods are kept to a minimum. These chains can respond dynamically to changing requirements or constraints. Such a response is significant, for example, when large oscillations in the use of machine production capacity are identified on the basis of real-time feedback. Flexibility in delivery is also significant. After shipping the product, increased flexibility in delivery allows customers to redirect shipments to the most convenient destination.

New business models for supply chain function planning or transportation management, such as Supply Chain as a Service, increase the flexibility of supply chain organization. Companies can buy and pay the supply chain as a service based on use, instead of using their own (internal) resources and capabilities. Such specialization and focus on service providers enable companies to realize economies of scale and economies of breadth, as well as to exploit the potential of outsourcing. By entering into a partnership with a particular service provider, to support all or part of the operations of their supply chain (procurement, production control, production, quality control, warehousing and logistics), companies can increase their return on investment by four to five times (Núñez-Merino, Maqueira-Marín, Moyano-Fuentes, Martínez-Jurado, 2020, pp. 5034–5061).

Supply chain as a service is a new model of flexible service, which allows companies to achieve economies of scale without investing in people, processes and equipment. A good example is the “uberization” of transport (offering flexible transport capacity to people who need transportation services (crowdsourcing)), which leads to a significant increase in agility in distribution networks (Müller, Voigt, 2018, pp. 659–670).

Crowdsourcing is a procurement model in which individuals or organizations procure goods or services, including ideas, microtasks, and finances, from a large, relatively open, and often rapidly evolving group of participants. Uber is one of the best examples of crowdsourcing. Uber connects available drivers with people who need transportation services. Crowdsourcing involves getting work, information, or opinions from a large group of people who submit their information through the Internet, social media, and smartphone apps. People involved in crowdsourcing sometimes work as paid freelancers while others perform small tasks voluntarily. For example, traffic-related applications encourage drivers to report accidents and other problems on the road to provide users with real-time information.

Supply Chains 4.0 are becoming more willing to respond to customers' individually smaller orders. Customer demand for more individualized products is constantly growing. This strongly encourages the offer of a wide range of products tailored to customer requirements. Thanks to Industry 4.0, customers have the opportunity to choose one of several “logistics menus” that exactly suits their needs.

New product transport concepts, such as drones, enable companies to efficiently manage the delivery of individual products as well as high-density and high-value products, from a central distribution hub to final destinations – companies or costumers (last mile). Due to the relatively low share of transportation costs in the price of these products, companies can use faster and more expensive modes of transportation. The English term last mile is used in supply chain management and transport planning to describe problems (such as rising delivery costs) that occur in the last segment of product delivery – from the central distribution hub to the final destinations. Products can be delivered to this hub by ships, trains, large trucks or planes. However, a number of difficulties arise after loading these products into smaller vehicles and delivering them to their final destinations – individual companies or customers.

Supply Chains 4.0 provide more accurate information. Modern digital performance management systems provide information that ensures transparency of the entire supply chain in real time. The information ranges from synthesized top-level key performance indicators (KPIs), such as overall service level, to highly detailed process information, such as determining the exact position of trucks in the network. This information represents a common basis for all levels of management and functions in the supply chain. Integration of information from suppliers, service providers, etc. into the “supply chain cloud” ensures that all stakeholders manage and make decisions based on the same facts.

In digital performance management systems, storage, transport, or inventory costing models are used to automatically set goals. In order to maintain the aspiration of supply chains towards goals and in case of their interruption, digital performance management systems automatically adjust goals to realistically achievable ones. Such systems “learn” to automatically identify risks and change supply chain parameters.

Automation of physical tasks and planning increases the efficiency of the supply chain. The robots, which are one of the key drivers of Industry 4.0, handle the material (pallets and boxes, as well as individual pieces) in the entire warehouse, completely automatically. Autonomous trucks transport products within the supply chain. In order to optimize truck use and increase transport flexibility, transport between companies in the supply chain is optimized.

Ideally burdening resources in the supply chain is a difficult goal to achieve. By using information to ensure transparency of the entire supply chain and dynamic planning, it is possible to initiate advanced demand shaping activities (e.g. to provide customers with the option to choose the time of delivery) with little use of means of transport.

Conclusion

The term Industry 4.0 has been around for ten years and represents the development of manufacturing and value creation systems by connecting the real and digital worlds. At the heart of this connection are self-controlled cyber-logistics systems that enable vertical and horizontal integration for efficient, decentralized and flexible production of products or services along the supply chain.

Digitalization is a prerequisite for the functioning of Industry 4.0. Industry 4.0 depends on the application of a wide range of digital innovative technologies (Internet of Things, additive manufacturing, process automation, artificial intelligence, big data, automation, virtual reality, robotics, etc.).

Industry 4.0, as a result of the strong integration of information and communication technologies to connect the physical world with the virtual world, creates new conditions for connecting and integrating companies and their resources. In this way, companies and supply chains can improve performance in terms of time, money and resource use.

Industry 4.0 enables the company to be transformed into a supply chain 4.0 (digital supply chain). Improving the business performance of companies will increasingly depend on the use of technologies to digitally transform their processes and activities. Unlike traditional, digital supply chains are: faster, more flexible and more responsive to individually smaller orders and able to more accurately meet new customer requirements and supply-side challenges.

The digital transformation of processes, generated by the use of digital technologies, enables the improvement of the competitiveness of companies and supply chains.

Scientific knowledge of the relationship between Industry 4.0 and Supply Chain 4.0 is still limited. The results of studies dealing with the role of Industry 4.0 in the integration of supply chain 4.0 are also modest. New theoretical and empirical research would significantly improve the understanding of the supply chain concept 4.0 and make its application in business practice more rational.

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SUSTAINABLE TOURISM DEVELOPMENT ACCORDING TO EU INDICATORS, IN THE FUNCTION OF ECONOMIC GROWTH OF NIŠKA BANJA

Abstract

According to the indicators of sustainable development, tourism in Niška Banja is not based on the principles of sustainable development. Economic, social and cultural indicators show a worrying situation that requires urgent measures while environmental indicators show a tolerable situation. Specificity and attractiveness, infrastructure facilities and accessibility, with the construction of hotels, sports grounds, catering facilities, and other supra-structural capacities, would enable the Niška banja to become an exclusive model of sustainable tourism. At the same time, it is necessary to constantly promote and propagate the advantages of this development, with the increase in tourism, better utilization of existing resources and other tourist potentials. On the other hand, the development of tourism can cause great damages to Niška Banja. Therefore, careful and efficient planning, management and rigorous monitoring are needed to ensure that tourism in Niška Banka is truly successful and sustainable, while respecting the natural, social and cultural components of the environment.

Key words: sustainable development, tourism, indicators, growth, Niška Banja

JEL classification: O1, Q56, Z32.

ОДРЖИВИ РАЗВОЈ ТУРИЗМА ПРЕМА ИНДИКАТОРИМА ЕУ У ФУНКЦИЈИ ПРИВРЕДНОГ РАЗВОЈА НИШКЕ БАЊЕ

Апстракт

Према индикаторима одрживог развоја, туризам у Нишкој бањи се не заснива на принципима одрживог развоја. Економски, социјални и културни индикатори показују забрињавајуће стање које захтева предузимање хитних мера, док индикатори стања животне средине показују подношљиво стање.

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Специфичности и атрактивности, инфраструктурна опрењеност и доступност, уз изградњу хотела, спортских терена, угоститељских објеката, и других супра-структурних капацитета, омогућило би да Нишка бања постане ексклузивни модел одрживог туризма. Паралелно са тим, неопходно је константно афирмисати и пропагирати предности оваквог развоја, уз повећање туристичког промета, боље искоришћавање постојећих ресурса и других туристичких потенцијала. С друге стране стихијни развој туризма може изазвати велику штету Нишкој бањи. Због тога, потребно је пажљиво и ефикасно планирање, управљање и строги мониторинг како би туризам у Нишкој бањи био заиста успешан и одржив, уз поштовање природне, друштвене и културне компоненте животне средине.

Кључне речи: одрживи развој, туризам, индикатори, раст, Нишка бања

Introduction

Tourism is one of the economic branches, which in the last few decades has recorded a very dynamic and high development with many positive direct and indirect effects. The direct positive effects of tourism affect the economic growth of the national economy, while the indirect impact the improvement of living standards and the quality of life of the population.

The large mass and mobility of tourists have affected the endangerment and devastation of the environment of many tourist destinations. The high pressure of tourists on tourist destinations has caused the degradation of natural resources urban, degradation of the living space of the inhabitants of the local community and, highly endangered their traditional way of life, socio-cultural heritage, and environment.

The expressive trend of tourism development has induced worry in many relevant worlds, national, scientific organizations, and individuals who have approached the quest for an appropriate solution to mitigate and eliminate these negative impacts. In the quest for a resolution in overcoming the adverse effects of tourism, adopted the concept of sustainable development. Sustainable development of tourism implies preservation and valorisation of tourist resources with constant improvement of the quality of the tourist product, i.e., performing economic activities within the ecological and socio-cultural parameters. So, the development of tourists is based on the criteria of sustainability, economic sustainability in the long run, and socially and ethically equal for all domicile people of the tourist destination. All three aspects of sustainable development, conservation of natural resources and cultural and historical heritage, economic sustainability, and social justice can be analysed and measured using indicators adopted by the European Union. The adopted indicators of sustainable development of the EU by adjusted to the characteristic features of each tourist destination, which by based on ecological, socio-economic, and tourist parameters.

Indicators of sustainable tourism development are not only important for assessing the condition of a tourist destination but are also essential elements in the process of planning the growth and development of tourism. As a result, a large number of countries around the world are increasingly committed to implementing the principles of sustainable tourism development in their strategic plans. A goal needs special attention and is supported as much as possible through development plans and strategies. Sustainable development of tourism

does not endanger the present but does not jeopardize the development of perspectives and opportunities of future generations. In a word, sustainable development is a new philosophy of thinking based on integral and complex development. A new philosophy that achieves efficient use of natural resources preserves the identity of the local community and cultural and historical heritage, achieves socio-economic benefits, strengthens the economic growth of complementary industries, and improves the quality of life of the domicile population.

A spa is an especially form of protection of natural and cultural-historical values. In most cases, they represent significant tourist values and existing and potential opportunities for the growth of several types of tourism. One of the most famous and attractive spas on the territory of the Republic of Serbia is Niška Banja, which according to the richness of tourist potential, represents an independent and complex tourist motive.

Tourist potentials of Niške Banje

Niška Banja is located, in the immediate nearness by the town of Nis, at the tenth kilometre, east located on the extreme branch of Dry Mountain, on the slopes of Koritnjak hill. By connected to Corridor 10, which goes to Sofia and Istanbul. Also, by linked with Nis by railway and City Boulevard. The proximity of Nis, which is at the crossroads of the most important Balkan and European turnover routes, leading from the north from Belgrade, and separating into two branches, towards Skopje, Thessaloniki, and Athens, and towards Sofia, enables good turnover linked and accessibility. Also, the regional road to Gadžin Han by separated from the area of Niška Banja. The populated places of the municipality by linked with about 60 kilometres of roads, and city and suburban bus turnover by organized.

The natural tourist values of Niška Banja are two very attractive gorges, Sićevačka and Jelašnička. Sićevačka gorge is six kilometres from Niška Banja on the road to Sofia, in the Nišava valley between Old and Dry mountain, where 68 endemic species of plants and over 30 species of birds have by registered, some of the very much rare, dry eagle and griffon vulture. On a five km from Niška Banja, in the direction of the ski centre Bojanina Voda, behind the village Jelašnica, there is a gorge, where there are famous stone shapes, dolomite teeth, as well as an attractive waterfall known as "Ripaljka". It has an ideal configuration for natural climbing areas, as well as the challenging peaks of Dry Mountain for hiking; Porch (1810m), Falcon Stone (1553m), Maiden's Tomb (1317m), Kolov Stone (1361m), and Mosor (984m).

The cultural and historical tourist values (anthropogenic tourist values) of Niška Banja are diverse, especially since Nis Spa is almost by linked Nis, which is rich in these landmarks from different historical times.

Niška Banja has characterized a temperate continental climate with an average annual temperature of 12, 2 degrees. The hottest month is July month an average temperature of 21, 2 degrees, and the coldest month is January, with an average temperature of 0.2 degrees. The average annual rainfall is 576, 25 mm. average wind speed is less than 3 Beaufort, and the average value of air pressure by 992, 74 mill bars.

Nišava is the based watercourse on the territory of the municipality Niška Banja, and the Jelasnica River and the Kutina River flow into it. The banks of these rivers are partially regulated, and during the sudden melting of snow and heavy rains, they cannot always prevent damage from floods. The most lag number of settlements is covered the city water

supply system, while part of the household have local water supply systems, while some use individual sources. Drinking water is very high quality, primarily from the Gornja Studena spring. There is no central heating system, and the facilities of the Institute for Cardiovascular Diseases (Radon, Zelengora, Terme, and the Health Station) receive thermal energy from the central heating plant in Radon. The Institute uses heat pumps during the transition period.

The healing properties of Niška Banja are mineral, thermal and radioactive waters. These waters by used for healing bathing treatment, drinking water, and mud treatment. The radioactivity of the water of the mainspring by first discovered by our famous scientist Marko Leko in 1909. At that time, the radioactivity of water at a temperature of 37.5 C0 was 9.69 units. He was the first to perform a chemical analysis of water, and an extensive study promulgates in the Voice of the Serbian Academy of Sciences. According to the results of detailed chemical analysis, which is 1965 performed by Ljiljana Zečević from the Geoinstitute in Belgrade, the water of the source has a specific gravity of 1,00023 reactions (pH) 7,33, the dry residue at a temperature of 180C0 0,2788 g / l. The source of Suva Banja is the second of utmost important springs in Niška Banja. It gives 14 to 42 liters of water per second, whose temperature is 12 to 37C0. According to the balneological classification, the water of Suva Banja belongs to radioactive hypothermia. This water is a feature of significant fluctuations in temperature, yield, and radioactivity.

Methodology of work

In the analysis of sustainable development of the tourist destination, Niška Banja applied five groups of indicators of sustainable tourism development economic, tourist satisfaction, cultural, social, and environmental indicators. These indicators of sustainable tourism development show the current condition of the tourist destination and the possibilities of tourism development in a particular area. Also, sustainable development indicators by used when evaluating the impact of tourism on the quality of the environment. The valuation of the real impact of tourism on the environment by based on three principles of sustainable development, ecological, socio-cultural, and economics. For each indicator, limits values by are defined the state of tourism in the analysed tourist destination appraised as critical, tolerable, and sustainable. In addition, three zones have by determined to determine the limit values of each indicator: red zone (critical situation and the need to take measures), yellow (the tolerable situation with preventive measures), and green zone (sustainable development of tourist destinations).

The group of comparative indicators, shown in the previous table, will be applied in the analysis of sustainable tourism development to the tourist destination Niška Banja. In the statistical analysis of sustainable development indicators, available data were used, collected from secondary sources, i.e., data from the Statistical Office of Republic Serbia and the Tourism Development Service of the Municipal parliament of Niška Banja. The limiting factor in the analysis is the deficiency of data related to the indicator of tourist satisfaction for two reasons: the first that so far the Service for Tourism Development in local government, and long tourism entities did not conduct surveys and the second, which is the period it is impossible to survey tourist satisfaction due to the small number of visitors, and the research sample would not be representative. In addition, the period since the outbreak of the KOVID-19 pandemic has not to be analyzed because we believe that it is irrelevant.

In the context of the pandemic, the tourism industry has suffered significantly, as evidenced by the reduction in the number of tourists coming by 65% globally in the first half of 2020 (Motsa, etc., 2020)

Table 1. Comparative indicators of sustainable development

Type indicator	Indicator	Explanation
Economically	Seasonal turnover:% of full season visits (three months)	<40% green zone 40-50% yellow zone >50% red zone
	Relationship between overnight stays and accommodation capacities	>150 green zone 120-150 yellow zone <120 red zone
Tourist satisfaction	Repeated visits:% of repeated visits over a period of five years	> 50% green zone 30-50% yellow zone <30% red zone
Cultural	Relationship between accommodation capacities and number of local population	< 1,1:1 green zone 1,1-1,5:1 yellow zone >1,6:1 red zone
	Tourism intensity: number of nights (000) according to population (00)	< 1,1:1 green zone 1,1-1,5:1 yellow zone >1,6:1 red zone
Social	Participation of tourism in the local net social product	> 70% green zone 50-70% yellow zone <50% red zone
	% of tourists who do not come through a tour operator	>70% green zone 50-70% yellow zone <50% red zone
Indicators environmental conditions	Participation of tourism in the local net social product	<10% green zone 10-20% yellow zone >20% red zone
	% of tourists who do not come through a tour operator	>20% green zone 10-20% yellow zone <10% red zone

Source: Jovicic, D, Ilic, T., Indicators of sustainable tourism development, Glasnik Srpskog geografskog drustva 2010

The collected data will be analysed quantitatively and qualitatively, by applying statistical-mathematical methods as well as measuring variables through simple mathematical formulas. Also too, this method, descriptive statistics methods, induction and deduction methods, and the comparative method. We will measure the variables by grouping them into dependent and independent. Dependent variables include variable variables on capacity utilization and tourist turnover intensity, while independent variables include the number of nights, number of beds, and number of inhabitants. The measurement of variables was done by first grouping them into dependent and independent ones. Dependent variables refer to capacity utilization and tourist turnover intensity, while independent variables include some nights, number of beds, and number of inhabitants. With a lack of data for the indicator of tourist (visitor) satisfaction, other available data will be for a comparative analysis of economic, cultural, and social indicators.

Research results and Discussion

By applying comparative indicators of sustainable tourism development, based on collected and available data, we will investigate the real impact of tourism on the environment of Niška Banja by measuring physical and socio-cultural variables that originate exclusively from tourism.

Economic indicator. Economic indicators include new models of education and sustainable business of modern companies to achieve competitive advantage through optimal use and increase the productivity of available resources. Economic indicators indicate the economic effects achieved by the development of tourism. The archive effect is visible through the seasonal character of the tourist business, the ratio of the number of tourist nights and accommodation capacities, and the coefficient of local tourists increase.

a. Seasonal character of tourism business 2019

Table 2. Number of tourists with the number of overnight stays in 2019.

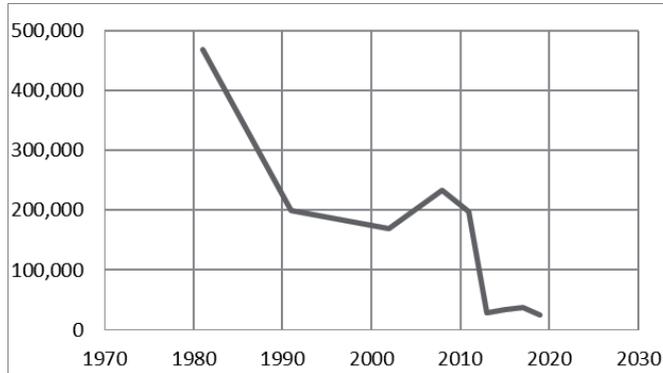
Months	Number of visitors	Number of nights
January	33	310
February	99	654
Mart	147	1.112
April	237	1.321
May	300	2.191
June	440	3.008
July	563	3.422
August	394	2787
September	419	3.444
October	405	3.329
November	372	3.307
December	319	1006

Source: Tourist turnover, by months for 2019, Republic Statistical Office of the Republic of Serbia

According to the available data from Table 1, it is noticeable that the realized tourist turnover, in terms of the number of visitors and the number of overnight stays, in 2019, does not have a pronounced seasonal character. According to EU experts, a seasonal concentration of 40% during the three most visited months enables the sustainable development of the destination. Data for 2019 show that in the area of Niška Banja, during the three summer months, 35.60% of the total number of overnight stays was realized. According to EU standards, the economic indicator, the seasonal nature of turnover, is in the green zone of sustainability for the tourist area of Niška Banja, which represents a satisfactory situation with the adoption of appropriate measures to increase the number of visitors. Tourist turnover to the area of Niška Banja is most pronounced during the two summer months of June and July, somewhat lower in August and unexpectedly, the realized tourist turnover, out of season, in September, October, and November. The lower tourist turnover has been realized in the winter months of December, January, and February. Uneven distribution and low level of tourist turnover, by months and seasons, is a consequence of low-quality accommodation

capacities which are primarily owned by individual households, without the existence of high category hotels and other accompanying tourist and other infrastructure. . Due to the shortcomings and low-quality accommodation capacities, Niška Banja, since 2013, has recorded a drastic decline in tourist turnover, which can be seen in the following chart.

Graf 1. Number tourist night



Source: Author based on RZSRS data

b. Relationship between the number of nights and accommodation capacities

Economic indicator of the relationship between the number of nights and the number of accommodation capacities shows the degree or level of utilization of available accommodation capacities of the tourist destination. In that sense, if the ratio between these two variables is less than 120 nights per bed, capacity utilization is unsustainable, from 120-150 utilization is at an acceptable level and above 150, and capacity utilization is at sustainable development. This company was the carrier of tourism development in Niška Banja and the owner of all hotels whose status has not been resolved, despite attempts at several privatizations unsuccessful. As a result, the accommodation facilities of this company were ruined and not for use. At the same time, no new, modern accommodation capacity has by built because there is no interest from domestic and foreign investors. The limiting factor in the construction of new tourist capacities is the status of the Niške Banje itself, it is a municipality of the city of Nis, which does not pay any attention to the development and improvement of tourism in this spa.

Table 3. Relationship between the number of nights and the number of accommodation capacities, the degree of capacity utilization

Year	Number of nights	Number bed	Indicator
1981	467.725	8.231	56,8.:1
1991	199.402	7.841	25,4.:1,
2002	169.721	1.537	110.4:1
2008	233.321	1.874	124.5:1
2011	198.606	2.205	99,0.2:1
2013	29.649	1.228	24.4:1

2015	34.406	796	43,2:1
2017	36.899	796	46,3,:1
2019	25.891	410	63,1:1

Source: Author, based on the Statistical Yearbook of the Republic of Serbia for selected years, and the Republic Bureau of Statistics of the Republic of Serbia

The presented results of the research indicate, of aspect the utilization of accommodation capacities, a negative trend. In the analysed period, capacity utilization, with the point of the number of overnight stays and accommodation capacities, was only acceptable in 2008, yellow zone > 120 . In other, analysed years by retained the tendency of the negative trend of utilization of tourist capacities (red zone). In particular, a marked decline in the degree of utilization of tourist capacities is evident from 2011 until today. The drastically declining trend, the utilization of tourist capacities is a consequence of the poorly executed privatization of the social enterprise “Serbia-tourist”.

The coefficient of local tourist increase is an economic indicator, which shows the effects of tourism on the economy and local population of a particular tourist destination. It shows how much other local economic activities of a tourist destination are involved in the tourist business. (Jovičić, Ilić, 2010) As this indicator has not yet developed, it can analyse in terms of the impact of tourism on other economic and non-economic activities the feedback effect of these activities on tourism development.

Therefore, the analysis out of this indicator is, conducted directly, a relation of the relationship between tourism and other activities, which are must integrate into the integral-selective tourist bid of Niska Banja. In between, the remaining activities, turnover, and agriculture are of very importance its, the impact is degree activity on the level of the coefficient of local tourist increase.

Turnover links are a significant element of tourist movements. The turnover-functional connection within Niška Banja with the surrounding area is satisfactory. Inhabited places on the territory of Niska Banja are linked with 60 km of roads, with Nis by a local road in the length of 10 km. Besides, the needs of tourism buildings are walk paths, trim tracks, post office parking, etc.

Particularly improvement is expected by connecting Niška Banja and Sićevačka gorge with the eastern branch of Corridor 10, i.e., the road Subotica-Belgrade-Dimitrovgrad on the Malčanska loop in the length of 1.4 km to the settlement Prosek. The precondition for the direct connection of Niška Banja with Corridor 10 is the construction of a bridge on the river Nišava near the equestrian club.

Agriculture as a complementary activity represents a particular potential for the growth of the surrounding rural areas and the improvement of the living standard of the domicile population. There is an increasing number of registered agricultural farms that are mainly engaged in the production of cereals, but the production of vegetables, fruits, and grapes, which are sold in smaller quantities to tourists through the green market, is not far behind. Also, part of the farm is engaged in cattle breeding. However, due to the small number of tourist arrivals, the advantages of agricultural production have not been sufficiently used hence, the functional relations between agriculture and tourism have been to a minimum.

II. Tourist satisfaction. Tourist satisfaction is an indicator that indicates the degree of tourist satisfaction with the quality of services provided. The analysis of tourist satisfaction

includes an extensive survey of tourists on the quality and other parameters significant for assessing and planning the future development of Niška Banja in a more realistic framework. (Momirović, 2009) Surveys of this type and scope by not been conducted, so we cannot say anything about them.

III. Cultural indicators of sustainable development show the preservation of the cultural identity of the local community under the influence of tourists who come from areas with different cultural characteristics. (Jovičić, et. 2010)

a. Relationship between accommodation capacity and population

The indicator of the ratio of accommodation capacities and the number of the local population indicates the extent to which the impact of tourism can affect the sustainability of the cultural identity of a tourist destination. That is, how these impacts affect the change in the urban appearance of the tourist destination and how they affect the construction of the necessary infrastructure, and what are implications for local budgets? If the number of beds about the number of inhabitants is higher than the ratio of 1.6: 1, then the local community suffers a lot of pressure from intensive tourist construction. A relationship of less than 1.5: 1 is much more favourable for the local community because, in these dimensions, the impacts of tourism are minimal and acceptable.

Table 4. Accommodation capacities and number of local population

Year	Accommodation capacities (number of beds)	Number of inhabitants	
1981	8.231	3.854	2,1:1, red zone
1991	7.841	4.179	1,9:1, red zone
2002	1.537	4.437	0,3:1, green zone
2011	2.205	4.380	0,5:1, green zone
2015	796	4.320 ¹	0,1:1, green zone
2017	796	4.400 ¹	0,1:1, green zone
2019	410	4.500 ¹	0,09:1 green zone

Source: Statistical Yearbook of the Republic of Serbia for the period 1981-2019 and the RZSRS Population Estimate¹

The research results show that the ratio between the number of accommodation capacities and the local population between 1981 and 1991 was in the red zone. With aspect this indicator, in the analysed period, the local community suffered from the pressure of urban and infrastructural changes. From 2002 to 2014, the number of beds decreased drastically, as a result of poor privatization of the tourist company “Serbia Tourist” which was the wearer of tourism development, failure to meet the conditions of private accommodation to obtain categorization and change the status of “Radon” in the Institute for Treatment and Rehabilitation “Niška Banja “.

Therefore, period 2002 to 2019, the relationship between the number of beds and the local population indicates the sustainable development of tourism in Niska Banja. By should be noted that this indicator is not a relevant indicator of sustainable tourism development in Niška Banja because it is not the result of successful implementation but is a consequence of poor governance and partly status changes. At the same time, no new

accommodation capacity by building. Some privately owned facilities have been renovated, which has improved accommodation conditions. Renovated privately owned facilities have by categorized as quality accommodation.

b.Intensity of tourism.

The intensity of tourism is an indicator that shows the relationship between the number of tourist nights and the population of the tourist destination. It represents the degree of tourist saturation and points out that the high intensity of tourism development harms local authorities, in the sense, of defining “the boundaries between tourism and general organization for the needs of the local population.” (Marković, Perić, Mijatov,) Expressing the intensity of sustainable tourism development will be by displaying the relationship between the colours of overnight stays expressed in thousands. However, the application of this indicator should be careful, especially since, depending on the type and specifics of the tourist destination, the ratio between the number of nights and the number of the local population shows significant oscillations.

Table 5. Ratio of the number of overnight stays and the number of inhabitants

Year	Number of nights	Number of inhabitants	Indicator
1981	467.725	3.854	12,1:1, red zone
1991	199.402	4.179	4,7:1, red zone
2002	169.721	4.437	3,8:1 red zone
2011	198.606	4.380	4,5:1 red zone
2017	36.899	4.400 ¹	0,8:1, green zone
2019	25.891	4.500 ¹	0,5:1, green zone

Source: Statistical Yearbook of the Republic of Serbia for selected years, and Population Estimate, Republic Statistical Office of the Republic of Serbia

The indicator of tourism intensity in the observed period indicates the red zone. The intensity of tourism is equally distributed and shows a distinctly negative impact tourism on local self-government in the direction of urban and infrastructural arrangements for tourism than for the general needs of the domicile population. However, this research result should be taken with great caution because in that period, despite the high degree of tourist saturation, the urban degradation of Niška Banja is visible, but not in the direction of renovation and construction of new tourist facilities but for the local community. However, we cannot conclude with certainty that the high level of tourism intensity in Niška Banja in the observed period is the outcome of rapid growth. But could be understood as better and more efficient use of available accommodation capacities in the social and private sector and mass tourism stimulated by the Pension and Disability Fund of the Republic of Serbia. The argument for this attitude stems from the statistical data on the number of tourist overnight stays, which fell drastically in 2012 with some trends of further growth until 2017, but six times lower than before that year. Also should not be forgotten that in the analysed period, capacities by the Rehabilitation Institute “Radon” were registered as tourist capacities. Also, we believe that the cultural identity of Niška Banja and its inhabitants has not to be damaged and that it is an attractive

tourist destination with exceptional thermo-mineral and other potentials that have yet to be grown in terms of tourism and economy.

IV. Social indicators. Social indicators show the social integrity of the local community are observed through the participation of tourism in the net social product and through the percentage of tourists who come through agencies. . (Marković, etc., 2010)

a. Participation of tourism in net social product

The participation of tourism in the local net social product is an indicator that shows the benefits and effects that the local community achieves from the development of tourism. In other words, this indicator indicates the contribution of tourism to the growth of the net social product of the tourist destination and its effect by conditioned by the degree of dependence of the local community on tourism. Therefore, to have a clearer view of its impact, it is necessary to compare this indicator with the level of employment of the local population in tourism.

The analysis of this indicator is not comprehensive because it was not possible to obtain data on the net social product of Niška Banja, so for these reasons, the made analysis is based on employees in tourism.

Table 6. Number of employees in the tourist economy of Niška Banja

Year	Employed	Employed in tourism	% employed
2001	2.618	680	26%
2015	2.090	101	0,4%
2016	2.480	121	0,5%
2017	2.418	121	0,5%
2019	2.412	119	0,4%

Source: Municipalities and regions in the Republic of Serbia
by selected years, SORS of the Republic of Serbia

According to available data, in 2001, the total number of employees in the tourism industry of the city of Niška Banja was 680, which in the structure of the total number of employees is 26%. After 15 years of transition, due to social and political changes, the number of employees in the tourism of Niška Banja has drastically decreased. In 2015, the share of employees in the tourism of Niška Banja in the total number of employees amounted to 0.04%. In 2016 and 2017, it increased by a symbolic 0.5%, and finally, in 2019 reached the level of 2014% again.

c.% of tourists who do not come through a tour operator

The second indicator of the social indicators of sustainable development, expressed through the percentage of tourists who come under the auspices of the agencies, is, according to estimates, the Tourism Development Service of Niška Banja modest and does not exceed 20%. In the area of the town of Niška Banja, there is only one agency that deals more with organizing annual vacations of the municipality's population and accommodating tourists who came by themselves and asked for help from it. In recent years, several tourists who have visited this spa have used incentive vouchers from the Ministry of Trade and Tourism of the Republic of Serbia, which has, impacted a modest increase in the number of tourists and

the number of overnight stays. In addition, according to the same service, part of the tourists come for several years in a row due to the treatment whose costs they bear.

V. Environmental indicators.

Environmental indicators measure the interaction between tourism and the environment relationships monitor the environmental sustainability of tourism development. In other words, they indicate the impact of tourism on some segments of life.

a. Percentage of land on which construction is allowed but not realized.

The percentage of land on which construction is allowed but not realized is an indicator that indicates possible future accelerated and uncontrolled construction. To avoid the danger of future land, degradations it is necessary to compare spatial and urban plans with maps that show the density of constructed buildings. Planned areas for tourist construction exceed 20% of the total area of agricultural land, then such a situation is assessed as alarming. Therefore, it is necessary to give up further building of tourist facilities he's been changing the urban plan. It is a way that reduces the planned agricultural areas for the construction of tourist facilities and turns them into green or protected areas. In the territorial of Niška Banja, agricultural land has by repurposed for 30 hours for the needs of the construction of tourist facilities. The land is separated for development tourism, building the turnover, and other necessary tourist infrastructures. Two tenders were enouncing by build to planned tourist facilities, but both failed because there were no interested domestic and foreign investors. Considering the present urbanization and degradation of space in the canter of the Niška Banja and the impossibility of changing the existing condition, the conversion of part of agricultural land for the needs of tourism development by justified. In addition, the percentage of conversion of agricultural land for the needs of tourism development is far below 20%. Further growth should be based, on the exploitation of natural resources, primarily on the development of sustainable tourism and the utilization of renewable energy sources. (Raicevic, Marjanovic, Djordjevic, 2020)

b. Percentage of land use and occupation.

Percentage of land use and occupation is an indicator that shows the impact of tourism on changing the purpose of agricultural and other land use over five years. Experience shows that any conversion of agricultural land for other purposes over five years is more than 2% worrying. The part of the agricultural land that extends to the right of the entrance to Niška Banja, known as the Lozni Kalem, has been renamed (changed purpose) into a tourist zone within 30 hours. By turnover and other infrastructures have been built for the needs of tourism and an investor is being sought by the building of a spa centre and other tourist facilities. In the territory of Niška Banja, the agricultural land extended the lower field, towards the valley of the river Nišava, and to the right of the entrance, to the spa in the area by 7,408 h.

The total percentage of occupations of agricultural land is 0.04%, which according to the Indicator of use and occupation of land is not worrying, since it does not exceed 2%. However, it should be data that in the total area of Niška Banja, agricultural land occupies 127h. If we use this data to express the change in the purpose of agricultural land in town Nis, then the result obtained is more than worrying and amounts to 19%. If we use this data to express the change in the purpose of agricultural land in Nis, then the result obtained is more than worrying and amounts to 19%.

c. Percentage of tourist arrivals that do not come by private car

The percentage of arrivals of tourists who do not come by private car is an indicator that shows the potential turnover congestion of the tourist destination, parking problems,

noise levels, and air quality. Therefore, it is much more desirable for tourists to use public and, where possible, railway turnover. However, experiences in the world show that the number of tourists travels by their car with a tendency to further increase in the future.

According to the analysis of the Tourism Development Service of Niške Banje, the percentage of tourists who come by private vehicles is about 50%. The low level of use of other types of turnover is a consequence of weak and bad connections of Niška Banja with other receptive places. If there is one direct line Niska Banja-Belgrade, during the season, then it is clear why the arrival in a private direction is big. Therefore, especially in the summer season, this tourist destination is very occupied by turnover, with not enough parking places, loud car noise, and worrying emissions of harmful gases. According to this indicator, the sustainable development of tourism in Niška Banja does not exist.

Conclusion

Even though not all indicators of sustainable tourism development have been fully considered, due to the lack of certain groups of data, we can conclude that tourism in Niška Banja is not growing on the principles of sustainable development.

Economic indicators of sustainable development show the non-sensuality of the concentration of tourist turnover, by accepted as a tolerable situation with the suggestion of taking urgent preventive measures to increase the number of overnight stays and more even distribution of tourist turnover throughout the year. The utilization of accommodation capacities is at a low level, in the red zone, which is not only worrying but also alarming, having in mind that the number of beds has drastically decreased after 2013, which has resulted in an enormous drop in the number of nights.

The indicator of tourist satisfaction stood not analysed because the competent authorities for tourism development did not consider it necessary to have such an analysis. Therefore, it is not surprising that many think that tourism in Niška Banja is developing spontaneously, left to itself, without identifying the needs and satisfying tourists.

The fivefold decline in tourist overnight stays in 2019 compared to 2011, almost the uniform estimate of the number of inhabitants in 2019 as in 2011 influenced the indicator of tourist intensity by the green zone. At first glance, it seems that if this indicator by viewed in isolation, sustainable development is achieved. However, that is a wrong conclusion because the intensity of tourism is not a consequence of innovations and business improvements but a drastic drop in the number of overnight stays.

The decreased number of beds and the number of overnight stays, with low changes in the number of inhabitants, certainly could not have a destructive effect on the cultural identity of the local population but has been confirmed with certainty that it has not been disturbed. Cultural indicators of sustainable tourism development in Niška Banja show that due to the small number of visitors, the cultural identity of the local community by the not endangered relationship is in the zone of sustainability.

There was not much pressure by tourists to change urban and infrastructural changes and buildings. Care should be taken with the estimate of the indicator of tourism intensity, even though it is located in the red zone and shows a very negative impact of tourism on the local population. The decline in the number of employees has causally and consequently affected the decline in the net social product in the total net social production of Niška Banja.

The existence of only one travel agency and the fivefold decrease in employees in tourism in the total number of employees speaks when a question to social indicators that tourism is unsustainable. At the same time, it emphasized that the low level of employees and probably the low level of the net social product indicate that the local community achieves lower effects and benefits from tourism.

The impact of tourism on the condition of the environment is enduring and does not significantly endanger the ecosystem. The conversion of agricultural land for the needs of tourism growth is under the prescribed minimum satisfies the criteria of sustainable development. The percentage of arrivals of tourists who do not use private vehicles is less and less to be expected in the future, which is a trend not only in Serbia but also in the world. This trend must improve through direct line road and rail turnover to receptive areas.

Niška Banja, with the protected area and other preserved natural attractions, should look for a chance the further develop tourism on the principles of sustainable development, especially since it is a comparative advantage, strength, development opportunity perspective. Therefore, it is necessary for local spatial and regulatory plans, among other activities, to base the development of tourism on the principles of sustainable development as a new philosophy.

On the other hand, the spontaneous development of tourism can cause heavy damage to Niška Banja. Therefore, it is necessary to carefully and efficiently plan growth tourism and good manage it. Also needed strict monitoring of how, will be tourism successful and sustainable while respecting the natural, social and cultural components of the environment.

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THE EUROPEAN UNION CONVERGENCE IN THE ACHIEVED LEVELS OF HUMAN DEVELOPMENT

Abstract

The paper examines the existence of convergence in the achieved levels of human development among countries of the European Union in the period 1995-2018. The aim of the research is to test the hypothesis, There is convergence in the achieved levels of human development among the integrated countries of the European Union. The Human Development Index is used as a measure of human development. Using regression analysis and coefficient of variation, the existence of β - and σ -convergence is tested in this paper. In addition to the entire European Union, convergence is being tested for a group of developed countries of the European Union, as well as among so-called "New Member States". The obtained results indicate the existence of convergence (both β and σ) in the achieved levels of human development in the European Union, where it is more pronounced and stable in the group of "New Member States" compared to the group of developed countries of the European Union. The main contribution of this paper is to increase the number of papers in the field of convergence in terms of human development, given that so far, a small number of papers have explored this topic.

Key words: *convergence, human development, Human Development Index, European Union.*

JEL classification: *C50, O47, O52*

КОНВЕРГЕНЦИЈА У ДОСТИГНУТИМ НИВОИМА ХУМАНОГ РАЗВОЈА У ЕВРОПСКОЈ УНИЈИ

Апстракт

У раду се испитује постојање конвергенције у достигнутим нивоима хуманог развоја међу земљама Европске уније у периоду 1995-2018 године. Циљ истраживања је тестирање постављене хипотезе, која гласи Постоји конвергенција у достигнутим нивоима хуманог развоја међу интегрисаним земљама Европске уније. Као мера хуманог развоја користи се Индекс хуманог развоја. Коришћењем регресионе анализе и коефицијента варијације, у раду се тестира постојање β - и σ -конвергенције. Осим за целу Европску унију, конвергенција се тестира и за групу развијених земаља Европске уније као и такозване "Нове земље чланице". Добијени резултати указују на постојање

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конвергенције (β и σ) у достигнутим нивоима хуманог развоја у Европској унији, при чему је она израженија и стабилнија у групи “Нових земаља чланица” у односу на групу развијених земаља Европске уније. Главни допринос овог рада је у повећању радова из области конвергенције у достигнутим нивоима хуманог развоја, обзиром да је до сада мали број радова истраживао ову тематику.

Кључне речи: *конвергенција, хумани развој, Индекс хуманог развоја, Европска унија.*

Introduction

Convergence between countries represents one of the most significant discoveries in Solow's neoclassical growth model (Novaković & Cvetanović, 2013, p. 8). The main conclusion of Solow's growth model is the existence of income convergence, i.e. a situation when poor countries, with a lower initial level of capital and gross domestic product (GDP) per capita, tend to catch up with richer countries, i.e. converge. This indicates that the farther the country is from its steady state, the faster its income growth will be. Conversely, the closer the country is to steady state, the slower the income growth will be.

Initial theoretical understandings about income convergence in neoclassical, and later in endogenous growth theories, have been significantly improved due to the numerous studies that have followed. The theoretical and analytical framework has expanded, which has led to the emergence of different approaches, concepts and methods in analysis, and a large number of them are still used today in the study of income convergence.

Convergence is a concept that has become a research topic among economists, not only because of the importance of catching up with countries of different development levels, but also because this analysis can serve as a way to confirm the validity of different economic growth models. Income convergence is a process that can be analyzed from different aspects. Real income convergence describes income level convergence, nominal convergence reflects price level convergence, and institutional convergence implies harmonization of legislation. In addition, we can talk about the convergence of business cycles, consumer behavior and social stratification (Varblane & Vahter, 2005, p. 8).

When it comes to convergence, most of the research relates to income convergence. In that case, GDP per capita is mainly taken as a measure. However, as the economic development of the country is largely a consequence of technological progress, the idea of studying catching up with the level of technology among countries has emerged (Dollar, 1991, p. 263; Dollar & Wolff, 1994, p. 197). The total factor productivity is used as a measure of technology, hence the name convergence of total factor productivity (Gligorić, 2015, p. 15). Over time, the idea of studying convergence by measuring living standards with the help of the Human Development Index also emerged (Mazumdar, 2002, p. 87; Sutcliffe, 2004, p.15).

When determining the existence of convergence or divergence between countries, two concepts are most often used in the literature: β -convergence (beta convergence) and σ -convergence (sigma convergence) (Marques & Soukiazis, 1998, p.3). The concept of

σ -convergence implies that convergence exists if dispersion of income among countries within the observed group decreases over time (Stanišić, 2016, p. 4). Coefficient of variation is used to measure dispersion of income.

Two types of β -convergence can be distinguished - absolute and relative β -convergence. Whether it is absolute or relative β -convergence, it exists when poor countries grow faster than rich ones, that is, when countries converge to the same level of GDP per capita regardless of their initial conditions. Absolute β -convergence implies that all countries converge to identical steady state and differ only in the initial income level (Milutinović, 2015, p. 132). Absolute β -convergence occurs when countries have the same savings rates, population growth rates, and depreciation rates. Differences in GDP per capita can occur only due to unforeseen shocks in these determinants or as a consequence of moving towards steady state. After some time, the same GDP growth rates per capita will appear.

Unlike the concept of absolute β -convergence, relative β -convergence implies that countries have different steady state levels, due to different levels of technology, savings rates and population growth rates. As a result, countries are converging towards their own, different states of equilibrium (Milutinović, 2015, p. 133). Countries that are further from their steady state will grow faster than richer countries, that is, to those countries that are closer to their steady state. Therefore, it can be said that relative β -convergence is a situation when poorer countries have faster growth than richer countries, towards different steady states.

Comparing these two concepts of convergence (β and σ), the interesting question is which of them is better. The concept of σ -convergence became popular in the 1990s with the work of Daniel Quah. Quah (1993) argued that σ -convergence is better because it shows whether income distribution among countries is becoming more or less equal. However, the concept of β -convergence is more commonly used in the literature because it shows whether poor countries are growing faster than richer ones, indicates the speed of the convergence process and whether convergence is absolute or relative (Milutinović, 2015, p.135). Finally, it is important to note that β -convergence is a necessary but not a sufficient condition for σ -convergence (Sala-i-Martin, 1995, p.5). Therefore, it can be said that these two concepts are complementary and irreplaceable with each other.

In addition to GDP per capita, convergence between countries of different development levels was also examined in the achieved levels of human development of the country. Namely, the connection between economic growth and the level of human development is evident. Economic growth expands the material basis for meeting human needs. Economic growth should promote human development in all its dimensions, i.e. generate full employment and security of life, promote human freedom and empowerment, distribute benefits equally, as well as promote social cohesion and cooperation and protect future human development (UNDP, 1996, p. 56). This is very important given that non-economic factors, such as ethnic, educational and religious characteristics, could also improve cooperation among nations and countries (Sržentić, 2020, p. 127).

Human development, on the other hand, requires, among other things, significant investments in education, health and nutrition. The result is a healthier and more educated population that is capable of being more economically productive. In addition, the importance of education lies not only in its effect on social and economic development,

but also as a tool for reducing unemployment (Bartosik & Wiścicka, 2021, p. 27). Indeed, many modern theories of growth explain economic growth primarily in terms of expanded human capital. Growth can also be linked to many other elements of human development, such as political freedom, cultural heritage and environmental protection. In the long run, economic growth and human development generally move together and tend to empower each other (UNDP, 1996, p. 66).

The subject of this paper is the analysis of the achieved standard of living and the level of human development of the European Union (EU) member states using the Human Development Index (HDI). The aim of this paper is to prove the existence of convergence in the achieved levels of human development among the countries of the EU. In other words, the aim of the paper is to test whether the EU member states are converging in living standards. Using the regression model and the coefficient of variation, following hypothesis will be tested in the paper: There is convergence in the achieved levels of human development among integrated countries of the EU. The main contribution of this paper is to increase the literature foundation on convergence in the achieved levels of human development, given that so far there are not a large number of papers examining this topic.

The rest of the paper is structured as follows. Concept of HDI as well as the comparative analysis of HDI among EU countries is presented in the part two. Literature review is given in part three, followed by data and model in part four. Results are presented in part five, while sixth part concludes.

Human Development Index in The European Union

Every year, beginning in 1990, the United Nations Development Program publishes a Human Development Report with the aim of pointing out not only the economic, but also other dimensions of human existence. Thus, the HDI measures three dimensions of human existence, i.e. the achieved standard of living, life expectancy and achieved education of the population. The indicator for the first dimension is life expectancy at birth, for the second expected and mean years of schooling, and for the third gross national income (GNI) expressed in purchasing power parities. HDI simplifies and encompasses only a part of what human development implies. Its disadvantage is that it does not reflect inequalities within its three dimensions, so it is considered an index of potential human development. Also, the HDI does not include all relevant areas of human development such as social inclusion, sustainability, environmental protection, human rights, cultural and political participation.

The 2016 Human Development Report focuses on how human development can be ensured for everyone, now and in the future. The progress of human development over the past 25 years has been impressive on many fronts, but the gains have not been universal for all countries. Namely, there are imbalances in countries, socio-economic, ethnic and racial groups, urban and rural areas, due to which millions of people are not able to realize their full potential in life (UNDP, 2016, p. 1). The 2019 Human Development Report explores inequalities in human development by going beyond income, beyond averages, and beyond today (UNDP, 2019). Beside inequality of income, there are inequalities in key elements of human development such as health, education,

dignity and respect for human rights. Even though HDI shows, on average, impressive improvement (even convergence) in the capabilities included in the HDI. Yet, along with convergence in the basic capabilities that were the focus of Human Development Reports in the early 1990s, divergences are opening in other indicators, both within and across countries. Namely, life expectancy at older ages is becoming more unequal, as is access to tertiary education (UNDP, 2019, p. 24).

Depending on the value of the HDI, all countries are classified into four categories, i.e. very high level of human development (HDI has a ratio of 1 to 0.800), high level of human development (0.799-0.700), medium level of human development (0.699-0.550), low level of human development (0.549-0).

Table 1 gives the HDI and world rankings for EU member states for 2018. Top ranked country is Ireland with an HDI value of 0.942, which puts it in a very high category of human development, positioning it in third place out of 188 countries and territories of the world. From 1990 to 2018, value of Ireland's HDI increased from 0.764 to 0.942, which is an increase of 23.4 percent. Between 1990 and 2018, Ireland's life expectancy at birth increased by 7.3 years, mean years of schooling increased by 2.8 years and expected years of schooling increased by 6.7 years. In this period, Ireland's GNI per capita increased by about 179.2 percent (UNDP, Retrieved September 18, 2020, from http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/IRL.pdf).

Table 1: Human Development Index for European Union member states for 2018

COUNTRY	INDEX	WORLD RANKING
Ireland	0,942	3
Germany	0,939	4
Sweden	0,937	8
Netherlands	0,933	10
Denmark	0,930	11
Finland	0,925	12
United Kingdom	0,920	15
Belgium	0,919	17
Austria	0,914	20
Luxembourg	0,909	21
Slovenia	0,902	24
Spain	0,893	25
France	0,891	26
Czech Republic	0,891	26
Malta	0,885	28
Italy	0,883	29
Estonia	0,882	30
Cyprus	0,873	31
Greece	0,872	32
Poland	0,872	32
Lithuania	0,869	34
Slovakia	0,857	36
Latvia	0,854	39

Portugal	0,850	40
Hungary	0,845	43
Croatia	0,837	46
Romania	0,816	52
Bulgaria	0,816	52

Source: UNDP, Retrieved September 18, 2020, from <http://hdr.undp.org/en/countries>

The worst ranked countries of the European Union are Bulgaria and Romania, which share 56th place, with an HDI value of 0.816. This value puts them in the category of countries with very high human development. Between 1990 and 2018, Bulgaria's HDI value increased from 0.694 to 0.816, an increase of 17.5 percent. In this period, Bulgaria's life expectancy at birth increased by 3.7 years, mean years of schooling increased by 3.0 years and expected years of schooling increased by 2.7 years. From 1990 to 2018 Bulgaria's GNI per capita increased by about 130.6 percent (UNDP, Retrieved September 18, 2020, from http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/BGR.pdf). In the case of Romania, between 1990 and 2018, HDI value increased from 0.701 to 0.816, an increase of 16.3 percent. In this period, Romania's life expectancy at birth increased by 6.4 years, mean years of schooling increased by 1.9 years and expected years of schooling increased by 2.4 years. Romania's GNI per capita increased by about 109.1 percent between 1990 and 2018 (UNDP, Retrieved September 18, 2020, from http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/ROU.pdf).

Literature review

Human development is a broad concept that must not be equated with economic growth. The experience of countries with high GDP growth rates shows that economic growth is not a guarantee of the socio-economic well-being of the whole society. On the other hand, many countries with low GDP growth rates have reached a relatively high level of human development thanks to channeling funds into building and expanding the quality of human capacity (Leković & Pantić, 2015, p. 61). Thus, human development is much more than economic growth expressed by GDP growth. Therefore, research has emerged that, in addition to testing the existence of convergence in income levels, tests the existence of convergence in the achieved levels of human development.

Mazumdar (2002), Sutcliffe (2004) and Noorbakhsh (2006) were among first authors that have investigated the convergence in the terms of human development. Mazumdar (2002) tested the existence of convergence in terms of human development for a sample of 91 countries, for the period 1960-1995, and also for three groups of countries according to their level of human development. The results showed divergence in terms of human development for all four cases over the period 1960-1995.

Sutcliffe (2004) examined this type of convergence for a sample of 99 countries, during 1975, 1980, 1985, 1990, 1995 and 2001. Author's results indicated convergence in terms of human development. However, the author rejects the idea of a convergence process in terms of human development for two reasons. First reason was that author argued that developed countries are close to one another in terms of human development

because in these countries life expectancy has been close to its biological limit, adult literacy and (primary) educational enrolment have been practically hundred percent, and the impact of the only variable without natural upper limit, i.e. per capita income, on measuring the difference between the rich and the poor is strongly restricted by taking the logarithm of per capita income (Konya & Guisan, 2008, p. 10). Secondly, author claimed that convergence in the terms of human development has been seized on by the International Monetary Fund, for example, to mitigate the acknowledged downside of the long-run economic history of the world economy.

Noorbakhsh (2006) tested the existence of convergence in terms of human development of countries and regions over the period 1975-2002, using data slightly updated compared to previous studies. Author found evidence of weak β and σ -convergence for the observed countries.

Bucur & Stangaciu (2015) tested the convergence within EU in the terms of GDP as well as social convergence using HDI. Authors proved the existing of convergence both in income and human development level. Results also indicate that the less developed countries from economic and social viewpoints managed to increase their level of GDP per capita and of HDI at a faster rate than the more developed states. Konya & Guisan (2008) investigated the possibility of human development convergence in the world between 1975 and 2004. Results indicate that the world had been converging in the sense that relatively backward countries managed to increase their HDI faster on average than more developed countries, though this convergence process was rather slow. Same authors performed similar analyses within EU and particularly NMS. In both cases authors have found β - and σ -convergence and convergence was much faster within these groups of countries than convergence in the world.

Data and Model

The following hypothesis will be tested in the paper: There is convergence in the achieved levels of human development among integrated countries of the European Union. Both β and σ convergence will be used to test the set hypothesis. The analysis was performed for the period 1995-2018.

The following regression model will be used to test β -convergence:

$$\ln(y_{i,T}/y_{i,0}) = \alpha_0 + \alpha_1 \ln y_{i,0} + e_i$$

where $y_{i,T}$ is HDI in the last year of the observation period, $y_{i,0}$ is HDI in the first year of the observation period, α_0 is constant, e_i is standard error. Negative value of the coefficient α_1 indicates the existence of β -convergence in the achieved levels of human development.

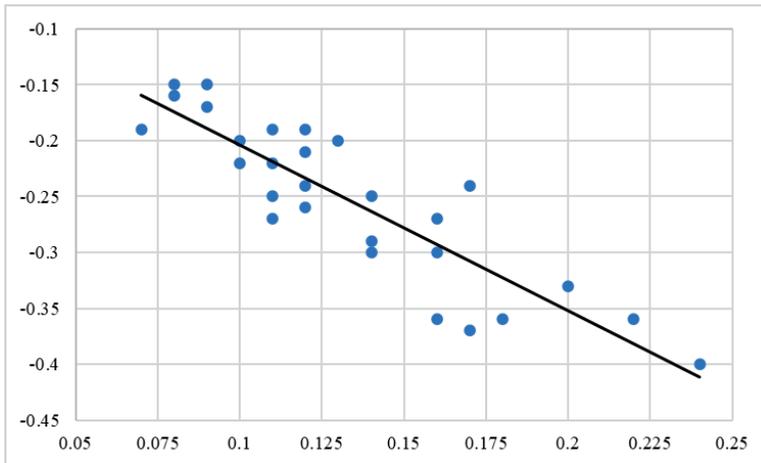
To test the existence of σ -convergence in the achieved levels of human development, the coefficient of variation of HDI is used as a measure of the dispersion of the development level between countries. The downward trend of the coefficient of variation shows the existence of this type of convergence.

Data for the analysis was obtained from United Nations Development Programme web site (<http://hdr.undp.org/en/data>).

Research results and discussion

The results of convergence in the achieved levels of human development obtained by regression analysis are presented below. Dependent variable is the HDI value in the last and first year of the period (2018 and 1995), while the independent variable is HDI in the initial year (1995). The existence of β -convergence is first examined. Figure 1 shows the scatter plot of the dependent and independent variables.

Figure 1: Distribution diagram of average HDI growth rate (1995-2018) and initial HDI level (1995) for EU member states



Source: author

The coefficient α_1 with the initial HDI level is negative and significant (Table 2) and is -0.465. This result confirms the assumption that there is convergence in the achieved levels of human development among EU member states, when it comes to β -convergence. This means that countries with lower living standards converge to countries with higher living standards. β -convergence was also confirmed when observed separately developed EU countries (EU15) and so-called “New Member States” (NMS). Analysis showed that convergence is more pronounced in the NMS group (higher value of the coefficient with the independent variable).

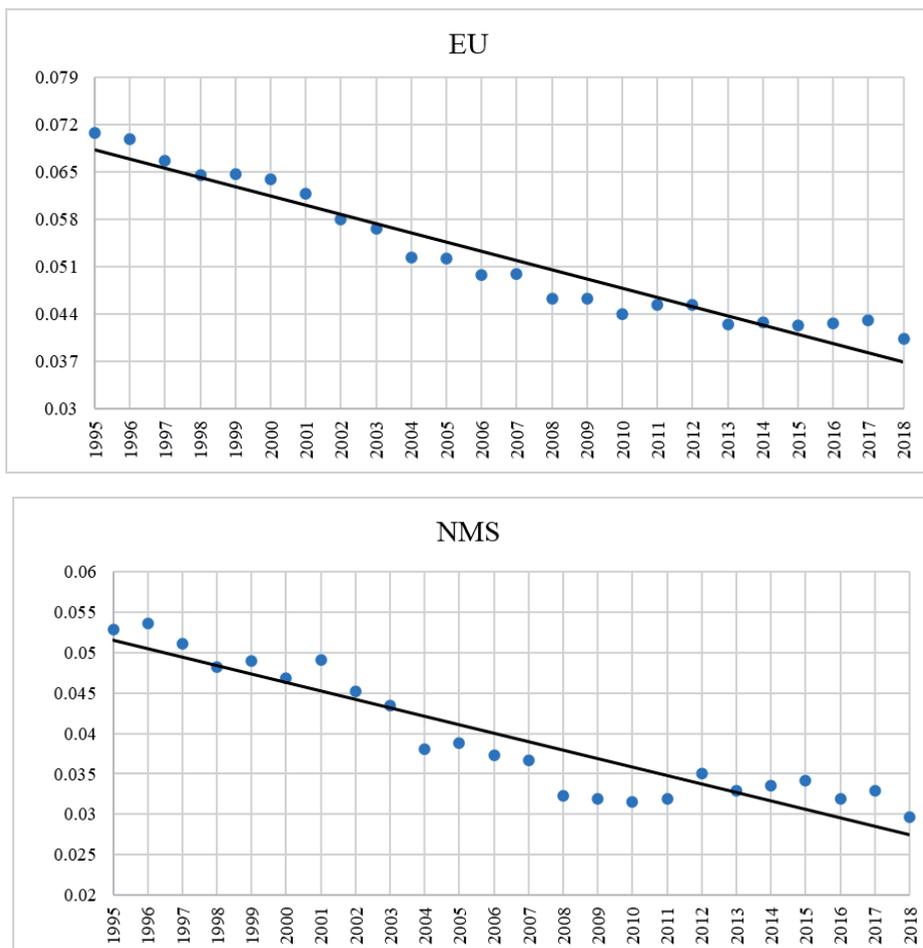
Table 2: Results of regression analysis of β -convergence in the achieved levels of human development

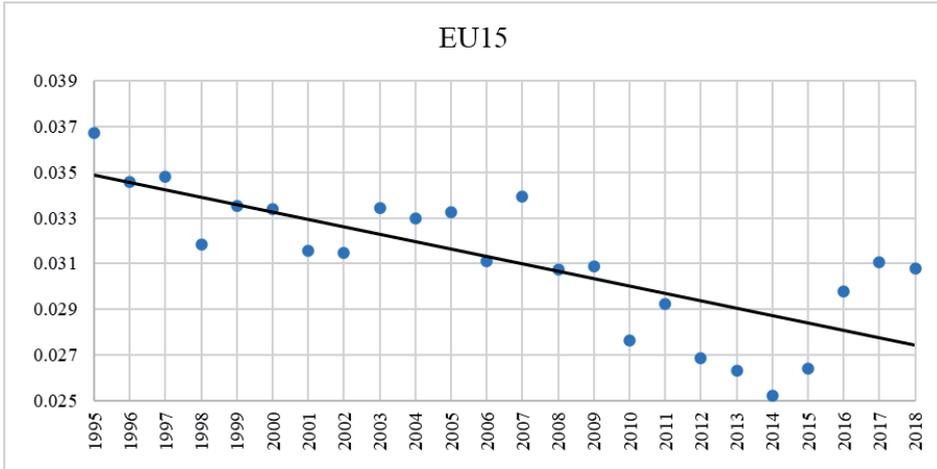
	EU		EU15		NMS	
	Coefficient	<i>p</i>	Coefficient	<i>p</i>	Coefficient	<i>p</i>
Constant	0,02	0,873	0,029	0,392	-0,004	0,892
ln(HDI)_i	-0,517	<0,0005	-0,386	0,031	-0,540	<0,0005
R²	0,757		0,310		0,761	

Source: author's calculation

The presence of σ -convergence in the achieved levels of human development is tested by calculating the coefficient of variation. If the coefficient of variation tends to decrease over time, σ -convergence exists. The coefficient of variation of HDI for all EU countries, as well as for EU15 and the NMS group is shown in Figure 2. The coefficient of variation shows a decreasing trend for all three groups of countries, which confirms the existence of σ -convergence in achieved levels of human development.

Figure 2: Coefficient of variation of the Human Development Index for EU, EU15 and NMS from 1995 to 2018





Source: author

When comparing groups of countries individually, it can be seen that the coefficient of variation has the smallest deviation in the EU. There is a slightly smaller deviation in the NMS group, while in the group of the most developed EU countries, the coefficient of variation shows the greatest instability. These results indicate a more consistent and pronounced convergence in the achieved levels of human development in the NMS group compared to the EU15.

The obtained results indicate that the hypothesis There is convergence in the achieved levels of human development among integrated countries of the EU can be confirmed. In other words, EU member states converged in the terms of human development.

Conclusion

The concept of income convergence is a broadly researched topic. Catching up with countries of different development levels has been proven in numerous papers, when less developed countries are catching up with the level of GDP per capita of developed countries. However, a high level of GDP is not always a guarantee of the socio-economic well-being of the population. Therefore, convergence between countries is also examined in terms of levels of human development, using the Human Development Index. Human Development Index is calculated every year since 1990 by United Nations Development Programme, and covers three dimensions of human existence, i.e. the achieved standard of living, life expectancy and achieved education of the population.

The subject of this paper is convergence in human development levels within European Union. The aim is to test the hypothesis There is convergence in the achieved levels of human development among integrated countries of the European Union. In order to test the hypothesis regression model and coefficient of variation were used. As a measure of human development level, Human Development Index was used. Results indicate the existence of convergence in levels of human development, meaning that the set hypothesis

is confirmed. The main contribution of this paper is to increase the number of papers that examine the existence of convergence in the achieved levels of human development, given that so far there is a very small number of papers that address this topic.

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POST-SALES SERVICES - A SIGNIFICANT PERFORMANCE OF ORGANIZATIONS' COMPETITIVE ADVANTAGE

Abstract

The majority of organizations not only aspire to sell their product(s), but they also aspire to solve the problems clients are faced with in that process. In other words, goods have to be amended and encompassed by a set of additional post-sales services. The research conducted in this paper was done with the aim of rating and ranking the post-sales services rendered by domestic organizations as the characteristic that influences their successful operation on the market. The primary goal is to further deepen the knowledge and evaluate the basic features of the post-sales service markets, given the fact that the knowledge of that market that has been acquired so far is quite limited. The starting premise implies that to achieve maximum organizational effects, it is necessary for the organization to successfully create post-sales services which appear to be the key to competitive maneuvering in the conditions in which products are being more and more similar to each other and when there is the need to find the other elements which will make buyers differ them from one another. In this research study, the following methods are used: the comparative statistics methods (ch2 Test, ANOVA), the hypothetical-deductive methods, the analytic-deductive and comparative methods, the historical and statistical-descriptive methods.

Key words: post-sales services, organization, clients, communication, competitiveness

JEL classification: M21, O14

ПОСЛЕПРОДАЈНЕ УСЛУГЕ - ЗНАЧАЈНА ПЕРФОРМАНСА КОНКУРЕНТСКЕ ПРЕДНОСТИ ОРГАНИЗАЦИЈА

Апстракт

Већина организација тежи не само продаји производа већ и решавању проблема с којима се клијенти у том процесу суочавају, односно пласирана роба

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мора бити допуњена и окружена читавим сетом додатних послепродајних послепродајних. Истраживање у овом раду реализовано је са циљем да се оцене и рангирају послепродајне услуге домаћих организација као карактеристике која утиче на њихово успешно функционисање на тржишту. Примарни циљ је продубљивање сазнања и евалуација базичних обележја тржишта послепродајних услуга, с обзиром да су досадашња сазнања о њему доста лимитирана. Полази се од премисе да је за постизање максималних ефеката организације неопходно успешно креирање послепродајних услуга, које се показују као кључ конкурентског маневрисања у условима када су производи све сличнији и, када ваља пронаћи друге елементе по којима ће их купци разликовати. У овом истраживању коришћене су методе компаративне статистике (цх² Тест, АНОВА), хипотетско - дедуктивне методе, аналитичко - дедуктивне и компаративне методе, историјске и статистичко - дескриптивне методе.

Кључне речи: послепродајне услуге, организација, клијенти, комуникација, конкурентност.

Introduction

As a result of changed buyer demand, an increased competition and a reduction in profit margins, post-sales business operations have been gaining in strategic significance for numerous industries and products on the market in the last decades (Schulz, 2015). Namely, buyers have been more and more informed, and they have been demonstrating ever-bigger appetites. Organizations tend to understand their needs and, should they be successful in doing so, they create a chance for themselves to offer their buyers the products and services that will have the capacity to continuously satisfy their needs, in which way buyers will have a feeling that the organization is taking care of them. The post-sales service market is characterized by a very large number of users on the demand side (Domazet, Stošić, 2017), while simultaneously the supply of consumer durables is treated as the capital supply which huge amounts of money, a relatively long product expiration date and a significant share of maintenance costs, i.e. the costs of product servicing in the buyer's budget etc. are typical of. Indeed, the accelerated pace of innovations makes products be of ever more similar characteristics and price, so organizations are forced to find out different elements and manners which will enable their buyers to make a difference between them (Ahn, Sohn, 2009). Post-sales services are one of those elements that are singled out. If successfully redefined, created and implemented in compliance with a new organizational strategic horizon, they may prevail (Legnani, Cavalieri, Ierace, 2009) in prospective buyers' minds.

Strong competition on the international market (Wilson, 1999) requires that sellers, managers, or sales directors in the enterprise should be knowledgeable in detail of the manner in which the implementation of such post-sales activities and the manner of dealing with clients work so that they could have a positive effect in the further sales process. Should the organization carry out all necessary post-sales activities, that will have a very positive influence on the quality of what the market is offered. Well designed and conceived promotional activities are used by sellers to help them persuade their

buyers that it is exactly their product that is the right one and that its characteristics are most appropriate to buyer needs. In that manner, the subsequent market services (Schulz, 2015) stabilize organizations' income for a longer term, increase buyer satisfaction, and also offer a vital tool in a competitive game. Through a carefully thought-out contact with clients (Senić, Senić, 2008, p. 347), organizations receive feedback in connection with a concrete product/service, which positively influences the quality of all that is offered, since whether and to what extent the buyer is satisfied or not, i.e. whether a certain service has met the client's expectations or not, will exactly be known.

Should a sales transaction be fully made, in a manner that the buyer has been satisfied with all the aspects of the sell-buy transaction, the organization would only benefit if it continued its business communication with its buyers as one of the forms of post-sales activities that starts immediately after the delivery of the product to the buyer (Kotler, Keller, 2006, p. 198). These activities are inevitable since equipment/the product must be maintained and they have their own price. For that reason, the modality in which those services are provided, their quality and client satisfaction are an essentially important factor influencing the next purchase. It is especially significant for a bought consumer durable that the buyer has adequate post-sales support reflected through the preventive service (Seth, Deshmukh, Vrat, 2005) of machines/devices, regular maintenance, as well as the availability of the people so experienced to solve all the issues related to the use of the bought equipment/product.

How an organization will ensure the conducting of its post-sales activities depends most on what buyers' needs are and what their needs are like after the first sales transaction has been performed (Stevanović, Stanojević, Nedić, 2013). In practice, there are cases when certain organizations omit post-sales activities mainly for the reason of frequent staff turnover in the sales function and the nonexistence of a clear post-sales strategy (Mathieu, 2001) as a configuration (Saccani, Johansson, Perona, 2007) of a series of sales and post-sales services to buyers and consumers aimed at improving sales. That series includes informing and advising buyers, a promotional material, special price discounts and conveniences for buyers, discounts on selling prices, guarantees for durability, functionality, quality and so on.

In order to maintain their profitability (Kurata, Nam, 2010) after the sale of a product, manufacturers take an active role in developing new business post-sales models. The service marketing of an organization keeps a close eye on what is happening on the market and adapts its activities to the market needs. Organizations ensure their technical and user support to their buyers through a call center as a modern way in which they carry out their post-sales activities. Organizations' communication with buyers on a subsequent market enables them to meet their requests in the way they demand it, creating buyer loyalty to a specific product. An increase in the buyer satisfaction level on a subsequent market also increases the market value of the organization as an important source of competitive advantage (Slater, 1996).

The absence of post-sales activities is the first sign to the buyer that the organization has no permanent determination to build its long-term relationships with its buyers through an appropriate post-sales activities system. This is the original criterion according to which buyers can make a difference between the offer made by different sellers in the conditions when all the other elements of the offer are of a similar character. How crucial a factor post-sales are for buyer satisfaction is testified to by the very fact

that not rarely are even several times as much of funds invested in this segment than in the sales resources.

The Starting Point and the Methodological Approach

Numerous research studies conducted have confirmed from diverse points of view the fact that organizations are ever more strongly dedicated to the development of their post-sales services (Cohen, et al. 2006) because they see it as an efficient means for acquiring a competitive advantage on a subsequent market and as a tool of an active initiative for consumers (Slater, 1996; Wilson, 1999). Apart from the sale of products, the largest number of organizations endeavor to amend and encompass the goods sold with an inclusive set of additional services, i.e. they endeavor to resolve the issues their clients are faced with in that process. This set depends on buyer demand and expectations, the structure of the costs of organizational turnover, the situation in the competitive firms and other factors (Håkansson, Snehota, 2006). Challenges in the field of competitive relationships on the post-sales service market are especially pronounced in situations when the Interbrand competition is not strong enough. The key issues the actors on the offer side are faced with on the domestic post-sales (service) market for devices/ consumer durables are, first of all, the presence of disloyal competition and an intensive turnover of goods/equipment (parts) of an unknown origin and unvalidated quality.

The subject matter of the research done in this paper pertains to perceiving the marks and ranking the characteristics that significantly impact the expansion of the business operations carried out by national organizations, the focus being on post-sales services. The starting assumption implies that post-sales services thought out in a quality manner and organized well are the condition necessary for the achievement of the organization's planned results and its business excellence. The factor of the organization's length of doing business and the level of business operations have a significant influence on the development of post-sales services and may make the difference in potential buyers' thoughts.

The research study was being conducted as a cross-sectional study of a deterministic character. While designing a methodological framework of the paper, the bibliographic-speculative method was also used beside the explorative method, whereas the multiple comparison method and the statistical test method were used in the results processing and interpretation. An intentional sample was used in function of this research study. The research was being done on a sample of 136 organizations selected from the database kept with the Business Registers Agency of the Republic of Serbia, of which (19%) were micro-organizations, (28%) were small organizations, (29%) were medium-sized organizations and (24%) were big organizations. When selecting the organizations to be included in the sample, the successfulness of their business operations within the national frameworks of doing business was the key factor. The research was performed in the online questionnaire matrix. The survey was conducted on an anonymous basis, the answers being given by either the organizations' owners or higher-level managers in the organizations. The point to be achieved through the questionnaire was to obtain primary information about the commitment of the domestic organizations to the development of extensive post-sales services and to mark and rank the same in the context of the other

characteristics of the selected elements necessary for the improvement of the competitive advantage of the national organizations.

Results and Discussion

A quality assessment of the characteristics of the post-sales market enables an organization to make important strategic decisions and minimize a possibility of potential omissions caused by wrong assumptions in goods placement in an easier way. The research presented in the study is primarily oriented towards the valuation of the properties of the post-sales services by domestic organizations in function of their sustainable survival on the market, and for the development and acquisition of a competitive advantage. In that sense, the target collection of reliable primary pieces of information about the activities that should be carried out on a subsequent market was performed with the organizations as the respondents selected for the sample. The respondents were asked to value the selected indicators within the framework of their business operations from the set of the questions posed in the survey and to use the marks from 1 to 5 for that purpose, the mark 1 being the lowest mark, and the mark 5 being the highest mark. The organizations striving to ensure high performances are certainly expected to meet certain conditions and criteria. The results as per particular characteristics with an accent on post-sales services are accounted for in Table 1.

Table 1. The organizational performance marks

Performances	M a r k s									
	1		2		3		4		5	
	Af	Rf	Af	Rf	Af	Rf	Af	Rf	Af	Rf
The organization's post-sales services	7	5.1	3	2.2	32	23.5	45	33.1	49	36.0
The quality level of the products on the market which the organization does business on	2	1.5	11	8.1	49	36.0	40	29.4	34	25.0
The technological level of the organization	0	0	15	11.0	20	14.7	57	41.9	44	32.4
The span to which extent the product quality concept according to the international standards is applied in the organization	13	9.6	17	12.5	9	6.6	41	30.1	56	41.2
The level at which the organization has clearly defined goals, as well as the elements necessary for their successful achievement	4	2.9	6	4.4	21	15.4	68	50.0	37	27.2

Af – absolute frequencies; *Rf* – relative frequencies (percentages); *S.Vr.* – mean values

Source: The authors

In the given context, the domestic organization's aspiration should be directed towards bringing the key performance indicators to compliance with the constantly changing conditions of doing business. Organizational managers should bear in mind the fact that the selected performance indicators will be relevant during the projected period of time, given the fact that sometimes the significance of post-sales services with respect to the predefined business plans is unintentionally neglected, so the same subsequently have to be changed and adapted to a new situation, which may significantly increase costs. Table 2 is a presentation of the position of the performances on the basis of the average marks (mean values) for each performance.

Table 2. The performance status

Performances	Mean values	Performance rank
The post-sales services of the organization	3.93	8
The product quality degree on the market which the organization does business on	3.68	15
The technological level of the organization	3.85	10
The span to which extent the product quality concept according to the international standards is applied in the organization	3.96	6
The level at which the organization has clearly defined goals, as well as the parameters necessary for their successful achievement	3.81	12

Source: The authors

Analyzing the obtained research outcomes, it can be concluded that the respondents/managers and/or owners of the domestic organizations included in the sample valued the post-sales services and their significance for the achievement of maximum business effects with the average mark 3.93, which is positioned at the top of the span of the performance indicators that were being marked, which range from 3.96 to 3.68. Apart from the post-sales services, the mentioned span is reduced to the valuation of the characteristics such as the product quality and the technological level of the organizations, the span that compares the compliance of the domestic product quality with the international standards of doing business and the level at which the organization has clear goals and parameters necessary for their successful realization.

Furthermore, two-factor evaluation was used to check how the length of the working of the organization and the level of business operations (local, national, regional, and international) influence the quality of the post-sales services on the market as a precondition for the creation of a sustainable competitive advantage. The value 0.05 (for all the values $\text{Sig} \leq 0.05$, there is a statistically significant difference) was taken for the difference relevance degree.

The mean values of the marks for the post-sales services in the organizations having been doing business for a different period of time and working at a different level are given in Table 3 for each particular span and length of business operations separately. The standard deviation (std. deviation) represents a deviation of the mean value of the mark, whereas N is the number of the respondents in the sample included in the survey. It is possible to notice that the post-sales services are best characterized in the organizations

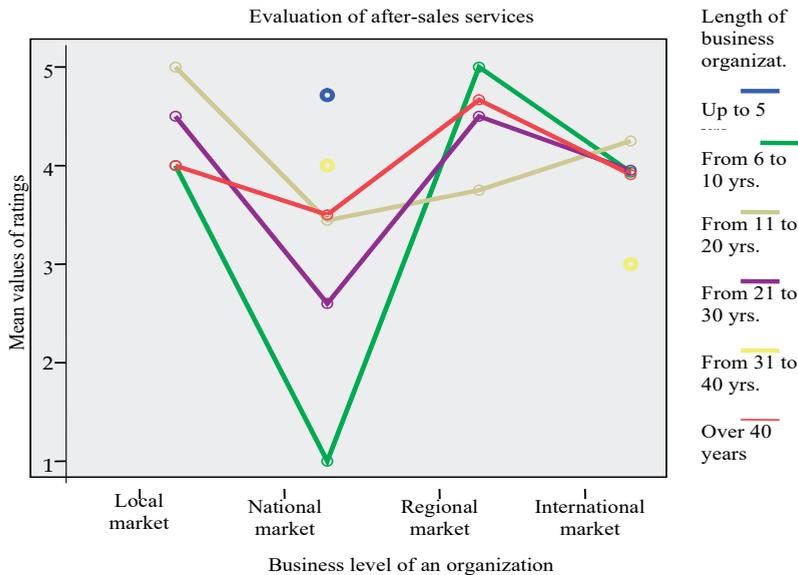
doing business on the national market, and within them, in the organizations having been doing business from 11 to 20 years.

Table 3. The mean value of the marks for the post-sales services in the organizations of a different level and length of doing business

The level of doing business	The length of doing business of the organization	The mean value of the marks	Std. Deviation	N
The local market	from 6 to 10	4.00	1.155	4
	from 11 to 20	5.00	.000	3
	from 21 to 30	4.50	.535	8
	over 40 years	4.00	.000	2
	Total	4.41	.712	17
The national market	up to 5	4.71	.488	7
	from 6 to 10	1.00	.000	2
	from 11 to 20	3.44	1.667	9
	from 21 to 30	2.60	1.174	10
	from 31 to 40 years	4.00	.000	2
	over 40 years	3.50	.577	4
	Total	3.35	1.433	34
The regional market	from 6 to 10	5.00	.000	2
	from 11 to 20	3.75	.463	8
	from 21 to 30	4.50	.577	4
	over 40 years	4.67	.500	9
	Total	4.35	.647	23
The international market	from 6 to 10	3.93	.961	15
	from 11 to 20	4.25	.754	12
	from 21 to 30	3.95	1.024	21
	from 31 to 40 years	3.00	.000	3
	over 40 years	3.91	.831	11
	Total	3.95	.913	62
Total	up to 5	4.71	.488	7
	from 6 to 10	3.78	1.278	23
	from 11 to 20	3.97	1.092	32
	from 21 to 30	3.79	1.166	43
	from 31 to 40 years	3.40	.548	5
	over 40 years	4.12	.766	26
	Total	3.93	1.072	136

Source: The authors

The mean values of the marks of the post-sales services in the organizations of a different level of doing business and the length of doing business are shown by Graph 1. It is noticeable that the post-sales services are marked best in the organizations having been doing business at the local level from 11 to 20 years.



Graph 1. The mean values of the marks for the post-sales services in the organizations doing business at a different level and for a different period of time

Source: The authors

The influence of the interaction of the length of the organization’s working and the level of doing business is presented in Table 4. In the column “The level of doing business/The length of doing business” Sig.=0.004, which is less than 0.05m so it can be concluded that there are significant differences in the marks for the post-sales services. The influence of the interaction of the level of doing business and the length of doing business is statistically significant. After the analysis of the joint influence, the analysis of the separate influences began. In the column “The level of doing business” Sig is 0.000, which is less than 0.05, so it is concluded that the level of the business operations of the organization exerts a significant influence on the marks for the post-sales services. In the column “The length of doing business” the Sig value 0.001 is read, which is also less than 0.05, so the length of doing business is also supposed to importantly influence the differences in the marks for the post-sales services. A fact can be established that the level of doing business and the length of doing business play a significant role with respect to the disproportion in the marks for the post-sales services.

Table 4. The influence of the interaction of the variables “the level of doing business” and “the length of doing business” on the marks for the post-sales services

Variables	Df	Mean Square	F	Sig.
The level of doing business	3	8.989	11.118	.000
The length of doing business	5	3.785	4.682	.001
The level of doing business / The length of doing business	10	2.242	2.773	.004

Source: The authors

It is visible that the individual influences of the span of the functioning and the length of doing business also vary. A subsequent test established a fact that, depending on the level of doing business, the organizations particularly differ in the marks with the help of the Tukey Test. Table 5 shows that the facts established by the organizations doing business locally and on the national market, the national market and the regional market, and the national market and the international market especially differ from one another.

Table 5. A comparative analysis of the organizations of a different level of business doing in the marks for the post-sales services

(I) The level of business operations of the organization	(J) The level of business operations of the organization	The mean value of the difference (I-J)	Standard error	The significance of the error (Sig)	95% trust interval	
					U p p e r limit	L o w e r limit
The local market	The national market	1.06(*)	.267	.001	.36	1.75
	The regional market	.06	.288	.996	-.69	.81
	The international market	.46	.246	.247	-.18	1.10
The national market	The local market	-1.06(*)	.267	.001	-1.75	-.36
	The regional market	-.99(*)	.243	.000	-1.63	-.36
	The international market	-.60(*)	.192	.012	-1.10	-.10
The regional market	The local market	-.06	.288	.996	-.81	.69
	The national market	.99(*)	.243	.000	.36	1.63
	The international market	.40	.220	.276	-.18	.97
The international market	The local market	-.46	.246	.247	-1.10	.18
	The national market	.60(*)	.192	.012	.10	1.10
	The regional market	-.40	.220	.276	-.97	.18

Source: The authors

Conclusion

In the conducted research study, the sample consisted of the organizations of a different length of doing business and the organizations of a different span of the functioning, accompanied by a note that their presence was proportionate according to their size. The largest number of the organizations included in the sample are engaged in manufacturing and service activity. The outcomes of the research study have confirmed the assumption that post-sales services (activities) that were valued with the mean mark

3.93, which is at the top of the range of the marked organizational performance indicators, are very significant for the achievement of sustainable competitiveness on the market.

The obtained results show that the length of the business operations of an organization and the level of doing business have an important joint influence on all the attributes of the organizations from the subject-matter research study that are observed as the performance indicators that the organization that endeavors to create a competitive advantage on the market should have.

The mean values of the marks for the post-sales services in the organizations having been doing business for a different period of time and working at a different level are best characterized in the organizations having been doing business on the national market, and from within them in the organizations that have been doing business for a period of time from 11 to 20 years. It is noticeable that post-sales services are best assessed in the organizations having been doing business at the local level for a period of time from 11 to 20 years. In the column "the level of doing business" Sig is 0.000, which is less than 0.05, so it is concluded that the level of the business done by an organization has a big influence on the marks for post-sales services. In the column "the length of doing business" Sig is read of a value 0.001, so the length of doing business is also assumed to be exerting an important influence on the differences in the marks for the post-sales services. It can also be concluded that the level of doing business and the length of doing business do have a significant influence on the disproportion in the marks for the post-sales services.

Finally, the domestic organization can be said to be reaping a double advantage of developing a quality post-sales system by cherishing client trust, simultaneously determining the quality of its own product/service, on the other hand, eliminating drawbacks in a timely manner.

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INDICATORS OF MARKET ORIENTATION OF FAMILY AGRICULTURAL HOLDINGS IN SERBIA AND KLADOVO MUNICIPALITY

Summary

The aim of this paper is to point out the importance of family agricultural holdings (FAH) in Serbia from the aspect of market orientation. The purpose of writing the paper is to analyse the indicators that affect the market orientation of FAH, which are: utilized agricultural area (UAA), economic size of the holding, the structure of the engaged labour force (by gender, age range and by educational level). The main source of data is from the Farm Structure Survey (FSS), and the results for the area of Serbia and the municipality of Kladovo are presented. It is concluded: fragmentation of land holdings; unfavourable economic size of holdings (small in Serbia and very small in Kladovo); in the structure of the engaged labour force on the territory of Serbia, members of the holdings participate with 56.7%, particularly 59.1% in Kladovo; male headed holdings are dominated, while women are most often represented as members of holdings; holdings are mostly elderly because 39.1% of holdings' managers in Serbia are aged 65 and over, specifically 45.9% in Kladovo; 95.3% of holdings' managers in Serbia and 97.2% in Kladovo have entirely practical experience. The analysis included only FAH because in Serbia they make up 99.7% and in Kladovo 99.8% of the total registered farms. The observed indicators were processed by the methods of descriptive statistics.

Keywords: *agricultural holdings (AH), family agricultural holdings (FAH), economic size of holdings, labour force.*

JEL classification: *Q12, Q15, J40*

ПОКАЗАТЕЉИ ТРЖИШНЕ ОРИЈЕНТИСАНОСТИ ПОРОДИЧНИХ ПОЉОПРИВРЕДНИХ ГАЗДИНСТАВА СРБИЈЕ И ОПШТИНЕ КЛАДОВО²

Резиме

Циљ рада је да укаже на значај који имају породична пољопривредна газдинства Србије са аспекта тржишне оријентисаности. Сврха писања рада је анализа показатеља који утичу на тржишну оријентисаност породичних пољопривредних газдинстава, а то су: коришћено пољопривредно

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земљиште (КПЗ), економска величина газдинства, структура ангажоване радне снаге (полна, старосна и образовна). Примарни извор података је Анкета о структури пољопривредних газдинстава 2018, а резултати су приказани за подручје Србије и општине Кладово. Добијене вредности указују на: уситњеност земљишних поседа; неповољну економску величину којој припадају газдинства (у Србији преовлађују мала, а у Кладову веома мала); чланови газдинства учествују са 56,7% у структури ангажоване радне снаге на подручју Србије, односно 59,1% у Кладову; доминирају мушкарци као носиоци газдинства, док су жене најчешће заступљене као чланице газдинства; газдинства су претежно старачка јер 39,1% управника (менаџера) газдинстава у Србији су старости 65 и више година, односно 45,9% у Кладову; само практично искуство има 95,3% управника газдинства у Србији односно 97,2% у Кладову. Анализом су обухваћена само породична пољопривредна газдинства јер у Србији чине 99,7% односно у Кладову 99,8% од укупно регистрованих пољопривредних газдинстава. Посматрани индикатори обрађени су методама дескриптивне статистике.

Кључне речи: пољопривредна газдинства, породична пољопривредна газдинства, економска величина газдинстава, радна снага.

Introduction

It is well known that agricultural production is characterized by many specifics, primarily seasonal labour force, mismatch of production time and working time, very slow turnover, expertise of agricultural producers, and fragmentation of land parcels in some countries and similarly. Despite these facts, an increase in participation in the creation of gross domestic product of Serbia (Grujić et al., 2019) have been only recorded in agriculture.

Author Klymak (2022) conducted a survey and concluded that half of labours in developing countries are not paid for the work they do on their FAH. Such labours are usually self-employed and unpaid at the same time. She interpreted this problem in two ways. *First*, FAH challenging high level competition rely on family workers not paying to reduce their costs. *Second*, diversify the costs of unpaid family labour by working on other holdings in order to compensate for the loss on their holdings with this income. Some authors (Dissanayake et. al., 2021) consider that the use of family labour force instead of hired employed labours contributes to greater efficiency of the agricultural production system on the family holding.

The group of authors (Cheng et. al., 2022) stated that higher employment of labours in agricultural production would contribute to the opening of new agricultural entities, due to small agricultural producers redirect their free time to work in new companies.

It is concluded, by the researching, there are differences in the volume of labour force used by members of the agricultural holdings between individual countries. The group of researchers (Volkov et al., 2022) analysed the volume of labour force used by members of the family holdings between the Nordic and Baltic countries. The result of the research displayed that the labour force of the members of the family household is

higher among the Baltic countries than on the family holdings of the Nordic countries.

In the territory of Serbia, FAH are the most important subjects in the organization of agricultural production composing 99.7% of the total registered agricultural holdings, specially the labour force that determines the overall development of agriculture is concentrated on family holdings (Maletić, Popović, 2016).

The problem of fragmented land parcels is predominantly represented in Serbia, which hinders the further development of agriculture. Land parcels with a small area dominated by plant production affect the weak development of Serbian agriculture (Stojanović, 2022).

The group of authors Grujić et. al. (2021) hold that Serbia ought to continue with further progress in the field of agriculture through the further development of the agricultural sector which could have a vital role in further socio-economic development in the sense of the availability of human resources. The authors Aničić et. al. (2019) agree also that agricultural development is necessary for the future economic growth of Serbia. The afore mentioned authors hold that agricultural development is required to secure the transition of small agricultural holdings into market-oriented holdings and for the better availability of a quality labour force.

Given the fact that FAH represent the backbone of future agricultural development, in the following parts of this paper, the indicators of the market orientation of agricultural holdings from the aspect of UAA, the economic size of the holding, the structure of the employed labour force on the holding, the gender structure, age structure (of the managers), and the educational structure of the managers on the holdings will be analyzed. The results are from 2018 and they are shown for the territory of Serbia, and for the area of the municipality of Kladovo (Strategija razvoja poljoprivrede i ruralnog razvoja opštine Kladovo za period 2021-2026. godina). The municipality of Kladovo is located at the furthest southeast of Serbia, with a population of about 30,000 is situated on an area of roughly 63 ha. The municipality is composed of 23 settlements and 6 hamlets, while as many as 18 settlements are located on the banks of the river Danube (<https://www.kladovo.org.rs/polozaj-klima-i-stanovnistvo.htm>).

The results of the research show that, on average, the UAA in the municipality of Kladovo (5.5 ha) is larger than the national average (5.2 ha), while the involvement of FAH with a property of up to 5 ha is larger in Serbia (71.9%) than in Kladovo (70.3%). Most of the holdings in Serbia belong to the economic class of 'small' (they achieve a level of production from 2,000 to 8,000 euros) with share of 46.6%, while in Kladovo 36.2% of them belong to the category of 'very small holdings' (achieving a level of production of up to 2,000 euros). The labour force structure of Serbia is predominantly made up of members of holdings who make up 56.7% of the labour force; 59.1% in Kladovo. An analysis of the gender structure on the territory of Serbia and Kladovo shows that males predominate as the heads of the holdings, while women usually make up the members of the holdings. Finally, the age structure has shown that FAH are generally made up of older individuals and that in Serbia every third one has 65 years or more; while in Kladovo every second.

In conclusion, the FAH has a deciding role in the activation of local growth potential of rural areas because a large number of registered holdings are FAH.

Methodology

This work uses data from the Statistical Office of the Republic of Serbia (SORS), published in *Farm Structure Survey 2018 (FSS)*. Analysed indicators are: used agricultural area (UAA), the economic size of the holding, labour force structure (gender, age and education). The aforementioned have been analysed both on the national level and for the municipality of Kladovo. The data has been processed via the methods of descriptive statistics. In accordance with the results, adequate comments and conclusions have been provided.

Results and Discussion

It is known that agricultural production in Serbia operates under the Law on Agriculture and Rural Development (Official Gazette of the Republic of Serbia, No. 41/2009, 10/2013 – other law, 101/2016, 67/2021 – other law and 114/2021) which precisely defines the meaning of the terms ‘*agricultural holding (AH)*’ and ‘*family agricultural holding (FAH)*’. However, it is necessary to emphasize what criteria determine an agricultural holding as a FAH.

According to the methodology of the *FSS 2018* (SORS, 2018), a FAH is defined as every community of persons (family or of some other kind) who live together. Besides that, they live together and spend their income on basic life needs (including single households). Also, one or more members of the holding are engaged in agriculture, regardless if it is a primary or secondary activity and they, as well, use resources together (land, machines, buildings). The holder of the holding is an individual.

For a holding to be categorized as a FAH, it needs to fulfil certain criteria as shown on the table (*Table 1*).

Table 1: Criteria for determining the status of the FAH

<p>work - use 50 or more ares of agricultural land on which they engage in agricultural production, regardless if it is meant for the market or not, or;</p>	<p>work - use less than 50 ares of agricultural land, but engages in intensive farming, fruit growing, viticulture, vegetable and flower production (including greenhouse production), mushroom production and livestock production that is they engage in agricultural production, regardless if it is meant for the market or not, or;</p>	<p>grow the least: – two cattle heads, or – one cattle head and two heads of small livestock (pigs, goats, sheep – together), or – five sheep heads or five goat heads, or – three pig heads, or – four heads of small livestock (pig, goat, sheep together), or – 50 pieces of poultry – 20 bee hives.</p>
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Source: SORS, methodological instruction, FSS 2018.

Data from the FSS 2018 shows that, on the territory of Serbia, FAH significantly predominate in the structure of agricultural holdings (562,895), with share of 99,7%. According to the same source, in the municipality of Kladovo 1,921 AH are registered, and 99.8% of them, or 1,917, are FAH. However, according to the date from the Register of agricultural holdings (as was on 09.02.2021) the municipality of Kladovo has 993 registered AH (947 in active status, 46 in passive status), of which 8 are AH in the possession of legal entities (6 enterprises, 1 unincorporated enterprise and 1 agricultural cooperative). At any rate, the data from the Register of Agricultural Holdings is more valid because it encompasses holdings that earnestly engage in agriculture, have an active status and are market-oriented.

The analysis above shows that the prevalence of FAH in the total number of AH in Serbia and Kladovo are on the same level (99.7% and 99.8% respectively). In other words, on the territory of Serbia and Kladovo, FAH that are aiming to be market-oriented predominate and as such they contribute to the sustainable development of the agriculture of the Republic and the municipality.

Indicators of Market-Orientation of Family Agricultural Holdings (FAH)

Agricultural production rests on family holdings where the members of the holdings have an uneven engagement in agricultural activities throughout the year, counting even the regularly employed labour force on the holding (Bogdanov, Babović, 2014). For every family holding the initial phase is crucial for funding in order to make managing the holding easier (Dudek, Pawlowska, 2022). The Authors Čejanović, Cvijanović (2005) hold that a family holding is characterized also by the work they do either on their own or rented land, by which the holding earns an income in order to meet the existential needs of the family.

The data from the FSS 2018 has been used for the analysis of FAH in relation to: *the area of UAA, economic size, labour force, as well as the gender, age and education structure of the labour force on the holding.*

UAA on FAH. According to the methodology instructions from the FSS 2018, UAA consist of: agricultural land in the kitchen garden, arable land (including fallow land), perennial plantations, meadows and pastures.

Of the total number of UAA in the area of the municipality of Kladovo, 86.7% or 10,547 ha are to be found in the possession of FAH, which is higher than on the national level, where it is at 83.9%.

Average UAA per FAH in Kladovo is slightly higher than the national average, though it still points to the problem of the fragmentation of possessions (*Table 2.*)

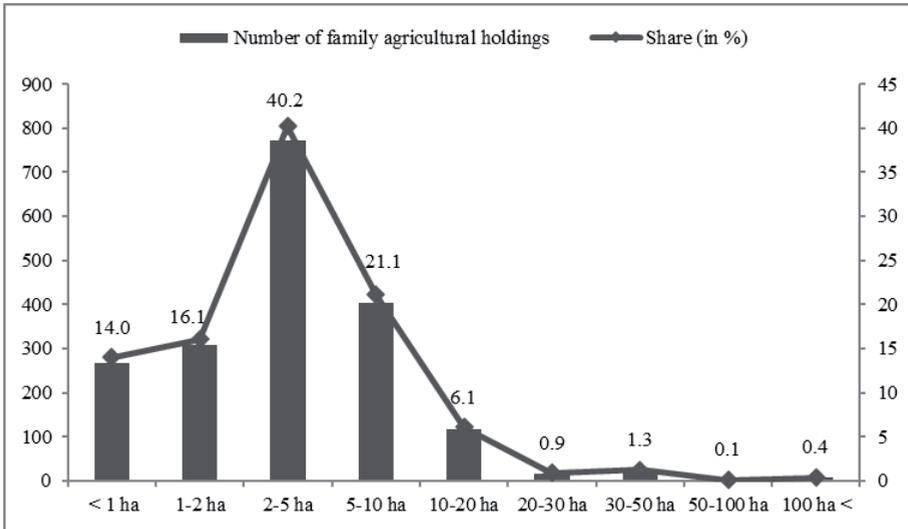
Table 2: Average UAA per FAH in Serbia and Kladovo, 2018

	UAA (ha)	Number of FAH	Average UAA per FAH (ha)
Republic of Serbia	2,916,125	562,895	5.2
Municipality Kladovo	10,547	1,917	5.5

Source: SORS, eletronic database of FSS 2018.

Observing the number of FAH compared to the size of UAA in 2018 on the level of Serbia, it can be noted that the vast majority of FAH use agricultural land that ranges in size from 2 to 5 ha and makes up 32.3% of the total number of agricultural holdings. A similar state of things can be found in the area of the municipality of Kladovo where 40.2% of FAH, from the total number of agricultural holdings, use agricultural land the size from 2 to 5 ha (*Graph 1*).

Graph. 1: Number of FAH in Kladovo compared to the size of UAA, 2018



Source: SORS, electronic database of FSS 2018.

On the graph above it is notable that with the rise of the area of UAA in Kladovo, the number of FAH begin to decline which confirms the existence of the already present problem of the fragmentation of possessions. The results of the analysis of the structure of the holdings as compared to the size of UAA, show that on the territory of Serbia, FAH with a size of 5 ha share 71.9%, while in the area of the municipality of Kladovo, they share 70.3%.

We conclude that the problem of the fragmentation of possessions exists on the level of Serbia, as well on the level of Kladovo because it hints that FAH have small area of UAA to work with. The author Popović R. (2003) holds that if in the structure of agricultural holdings, the holdings with small and fragmented possessions predominate, then such a structure negatively influences the growth of total agricultural production. Possessions that are fragmented to such a degree can be a roadblock to further market development of FAH. That is why adequate measures should be taken in order to facilitate their enlargement.

FAH in relation to economic size. The economic size of a holding is measured by the value of its total standard output. Standard Output (SO) represents the sum of the individual SO of all the agricultural produce (types of crops, perennial plantations and types of livestock) which is produced on the holding and is expressed in euros. The Regulation of the European Commission no. 1242/2008 defines 14 classes of the

economic size of holdings expressed in euros. Eurostat, however, has grouped these holdings into 5 classes which cover the following intervals (RZS, 2019):

- *very small, up to 2,000 euros;*
- *small, 2,000 to 8,000 euros;*
- *medium, 8,000 to 25,000 euros;*
- *large, 25,000 to 100,000 euros;*
- *very large, over 100,000 euros*

According to this classification, there is no holding in Serbia that could be classified as very large. The vast majority of holdings belong to the small class with share about 46.6% of the total number. Very small holdings are at second place as they share about 27.6%, namely every fourth holding in Serbia belongs to this economic class.

Observing Table 3, notice that most of FAH with UAA on the territory of the municipality of Kladovo belong to the class of very small holdings, which is in the category of 0-2,000 euros in realized production, and with share of 36.2% of the total number of FAH in the municipality. On second place are small holdings which release 2,000 – 8,000 euros and share 27.9% of total number of FAH in the municipality.

Table 3: Number of FAH with UAA by economic size on the level of the Republic of Serbia and municipality Kladovo, 2018.

	0-2,000 euros	2,000-4,000 euros	4,000-8,000 euros	8,000-15,000 euros	Over 15.000 euros
Republic of Serbia	155,579	132,516	130,073	83,132	61,595
Municipality Kladovo	694	509	478	136	100

Source: SORS, electronic database of FSS 2018.

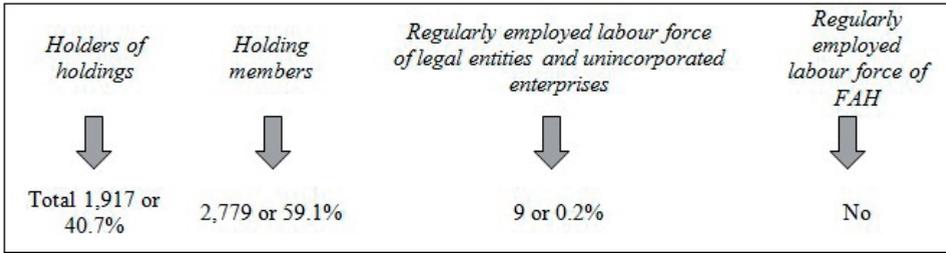
While analysing the economic size of FAH, we conclude that holdings in Serbia and Kladovo are primarily very small and as such cannot achieve a certain level of marketability. However, such holdings can achieve good results only within certain limits which are available to them and which can often be obstacle for further development.

The Labour Force on the Holding. According to the data in the FSS 2018, in Serbia 1,336,940 persons are hired as workers in the sector of agricultural holdings³. In the structure of the engaged labour force, the members of the holdings are predominantly represented with 56.7%, while holders of the holdings are represented with 41.8%. The remaining 1.5% of hired workers are made up of regular employees on the family holdings (0.1%) and at legal entities and unincorporated enterprises (1.4%).

On the territory of Kladovo, the total engaged labour force in the sector of agricultural holdings in 2018 numbered 4,705 persons. The structure of the total engaged labour force on the holdings is shown on Graph 2.

³ Given that SORS does not possess data on the level of FAH for all indicators, in a number of the analyses data about AH are given in total. This discrepancy won't significantly affect the real state, given that FAH make up 99.7% of total AH in Serbia and 99.8% in Kladovo.

Graph. 2: Structure of engaged labour force on holdings in municipality Kladovo, 2018



Source: Graphic view by author based on the electronic database of SORS, FSS 2018

By comparing the structural data about the labour force, we notice that members of the holdings have a larger share in the total number of workers than that of the national average (56.7%). Interpreting this result could indicate that in Kladovo holdings with a larger number of members are more dominant and that almost all the members actively engage in agriculture.

Gender structure of the engaged labour force on the holdings. The gender structure gives an overview of the distribution of males and females in accordance with their ability to make decisions about agricultural production or if they only perform executive affairs.

Data from SORS (2018a) shows the following information, on the territory of Serbia the gender structure of the labour force is:

- 80.6% of the total number of holding holders are men;
- 58.3% of holding members are women;
- 84.1% of the regularly employed labour on family holdings are men;
- 77.5% of the regularly employed labour of legal entities and unincorporated enterprises are men.

On the territory of the municipality of Kladovo the gender structure of the engaged labour force is:

- 78.5% of the total number of holding holders are men;
- 61.4% of the total number of holding members are women;
- All 9 who are regularly employed by legal entities and unincorporated enterprises are men.

The analysis of the gender structure on the territory of Serbia and Kladovo shows that men predominate as the holders of holdings, while women are most often members of holdings. Given that, we conclude that men are given the possibility of decision making in agricultural production, while women only engage in executive affairs. Some of the reasons for why women participate less in decision making were explained by Pierotti et al. (2022). They explained this discrepancy by the time limitations which women have while working in agriculture, and most of their time being spent on housework, care for the children, food preparation etc. Because of this, decision making jobs would have suffered, so they were handed over to men.

The Age Structure of Managers on the Holdings. According to the methodology of the FSS 2018 (SORS, 2018), there are as many managers in AH as there are AH and they

are regarded as the holders of the holdings. Also, the manager of the holding is regarded as any person who is responsible for daily decision making and the implementation of production and financial decisions in regards to the holding. According to the quotes of Birovljev J. (1997) today's manager should carry out the entire activity on the AH (plan, move, lead, direct etc.) which he contributes to successful business on the holding.

Analysing the age structure of agricultural holdings, it is noted that the holdings were generally of elderly people (SORS, 2018a). This is supported by the fact that in Serbia every third manager of a holding has 65 or more years (39.1%). In second place are managers who belong to the age group of 55-64 years with 29.1%. However, it is not laudable that only 0.3% of holding managers belong to the age group of people younger than 25.

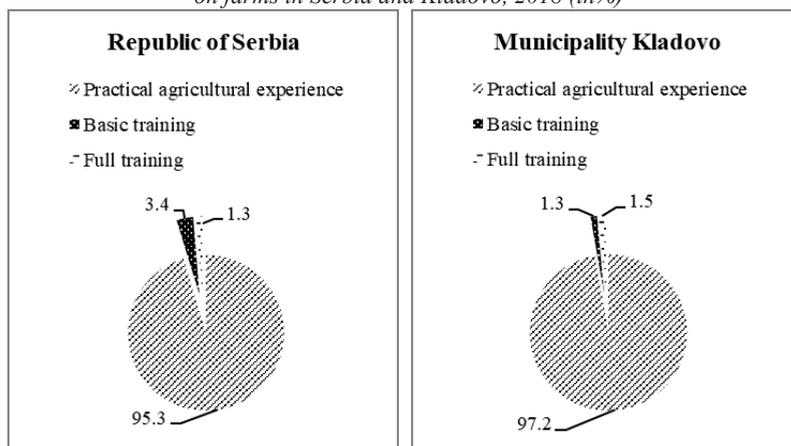
The age structure, as shown, only confirms the assumption that holdings are primarily of older persons. Authors Bogdanov, Babović (2014) consider these results as a consequence of the slow transfer of possession of the holdings onto younger holders, as well as that the traditional model of property relations is very prevalent along with the insufficient participation of physical division and sale. Authors Dudek, Pawlowska (2022) have conducted research in which they confirmed that when younger people take over farms, this is followed by an increase in production potential and a betterment of the economic index in the following years.

At the territory of Kladovo in the structure of managers of AH every second of managers of holding has 65 years old or older (45.9%), while every third of manager of holding has 55-64 years old (31.1%). The least engaged are managers 25-34 years old (0.5%) and there is no one of manager under the age of 25.

Generally, the problem is that holdings held by older persons can't quickly and easily adapt to new market rules and that it is difficult to decide on further development, so we should work on improving the age structure.

Education structure of the managers on the holdings. As for the education structure of the managers of AH in the municipality of Kladovo, it is evident that the largest percentage of them (97.2%) has only practical experience, which is higher than on the national level (95.3%) (Graph 3).

Graph. 3: Comparative overview of the level of training of managers on farms in Serbia and Kladovo, 2018 (in%)



Source: SORS, electronic database of FSS 2018.

Data from the FSS 2018 (SORS, 2018a) shows that on the level of the municipality of Kladovo, more managers with higher education (1.5%) have been noted than on the national level (1.3%). This fact only shows that there is a wish for the perfecting of managers and their further education.

The group of authors (Bogdanov, Babović, 2014) hold that the educational characteristics of holding managers indicate a low presence of formal and systemic education and professional training because the number of managers with a higher level of training is very low compared to the total number of managers of AH.

Conclusion

After presenting the analysis of the market orientation of AH, we conclude that these holdings have a dominant role in the engagement of development potentials of rural areas because they have a high share in total number of AH. Given that the number of family holdings compared to the total number of holdings in Serbia and Kladovo is very high, we hold that these holdings are striving to be market-oriented and as such contribute to the sustainable development of agriculture in the nation as a whole and in the municipality.

The problem of the fragmentation of possessions of AH in Serbia and Kladovo hints that FAH work with a small area of UAA. In this way, fragmented possessions become a obstacle to the further market development of family AH, therefore it is recommended that adequate measures be taken for their enlargement.

The analysis of the economic size of FAH has shown that holdings that belong to the class very small and small predominate and, as such, cannot survive and achieve better results.

Given that in the area of the municipality of Kladovo holdings are present with a larger number of members than the national average, the conclusion is that almost all the members of the holdings are actively engaged in agriculture. With additional engagement of all members of a holding, the results of production become better.

Since men predominate as the holders on FAH, and women generally as members of the holdings, it cannot be said that this uneven distribution has negatively influenced on the marketability of FAH.

We hold that the bad age structure of FAH is a consequence of a slow transfer of ownership over the holdings onto younger holders, as well as the existence of the insufficient participation in the purchase and sale of property and plots. Because of this, these holdings have with time become run by older persons and cannot sufficiently become market oriented.

In regards to the education structure, our recommendation is that more work be put into the betterment of the education of all the persons who are part of the chain of agricultural production and into the transfer of knowledge on the national level. With the implementation of these recommendations and with a greater implementation of new technologies, better results could be achieved in the sector of agricultural production. Also, the high number of holders with low professional training influences the slow implementation of new measures and technologies on the holding itself.

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APPLICATION OF THE INNOVATIVE CONCEPT “MINDFULNESS” IN ORGANIZATIONAL AND ACADEMIC PRACTICE

Abstract

The paper presents the importance, basic determinants, as well as the best world practice of one of the leading insurance companies in Europe, If P&C Insurance and technology giant Google in the field of application of innovative Mindfulness concept with the aim of improving the total performances of employees. The above examples are addressed in the argument of growing importance and broader application of the innovative concept towards the development of employee potential through the development of emotional intelligence, cognitive abilities, but also through stress reduction. The main goal is to point out to the management of companies, as well as to other authors and researchers, the importance of this concept, which gives ever more positive results in the direction of improving the overall performance of employees and, consequently, the overall performance of organizations in order to achieve a sustainable competitive advantage.

Key words: mindfulness, prudence, thoughtfulness employee performance, education

JEL classification: M53, M54, J24, J28, J81

ПРИМЕНА ИНОВАТИВНОГ КОНЦЕПТА „MINDFULNESS“ У ОРГАНИЗАЦИОНОЈ И АКАДЕМСКОЈ ПРАКСИ

Апстракт

У раду је дат приказ значаја, основних детерминанти, али и најбоље светске праксе у домену примене иновативног концепта “Mindfulness” (Промислљености) са циљем унапређења укупних перформанси запослених и то на примеру једне од лидерских осигуравајућих компанија у Европи, компаније “If P&C Insurance”, али и на примеру технолошког гиганта, компаније “Google”. Наведени примери су обрађени у првацу аргументације растућег значаја и шире приме-

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не наведеног концепта у правцу развоја потенцијала запослених кроз развој емоционалне интелигенције, когнитивних способности, али и кроз редуkcију стреса. Основни циљ је да се укаже менаџменту компанија, али и другим ауторима и истраживачима на значај овог концепта који даје све позитивније резултате у правцу унапређења укупних перформанси запослених а самим тим и укупних перформанси организација у правцу достизања одрживе конкурентне предности.

Кључне речи: *промишљеност, миндфулнесс, перформансе запослених, образовање*

Introduction

In the New Economy, which is largely determined by the process of globalization, digitalization, innovation, the growing importance of intellectual capital as well as the principles of sustainable development, achieving sustainable competitive advantage becomes imperative, but also an increasingly complex task. Sustainable competitive advantage is “the long-term ability of an organization to create and deliver superior value to consumers, but also to create and generate superior profit for itself, compared to direct or indirect competition over a long period of time” (Kuma, 2016; Илић, 2018, p.35). Sustainable competitive advantage is based on the capabilities of the organization, intellectual capital and potential of employees as well as on the successful application of innovations (Train, & Egbu, 2006). As can be seen from the previous two definitions, organizations are increasingly developing their future competitive advantage and based on the successful creation and introduction of innovations in all areas of business, but especially by developing the potential and overall performance of employees. The growing importance of developing innovative potential, as well as the development of emotional intelligence, cognitive abilities with simultaneous reduction of employee stress, is becoming an increasingly complex challenge for companies in the modern business environment. As one of the answers to the mentioned challenges, the application of the concept “Mindfulness” is more and more emphasized. The concept and theme of “Mindfulness” is relatively new in Western culture. However, given the large number of benefits it provides, it has encouraged authors and researchers in the past period to conduct a number of studies and draw a number of conclusions. What is obvious and completely certain so far is that in a state of thoughtfulness people achieve much better connections and relationships, become calmer and make better decisions (Kabat-Zinn, 2014). In general, prudence is not a condition that is not related to humans. It is only deeply repressed due to the chaotic schedules and pace of life (AMRA, 2016). Certain large companies are recognized these benefits, of which Google has gone the furthest in implementing this concept. For some time now, Google has been proud of the practice of meditation conducted by employees on a daily basis under the supervision of qualified professionals (Schaufenbuel 2015). Not even the US military is an exception, which has implemented a program called “Mindfulness Based Mental Fitness Program” with numerous positive results. The program is also applied at eminent colleges as Harvard Business School, Berkeley, Drucker Graduate School of Management which has implied overall better semester results (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). It is

certain that the popularity of the concept will grow in the future. Experts of various profiles are already studying it, such as consultants, academic coaches, psychologists. Also, it is important to point out that over 2000 articles and books on this topic can be found on Amazon's site alone (Glomb, Duffy, Bono, & Yang, 2012).

Precisely for all the above reasons, the authors of this scientific paper decided to further explain the essence of the concept, as well as to point out the aspects and benefits of its practical application in business organizations and academic institutions. Also, the paper presents a qualitative research related to the implementation of the program in the company If P&C and Google.

The origin of the concept and the definition of the term thoughtfulness

The term "Mindfulness" is taken from the English language, although the original origin comes from the Indian word "sati" which means "conscious attention" (Đorđević, 2016). There is still no adequate and unique translation of the term into Serbian language, but the most approximate translation would be "thoughtfulness" or „prudence“. Prudence, as currently taught and practiced in Western culture, is closely related to traditional Buddhist methods. Specifically, in Buddhist practice, prudence is the act of perceiving things and situations as they are at the present moment. In this way, by applying the concept of forethought, reality gained its clarity - the individual sees the world clearly and without manipulation. A thoughtful person has an open mind, is kind, curious and shows an attitude of sympathy towards the people and events around him (Gunaratana, 2011).

Research related to prudence in the Western world began in parallel with the work of Jon Kabat-Zinn, a postdoctoral student at the University of Massachusetts. After practicing meditation on his own, Kabat-Zinn decided to make the program available to the general public, so he made it official for the first time within the School of Medicine at his University. The program experienced its first application among patients who were in severe pain and who could no longer be helped by the medical staff. Then Kabat-Zinn and his colleagues further developed the same program and the world knows it today under the name "Mindfulness Based Stress Reduction - MBSR" (Kabat-Zinn, 2011).

For the past 35 years, the program has been successfully implemented and has helped participants reduce pain, stress and anxiety. Since that period, about 600 people have been trained as mindful trainers, and over 20,000 people have attended an eight-week stress reduction program (Kabat-Zinn, 2011).

When it comes to defining the term itself, an insight into the professional literature can conclude that there is no single definition, rather it is about their convergence. However, what they all have in common is the observation that thoughtfulness is a state of consciousness in which the individual directs his attention exclusively to the events in the present moment. Many authors have contributed by defining the term, but what can certainly be concluded is that they all start from the same premise. For example. author Carlson defines prudence as attention focused on present experiences; author Bass et al. as a state of full awareness of experiences in the present moment; author Reb et al. as accepting current events without prejudice and condemnation (Carlson, 2013; Baas, Nevicka, & Velden, 2014; Reb, Narayanan & Chaturvedi, 2014).

In order to best describe what the state of thought really entails, it is best to state its foundations, which were initially determined by the author Jon Kabat-Zinn: 1. Non-judgmental attitude - things should be viewed as a neutral person, 2. Patience - everything happens in its time, 3. The mind of a beginner who is always open to new experiences and possibilities, 4. Confidence in one's own being and one's own feelings, 5. Non-combative attitude - observing the situation as it really is without resistance, 6. Accepting things and situations, 7. Liberation (Grecucci, Pappaianni, Siugzdaite, Theuninck, & Job, 2015). It is certain that this strategy can be of great benefit in both private and business life.

Aspects of application of the concept of prudence in the organizational context

The application of the concept of prudence in organizations, and in the opinion of a large number of researchers, coaches and managers, gives enviable results. Specifically, these trainings have proven to be extremely effective when it comes to amortizing feelings of emotional exhaustion due to the pressure of business obligations (Hyland, Lee & Mills, 2015).

Setting up a quality stress management program today seems more important than ever. Stress directly affects work performance, so it is necessary to constantly monitor the situation among employees. A report published in 2014 by the American Psychological Association indicated that 67% of employees experience emotional symptoms of stress while as many as 72% also experience stress on a physical level. Accordingly, the majority of employees today, in the literal sense of the word, suffer from stress (Percieval, 2015). An issue that has also proven to be extremely important are the costs that companies suffer due to the increasing occurrence of burnout or leaving the organization. Consequently, organizational management and human resources departments must imperatively address the issue of the general well-being of their employees. Only in a situation when they are satisfied and properly motivated, general increase in organizational performance can be expected.

Previous research has indicated that the application of prudence training has given excellent results in these situations. For this reason, organizations should view investing in the implementation of the program as investing in the future of their employees, and thus their business success. Employees who are happy and do not feel "business sick" are the surest way to achieve a high level of productivity (Center for Mindfulness, 2017).

As already mentioned, many global companies have introduced mindfulness training as a daily practice. The programs mainly consist of the following activities: 1. Deep breathing exercises, 2. Short meditations, 3. Rest in the form of short walks, 4. Shutting down electronic devices for 10-15 minutes, 5. Keeping a diary, 6. Setting a timer that reminds them that it is time for a break (Center for Mindfulness, 2017).

All of the above strategies do not seem complicated to include in the organizational culture, and they bring great benefits.

State of prudence and work performance - As has been repeatedly confirmed in the professional literature, prudence affects the achievement of higher levels of work performance in several ways. The contingent theory of Dane's author starts from the fact

that the state of thought influences the expansion of the range of attention, so that the employee is able to notice many peripheral stimuli (Dane, 2011).

Prudence simply stabilizes attention. It becomes focused and constant, so employees make significantly fewer mistakes in performing tasks, which are a common cause of high expenses in companies (Smallwood & Schooler, 2015). Also, prudence affects the amortization of “ups and downs” that occur during the course of business. As the author Mullins and co-workers state, they are most often conditioned by factors originating from the employees themselves, specifically, lack of attention, age, state of insufficient sleep, positive or negative emotional states, degree of self-control (Mullins et al., 2014). In this case, the state of thought will calm the attention and focus, so the person will be able to control his own thoughts and behavior. In this way, the mentioned variations, which are a frequent occurrence but also a problem in every work environment, will be reduced.

Likewise, the state of mind balances the impact of all distractions coming from the work environment. An employee who has stabilized attention will also have a higher level of cognitive potentials, so it will be easier to abstract any kind of “noise” from the environment. For example, nurses face about 14 different distractions in just one working hour, which causes an increase in the number of errors by as much as 12%. In general, distractions in any work simply “split” attention, but as many authors state, only 5 minutes of practicing prudence can almost completely eliminate these negative influences (Kuo & Yeh, 2015). Thoughtful people will find it easier to distance themselves from a hectic, intense work environment and get the job done with full attention (Long & Christian, 2015).

Prudence also leads to faster and easier achievement of goals. Although it may seem that the very concept that otherwise forces reconciliation is not in line with “combative”, goal-oriented behavior, it does not imply passivity in behavior. An employee who is in this state will have a higher level of internal motivation which has proven to be longer lasting than external. In a situation where internal motivation is dominant, the person will feel personal satisfaction and satisfaction due to the successfully completed task, so it will be easier to achieve both business and personal goals (Vago & Silbersweig, 2012).

State of thought and relationships at work - Within the organizational context, people have a large number of relationships and in order for the business to run smoothly, they should take place with ease and without conflict. The most important relations in each organization are those on the employee-management line and among the employees in the working group / team.

A large number of examples from practice confirmed that the state of prudence creates a large number of benefits in this situation as well. First, employees will achieve much more effective cooperation and coordination and communication will become significantly better. Listening activity will no longer be just a “letter on paper” but a successful practice while the level of condemnatory attitudes and different types of prejudice will be reduced to a minimum. In this way, the relationship with clients can be drastically improved (Beach et al., 2013). The author Reb and colleagues came to the conclusion that thoughtfulness trainings change attitudes in a positive sense, so that negative events, various organizational gossips and injustices can be overcome much easier and faster (Reb et al., 2014). As already mentioned, the state of thoughtfulness automatically increases the level of attention and reduces emotional reactivity, which is

the key to establishing emotionally positive relationships. Group / team members in such an environment will show a much higher level of mutual respect and empathy which can make the group significantly more cohesive in the long run (Cleirigh & Greaney, 2014).

It is very important to state that the training of an individual's prudence teaches how to become a prosocial being and reduce the level of egocentric attitudes. Self-centeredness will automatically give way to caring about the success of the whole group / team, so the decision-making process will become more efficient. In general, all of the above is a sure way to building a good work climate characterized by relationships of mutual trust and a higher level of openness to new ideas and practices (Reb & Narayanan's, 2014).

Prudence and well-being of employees - A sense of well-being refers to the experiences that an employee experiences in the workplace in an organization. As such, well-being has its physical, mental and behavioral aspects and represents one of the most important outcomes of corporate life. Positive emotions and experiences will directly affect the growth of work performance. Due to undamaged mental and physical health, there will be no absence from work, laziness, burnout, etc.

The author Roeser and colleagues in their research came to the conclusion that the practice of prudence directly affects the reduction of stress levels, family business conflict, improves the quality of sleep and "erases" negative emotions (Roeser et al., 2013). Likewise, research conducted on a sample of managers and entrepreneurs has shown that a state of mindfulness induces much more goodwill and gives a person the strength to more easily withstand business problems and challenges (Roche et al., 2014). As can often be read in the professional literature, this practice simply gives hope and raises the level of optimism (Malinowski & Lim, 2015).

A positive aspect that the authors especially dealt with is the quick recovery after stressful situations. This indicates that a thoughtful person will adapt much faster but also recover from various stressful and strenuous business outcomes. For example, an argument with a "toxic" boss or colleague will be overcome with a much lower degree of anger, rage and negative emotions. This attitude will lead to building and a higher degree of self-confidence (Neff & Broady, 2011).

Thoughtful leaders - The 21st century is a time of innovation and creativity. They become a competitive advantage of every company. So the question is, how should leaders lead modern organizations? The leader of the autocrat is focused on his ego, hierarchy and fulfillment of tasks and very often neglects the importance of morals, organizational culture and the values that employees hold. Therefore, this solution "from the past" cannot give results when employees are expected to contribute to the creation of an innovative culture. Leaders with different attributes are now entering the scene. In this case, they are thoughtful leaders who respect their employees and make each of them feel equally important. This type of leader does not only work for profit, business ethics is of great importance to them. A leader who possesses prudence highly values clear, unambiguous situations, supports innovative and creative behaviors, builds relationships of understanding with his employees, possesses empathy and knows how to listen (Walker 2017).

Table 1. Characteristics of a thoughtful leader

Leadership	Behavior of a thoughtful leader
Efforts	Ability to let go of practices that have been overcome without condemnation or regret
Work methods	Presence in the present with complete understanding and knowledge of the situation
Mode of conversation	Ability to listen to others without interruption and argumentation
Condemning attitude	Constant attempt to understand both oneself and others; empathy
Multitasking	Ability to work in a separate task with full attention paid to each and individually
Routing	Accepting the present moment and responding to its demands
Business	Persistence, calm spirit, full attention, conversation without noise and raised tones

Source: Wells, C. M. (2015). *Conceptualizing Mindful Leadership in Schools: How the Practice of Mindfulness Informs the Practice of NCEA Education Leadership Review of Doctoral Research*

A recent study conducted by Harvard Business Review Research reveals that when leaders are under stress, the entire organization “suffers”. In this case, the employees will leave their jobs in order to save their own health. According to the results of the research, the employees believe that a leader who cannot overcome his own nervousness and tension is not capable of running a company. By practicing prudence, the psychological capital of the organization is constantly growing and a leader who is able to control his emotional states will significantly contribute to the growth of general optimism, hope and self-efficacy in the organization (<https://www.inc.com>). According to these researchers, a thoughtful leader will always be able to separate from stressful situations and not experience them personally. He will always be able to control his reactions and think carefully before taking any action.

Examples of good practice in companies If P&C Insurance Ltd and Google

In the following part of the text, the authors will present examples of good business practice related to the application of the concept of prudence. Specifically, these are If P&C Insurance Ltd and Google.

When it comes to the first company, the authors of the paper will present research taken from the authors Reb and Choi and related to the application of prudence programs in the insurance company If P&C Insurance Ltd (Reb & Choi, 2014). Thus, it is a question of the use of secondary data that seem valid and extremely useful for a detailed presentation of the topic of prudence and the purpose of the work in general. In their expert article, the authors Reb and Choi presented the research conducted within the industrial division of If P&C Insurance Ltd., which is one of the largest insurance companies in Europe. The company has over 3,800 customers in Sweden, Norway, Finland, Denmark, Estonia, Latvia, Lithuania and Russia and has 6,400 employees. The company is headquartered in Stockholm, Sweden. In particular, the research was conducted within

a division that deals with risk management and its clients are usually larger companies with very complex insurance requirements. The research covered all thirty employees working in the division. They are all highly educated and the job description is such that they face very dynamic, stressful demands from clients on a daily basis.

Employees work individually or in small groups and have described their organizational culture as tolerant, flexible, respectful but also highly individualistic. The work they perform requires the possession of highly professional knowledge. Also, they stated that they are often faced with doing multiple jobs at the same time to meet all expectations.

Internal health control that was conducted just before the start of the study indicated that a large number of them work under a high dose of stress. Accordingly, it was in the company's interest to raise the health status of employees to a higher level. It was found that everyone was familiar with the basic principles of healthy living but did not have time to adhere to them. Thus, the division manager came up with the idea that the application of a program of prudence, in this constellation, could give good results.

After a short deliberation, it was decided to implement a prudential program within the division under the auspices of Potential Project International. By the way, this company is fully recognized and qualified to hold trainings within corporations and non-profit organizations, it operates globally in 27 countries with the engagement of 200 trainers. At the very beginning, the whole group was explained that the state of prudence directly affects the growth of efficiency and effectiveness of work. In this way, their problem of overbooking could be more easily solved and overcome. Also, the presenter of the program especially emphasized that the program is not applied exclusively for medical purposes and that it has given extraordinary results in business practice until then.

The program was launched under the name Corporate Based Mindfulness Training (CBTM) and was designed to meet the needs of this demanding environment. Employees needed to be trained on how to devote themselves to each task individually, with a state of complete attention and without interference. The duration of the program was eight weeks and all participants joined it voluntarily. The first session lasted intensively, 12 hours a day, and aimed to train in detail about the benefits of the program. In this situation, the coach kept to presenting facts that were scientifically substantiated and proven. After that, he introduced weekly sessions in which employees received detailed instructions on how to apply prudence in their workplace (prudence in writing e-mails, communication, in meetings, during breaks). Also, all participants were trained on a daily basis on how to properly apply deep breathing and relaxation techniques.

It should be emphasized that most of the participants initially expressed a high dose of skepticism. The typical negative reaction of the manager, and according to the author, was "I don't see a way how this training can help us?!". It is interesting to mention the words of the engineer "I am a really curious person, but I still do not understand the goal of this hocus-pocus". However, after these initial doubts, the participants began to express increasingly positive attitudes. Prudence training is generally seen as a useful tool that purifies their thoughts and allows them to better concentrate on a large amount of work. In particular, the results showed the following - 88% of participants in the program noticed that it is much easier to concentrate and have a higher degree of attention; 82% are much easier to deal with various types of disruptions in the business environment; 59% of participants tolerate stress much better.

As a benefit that the coaches did not count on, and which was noticed by all participants, is the daily stay with colleagues. Since the employees mostly worked individually, everyone liked this practice of team building. As everyone stated, she completely changed the dynamics of the group. After each session, people felt closer to each other and had better communication and understanding. Likewise, the benefits of the program are felt sui after the end of the business day; traffic jams no longer irritated them so much, they had a better quality of sleep, etc. As expected, participants went through a number of challenges during the program. Since they voluntarily participated, some of them did not regularly attend daily sessions. Several of them gave up, justifying that the introduction of innovations in the program every week is quite difficult to follow. The program trainers were faced with the challenge of maintaining staff attention, especially in the formal parts of the session. Also, employees from certain professions, and especially mechanical engineers, said that it was quite unusual for them to observe their own thoughts and emotions in that way, so they were not open enough for the program.

When it comes to Google, it is generally known that it has been globally recognizable for many years for its successful business in the field of high technology. Headquartered in California, the company has over 40 offices worldwide and approximately 57,000 employees. According to their website, the policy they follow in business is “fast is better than slow”. Although the atmosphere in the company is completely casual - new ideas are exchanged during a coffee break and team building meetings are held in the fitness room - the pace of work is extremely fast. Google places special emphasis on production, implementation and innovation, all of which create a busy work environment and a lot of pressure on employees. Precisely for this reason, a prudential program was introduced, which is otherwise highly recognized and verified in the business culture of Silicon Valley (Tobias & Spiegelhalter, 2016). As stated in the renowned Fortune magazine, the company has twice been named “the best place to work in America” since it sincerely cares and constantly invests in the well-being of its employees. (Harvard Business Review, 2015).

Google’s thoughtfulness program is designed to constantly raise the level of emotional intelligence of employees. In this way, employees become extremely motivated, cooperate better, show a high degree of emotion and have a greater tolerance for stress (Tobias & Spiegelhalter, 2016).

The Search Inside Yourself (SIY) program has been in place since 2007. By the way, it was developed by an engineer from the company Chade-Meng Tan in cooperation with professor of neurology Daniel Goleman from Stanford University. According to the SIY website, the program lasts four weeks and aims to develop both a high level of thoughtfulness and emotional intelligence in employees (Search Inside Yourself Leadership Institute, 2016).

The SIY course is divided into several sequential sessions: 1. Attention training aimed at bringing the brain to a state of calm, 2. Getting to know one’s own personality in order to control emotions more easily and effectively, 3. Creating a mental habit. Employees can apply the program in any room in the company, of their choice, and also have the opportunity to share their impressions and opinions with colleagues in the online community formed for this purpose (Tan, Goleman & Kabat-Zinn, 2014).

By the way, The Search Inside Yourself Leadership Institute (SIYLI) is a non-profit organization that is owned by the company and provides services to other clients.

The importance of mindfulness programs for academic institutions

Prudence programs have recently begun to be introduced within educational institutions all with the aim of supporting the health and general well-being of students and pupils (Meiklejohn et al., 2012). From practice, it can be concluded that students on a daily basis experience high levels of stress resulting in anxiety, low self-esteem as well as other emotionally behavioral outcomes that negatively affect the ability to concentrate and learn (Rempel, 2012; Shanker, 2014).

The mentioned negative connection between stress and academic performance emphasizes the importance of the role of the professor on the further emotional and social development of pupils and students (Rempel, 2012). If we take into account the time spent in the premises of educational institutions, the introduction of a program of thinking is imposed as a logical solution that will help young people to develop the so-called. a mechanism for self-regulation, ie to approach different challenges with a much higher degree of flexibility and openness (Meiklejohn et al., 2012).

According to the creator of the program, Kabat Zinn, the learning process is impossible if the attention is not focused properly. In this context, thoughtful programs can help a lot - students have the opportunity to learn how to see the problem from different perspectives, recognize what is new and important in the situation, become aware of the context of events, and better interpret the information provided to them (Napoli et al., 2005). In general, these programs have great potential when it comes to both the mental health of young people and their academic performance, and as such provide the opportunity for comprehensive reforms throughout education (Soloway, 2011).

The author Ashe conducted a multi-stage research on this topic and came to the conclusion that the following can be cited as concrete benefits of introducing a program of deliberation in schools / universities (Ashe, 2016):

Mental health and emotional skills - After only a few minutes of exercise, and according to the results of a large number of students tested, everyone said that they feel relaxed, which directly leads to an increase in the level of general well-being (Napoli et al., 2005). Also, the application of the program enabled the focusing of attention and articulation of behavior, which ensured more efficient performance of various tasks (Shanker, 2013). Also, pupils / students confirmed that the program led to “calming of thoughts” and thus to reduction of nervousness levels, easier regulation of emotional problems and increase of social skills levels (Shanker, 2013).

Improving academic performance - As already mentioned, high levels of stress reduce the ability to achieve the desired academic performance. On the other hand, a state of mindfulness ensures that students are in touch with their own thoughts and interpret the exam material from a perspective that is close to their personal experience. The increase in the possibility of visualization as well as the growth of creativity cannot be ignored (Soloway, 2011).

Growing enthusiasm - Although students in the first phase refused to apply meditation techniques, everyone said that they felt better after applying them. The state of prudence influenced the mechanisms for self-regulation. Consequently, it is not difficult to conclude that programs can help young people cope more easily with the emotional problems they face not only during schooling but also later in life (Remple, 2012).

Better classroom situation management - The implementation of the program has enabled both students and professors to concentrate more easily, reduce the level of reactive behavior and cooperate more easily even in a situation where the material is complex and difficult (Ashe, 2016).

The author Ashe made two more interesting observations regarding the implementation of the program, regarding the challenges of implementation and consideration of the necessary conditions for the introduction of the program in the education system. In his opinion / research, the factors that inhibit the implementation of the program relate to the religious connotations attributed to it, the initial reactions of students (to whom the program looks “silly”), the reluctance of professors to show vulnerability in front of students, lack of instant results and finally, lack of time. In order to successfully introduce programs into the entire education system, the author emphasizes that it is necessary to obtain administrative support, raise awareness of professors about the benefits of the program and calculate that without their long-term implementation the results will not be visible (Ashe, 2016).

The author Leland also came to interesting conclusions, using secondary data (Internet search). He states that prudential programs not only enhance academic performance but also contribute to the following activities (Leland, 2015):

Improved Critical Thinking Skills - Critical thinking is an exclusively internal process and thoughtfulness helps better introspection, questioning values and beliefs, and thus recognizing wisdom that can help solve problems in a turbulent environment (Burke & Hawkins, 2012).

Better self-control - Thought programs contribute to the growth of self-awareness, better “locating” of feelings and more successful control of reactions and behavior in general (Rodgers, 2014).

Developing skills for future work - Formal education equips students with the necessary knowledge for future work, however, thoughtful programs allow the development of specific skills that are desirable in almost every workplace. This case refers to the development of empathic feelings (Grant, 2014), active listening and multitasking (Goh, 2012), early recognition and prevention of burnout syndrome (Napoli & Bonifas, 2011).

Helping students with learning difficulties - The programs have proven to be extremely successful in situations where students have attention deficit disorder, ADHD (Thomas, 2013).

Success in sport - Better contribution to team sports during schooling (Davis, 2012).

Conclusion

It is certain that thoughtful programs have many good sides. However, what needs to be pointed out is the fact that they have not yet been universally recognized or accepted by company management and academic institutions. Their introduction depends on how much the institutions are willing to invest in the development of talents and human health in general. Organizations that want the human factor to become the basis of their competitive advantage should be free of skepticism and move towards

creating an organizational culture in which employee welfare will not be stigmatized (Dimoff & Kelloway, 2018).

The introduction of the program should be seen as a net return on investment; they are a tool that will motivate employees to give the most and the best of themselves. Corruption is still a hot topic in modern organizations. In this case, thoughtfulness programs can be of great help - as the authors Krishnakumar and Robinson state, employees who pass the program will show a much lower degree of Machiavellian aspirations, and will generally be less hostile to colleagues (Krishnakumar & Robinson, 2015). Of course, in modern literature, one can find many allegations that oppose the application of these programs. Thoughtful employees, aware of their limits that they should not cross, will no longer work so intensively. They will approach the job in a much more relaxed way, so that performance growth will actually decrease (Ericson, Kjonstad & Barstad, 2014).

What also needs to be kept in mind is the fact that the programs will give different results depending on the type of industry, job description, general condition of the working environment. In addition to the above, one should not overlook the fact that the needs of people for training are completely different. In this case, it is necessary to consider in more detail the mental models and personality characteristics of the participants (Dane & Brummel, 2014). It is certain that the programs have given extremely good results so far. However, given that there are still innovations in corporate life and academic life, they need to be studied in more detail by the research and academic public.

Special attention in further research on this issue should be paid to the possibility of applying the concept of prudence in companies in the Republic of Serbia. The authors of the text plan to address this issue in one of the following papers. But what can be concluded for now is that although the concept is not unknown, (both to the management and the employees) its application is definitely missing. According to the authors of this text, the reasons are numerous, starting with the dominant dimensions of national culture, the prevailing management style, the transition process, poor financial conditions both in the country and the organizations themselves, etc. All these "difficulties" related to the implementation of the program are subject to further, very detailed debate and research.

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AN ANALYSIS OF DEALERS' INFLUENCE ON THE AUTOMOTIVE MARKET IN THE REPUBLIC OF SERBIA

Abstract

In the paper, the dealer influence on the automotive market is researched both from the aspect of the offer and from the aspect of the development of the dealer network itself in the provision of vehicle maintenance and repair services and their contribution to the market development. The determination of the dealer influence on the automotive market is a complex process both from the point of view of the dealer offer in Serbia and from the point of view of the state in which the economy, particularly so the car market, is. Numerous factors with an interwoven and multiplied influence act on the automotive market. The subject matter of the research study represents a cross-sectional study of an empirical character. During the collection of the data, the survey non-standardized research technique was used. For this purpose, a special questionnaire was created. The collected data were processed by means of the applicative SPSS system (Statistical Package for Social Sciences), simultaneously applying descriptive and comparative statistics. The research results have shown that the greater the dealer development degree in Serbia, the stronger their influence on the automotive market in Serbia. Also, the following factors have the greatest influence on car manufacturing and sale in Serbia: the development of the dealer network, per-capita income and macroeconomic stability. Simultaneously, vehicle maintenance and repair services substantially influence the purchase of cars. A fact was established that the performance parameters of a vehicle also influenced the buyer's choice of a vehicle.

Keywords: *dealers, market, manufacturers, services, marketing, cars*

JEL classification: *F10, D40, L10, M31*

АНАЛИЗА УТИЦАЈА ДИЛЕРА НА ТРЖИШТЕ АУТОМОБИЛА У РЕПУБЛИЦИ СРБИЈИ

Апстракт

У раду се истражује утицај дилера на тржиште аутомобила, како са аспекта понуде, тако и са аспекта самог развоја дилерске мреже у пружању

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сервисних услуга и њихов допринос развоју тржишта. Утврђивање утицаја дилера на тржиште аутомобила је сложен процес, како са аспекта понуде дилера у Србији, тако и са аспекта стања у којем се налази привреда, готову тржиште аутомобила. На тржиште аутомобила делују бројни фактори који имају испреплетан и мултипликован утицај. Предметно истраживање представља трансверзалну студију, емпиријског карактера. Приликом прикупљања података коришћена је нестандардизована истраживачка техника – анкетање. За ову сврху креиран је посебан упитник. Прикупљени подаци су обрађени апликативним SPSS системом (Statistical Package for the Social Sciences), уз примену дескриптивне и компаративне статистике. Резултати истраживања су показали да што је степен развоја дилера у Србији већи, то је њихов утицај на тржиште аутомобила у Србији јачи. Такође, на производњу и продају аутомобила у Србији највећи утицај имају следећи фактори: развијеност дилерске мреже, доходак становника и макроекономска стабилност. Истовремено, сервисне услуге знатно утичу на куповину аутомобила. Утврђено је и да радне карактеристике утичу на одабир возила, од стране купаца.

Кључне речи: дилери, тржиште, произвођачи, услуге, маркетинг, аутомобили

Introduction

The automotive industry is increasingly gaining in significance in the business operations of companies of all sizes, as well as for consumers and national economies. At the same time, the automotive industry is an important sector of the global economy given the fact that this sector contributes with almost 3% of the global GDP, with sales having simultaneously reached record 88 million cars in 2016 (Vychytilová et al., 2019).

The key difference between the domestic automotive industry and the European automotive industry lies in a larger number of the dimensions and the complexity of the numerous foreign markets on which a firm does business. There are numerous models of analysis, but the different aspects and trends that come to light on the international market will be analyzed for the purpose of this research study through social/cultural, legal, economic, political and technological dimensions.

Many countries introduced programs for the replacement of “the old with the new” so as to mitigate the overall fall in the economic activity, but they also increased the sale of cars in a short term. Given the fact that such programs are only short-term and based upon transferring the purchase from the future to the present, an increase in sales might have an opposite effect once such programs are abolished (Tričković, 1983, p. 3). The role of dealers in the automotive industry is increasingly gaining in significance with respect to the manufacturing volume, as well as car models. Without their presence, the placement of products, the product price and marketing activities, too, are brought into question. One of the main problems of contemporary business doing enterprises, and dealers as well, are faced with is the adoption (on their part) of one long-term business model instead of relying on short-term goals.

Marketing is the basis of market appearance. It is not only present in manufacturing organizations, but also in those dealing with the turnover of goods and services in trade, traffic, catering and tourism, briefly saying in all those activities in which business organizations are forced to fight for the placement of their products due to the presence of competition on the market (Tričković, 1983, p. 3).

It is the task of the car manufacturer's marketing to establish contacts with the external actors (the competition and buyers) whose existence is of an independent nature. The survival itself of the car manufacturer depends on how well the management adapts to the market conditions which are under the influence of the activities of a large number of market actors in the automotive industry.

User services, stock management and using production capabilities should be considered in an integrated manner (Godlewska-Majkowska & Komor, 2017). The concept of successful service organization is a set of the created quality resources included in the production of a service, i.e. people (the personnel and consumers on an equal footing), then technology, physical resources, operational systems and administration (Stojanović, 2018, p. 36).

Searching for a differential advantage on the automotive market is a creative process requiring a long-term vision and notional ability. The creation and operationalization of the car manufacturer's marketing mix implies an active treatment of market movements and internal possibilities. The majority of the available studies more or less agree that buyer orientation, competition orientation and inter-functional coordination are the most important elements of market-orientation (Kanovská & Tomášková, 2014).

Literature Review

In the developmental technological process, the roles of research, development and knowledge become the basis for the explanation of only economic and social development. The indicator of the connectedness between science and empirically gained knowledge in the contemporary epoch of development, as well as the thesis that, thanks to research and development, the time needed for applying the types of knowledge verified as innovations, i.e. inventions, in the manufacturing context as well rapidly decreases, also arise from that fact (Jelenković, 2015, p. 61). Attracting new foreign direct investments in the Serbian automotive sector is the key to the development of the domestic economy and an increase in the competitiveness of the automotive sector. "Automotive and business cycles are usually monitored closely although amplitudes inside the automotive industry are greater. The instability of the automotive industry is also greater than in the whole manufacturing industry (Jelenković, 2015, p. 61)." The inherent variability of the economic situation influences the basic factors that determine the balance between profits and losses in the automotive industry (Boj et al., 2019).

The acceptance of the implementation of corporate sustainability and reporting on sustainability have continuously been increasing in recent years (Sukitschet et al., 2015). Today, both practitioners and scientists accept the fact that the acceptance of the principles of corporate sustainability and the improvement of buyer loyalty may bring relevant business benefits (Moisescu, 2018). Namely, company loyalty and profitability are strongly connected with the process of the creation and delivery of buyer value (Scridon

et al., 2019). In recent years, an accelerated promotion of the modern urban motorization process has led to traffic problems including traffic jams, traffic accidents, air pollution and energy consumption (Shuaiyang et al., 2020). Consequently, the integration of ecological goals in all the aspects of the enterprise's activities (from the formulation of a strategy, planning, design in manufacturing, as well as doing business with consumers) has been promoted in the manufacturing field. For that reason, organizations have to find solutions to ecological challenges through marketing strategies, products and services, while simultaneously still remaining competitive (Petrović, 2007, p. 138). Because of sustainability challenges, the growing industrial concern has forced vehicle and car-part manufacturers to adopt service possibilities as a way to maintain competitiveness in accordance with ecological regulations (Opazo-Basáez, 2018). Namely, there is a positive connection between sustainable entrepreneurship and business performance (Galant & Cadez, 2017).

Consumers and organizational buyers constantly endeavor to obtain as much as possible for as little as possible in the exchange process. Both groups appraise what they give for what they obtain (Milenović & Ratković, 2012, p. 34). In the automobile context, safety is the key characteristic of the product (Wurster & Schulze, 2020). The planning strategy represents the process of the improvement and application of an appropriate line of action regarding the direction that an enterprise should unconditionally follow so as to achieve its goal (Stojanović, 2019, p. 191). The strategy of the manufacturing entity itself, or the dealer, is also of exceptional significance – how the enterprise creates value and in which manner it achieves its competitive advantage, while the sources of the cost advantage depend on the structure of the given industry. “A strategy implies that the enterprise is unique in the dimensions highly valued by consumers, because of which fact they reward it by accepting its premium prices. A business strategy is brought into connection with the performances of the enterprise, while simultaneously a distinction is made between the strategies that ensure a high level of performances, i.e. between proactive and reactive strategies. Proactive strategies imply taking the initiative and they encompass the activities that, by putting them into the limelight, highlight the quality of the product, the innovations of products and services, the development of new technologies and the opening of new markets and consumer support services as well. The enterprises that follow reactive strategies usually only follow other enterprises and react to events occurring in the environment, without a possibility of acting upon them (Stojanović, 2019, p. 191).”

Also, the spare part supply chain is of key significance for the automotive industry, which belongs to logistical support to both the manufacturer and the buyer – dealer in today's time. “In the automotive industry, supply chains encompass a large number of participants, i.e. the interconnected organizations whose goal is to deliver a product or parts for the end user by carrying out different activities and conducting different processes (Stojanović, 2019, p. 191).” Today, all car manufacturers treat vehicle maintenance and repair services at their sellers as highly significant in order to satisfy their clients and tend to improve them as much as possible. The whole spare part supply chain must be focused on the manner that enables a quick and easy adaptation to changes on the market. Pursuant to that, the supply chain is a complex manufacturing system consisting of a network of manufacturers and service providers connected with the logistical systems providing transportation and storage (Groznička & Trkman, 2012).

In order for an enterprise's marketing communication to be successful, i.e. in order for an enterprise to achieve its set goals, a creative message is, therefore, of enormous importance. Creativity is a very important aspect of the market economy. One of the most important conditions for survival in the competition between organizations, however, implies creativity and innovativeness as its application (Kačerauskas, 2016). The message of the right content and the right form (Brkić, 2003, p. 262). Those better knowers and visionaries considered that automobiles would soon become a necessary need of today's man and that they would give impetus to his work and creativity, greater possibilities for holidays and faster travel, which on its part would all therefore help him raise his living standard faster.

Numerous decision-making problems are mainly solved in conditions of uncertainty (Russell et al., 2012). Risk in business doing should be managed adequately (Hassani, 2019). One of the initial steps in any efficient risk management strategy is the exact measurement of market risks (Ho et al., 2017). The anticipation and understanding of clients' characteristics and their demand and need for personalized services may contribute to the improvement of business operations and, ultimately, an increase in profitability by using the electronic client relationship management system (Peštek & Lalović, 2012). What the state would invest in that kind of industry would pay in a very short period of time, not only materially speaking. Once that host factor was mentioned, yet another important argument came to light: our market craved, *inter alia*, for cars.

Satisfied buyers are likely to become regular buyers, so repeated purchases will turn into the economic value of the enterprise, which enables the maintenance of its market share and the profitability of its business operations on a highly competitive market (Lee & Salciuviene, 2018). The success of business organizations and institutions is strongly connected with their ability to establish labor between themselves and efficiently manage teamwork (Zubanov et al., 2017). Pieces of information as such are no longer the key source of success; it is rather the real knowledge connected with a certain holder – employees, who must constantly develop it in a currently highly competitive environment (Urbancová et al., 2016). Today, the automotive industry is one of the most prominent sectors in Serbia, which has attracted a large number of total foreign direct investments since 2001. So far, several tens of international companies have invested in this sector, having invested more than 1.7 billion euros and having opened several tens of thousands of workplaces. Serbia's automotive industry supplies numerous larger-size European and certain Asian car manufacturers with its products.

Should the structure of the automotive industry be observed, it can be said to consist of suppliers, i.e. part manufacturers, car manufacturers themselves or the sale-service network. The part manufacturer industry is determined as a big independent group of manufacturers manufacturing and selling ready products to domestic and foreign car manufacturers and the service network as well (Haugh et al., 2010). A research study conducted by the Center for Automotive Research in 2010 shows that the employment multiplier in the automotive industry is very high and can be observed from several points of view (Wallace et al., 2011). If the number of employees only at car manufacturers is compared in relation to the total number of the employed in the automotive industry, then the multiplier is around 10, which means that there are 10 additionally employed in the overall automotive industry on every employee at the car manufacturers. When the multiplier is observed in relation to part manufacturers, then it is 4.6, and 2.1 for the

sale network, which generates the multiplier of 4.6 for the overall automotive industry. This analysis of employment was carried out on the example of the automotive industry in the USA, so the same is mainly applicable to every state that manufactures cars, due to the global connectedness of the overall automotive industry (Bilas & Franc, 2013). Pursuant to that, the so-called trade orientation is becoming stronger (Wolf, 2016). “In many car manufacturing countries, a large segment of production is exported. The export of cars accounts for over 20% of the export products of Japan, Slovakia, Hungary, Canada and Spain, and around 15% of the other manufacturing countries. Car manufacturers had to adapt their production given the fact that almost all the countries that manufacture cars had recorded a fall in production in 2008, especially so a big fall had been recorded in the countries such as France, Spain, and Italy (Sturgeon & Biesebroeck, 2010). In the USA, a fall in the sale of permanent goods, then the investment of enterprises in the purchase of cars, contributed 20% to 30% to the fall in the GDP in the second half of 2008 (Council of Economic Advisers, 2009).”.

Research Methodology

The subject-matter research is a cross-sectional study of an empirical character. Namely, the empirical research was conducted on the Renault dealers in the Serbian territory. “While collecting the data, a survey was conducted as a non-standardized research technique. For this purpose, a special questionnaire was created. The collected data were processed by means of the applicative SPSS system (Statistical Package for Social Sciences), with the application of descriptive and comparative statistics. The examination was carried out by handing in the Questionnaire in person and by sending it electronically, too (Tričković, 1983).” The basic and three ancillary hypotheses are set in the paper:

The basic hypothesis (H0) reads as follows: The greater the degree of the dealer development in Serbia, the stronger their influence on the Serbian automotive market.

The ancillary hypotheses (AH) read as follows:

AH1 – The following factors have the biggest influence on car manufacturing and sale in Serbia: the development of the dealer network, per-capita income and macroeconomic stability.

AH2 – Vehicle maintenance and repair services considerably influence the purchase of cars.

AH3 – Performance parameters influence buyers’ choice of a car.

The determination of dealers’ influence on the automotive market is a complex process both from the aspect of the dealer offer in Serbia and from the aspect of the state in which the economy, especially the automotive market, is. The automotive market is acted upon by the numerous factors that exert an interwoven and multiplied influence. Consequently, the precise evaluation of the influence of dealers has been made significantly more difficult and, in many situations, requires a highly sophisticated statistical methodology, whose application requires that numerous conditions should be met.

Results and Discussion

The basic hypothesis (H0): The greater the degree of the dealer development in Serbia, the stronger their influence on the Serbian automotive market.

The testing of this hypothesis is represented by the analysis of the respondents' attitudes towards the influence of the development of dealers on the development of the automotive market in Serbia. So, the testing of this hypothesis was for the purpose of proving that the factors that determine the development of dealers in Serbia produce a positive effect on the automotive market development trend. The respondents' attitudes were graded through an ordinal scale from 1 (the nonexistence of the influence of the analyzed factor) to 5 (for the opinion reflecting the existence of a very significant influence between the analyzed variables). Should the respondents consider that the analyzed factors are more than moderately significant for the development of the Serbian automotive market, the medians of the grades assigned to them by the respondents will be statistically greater than 3. A standard t-test would be the appropriate statistical test that might be applied in situations like this, on condition that the data can be measured on a continual measurement scale and by a desirable normal distribution. In the case required by the analyzed data, namely the data of an ordinal nature, and without a distribution known in advance, it is necessary that an appropriate nonparametric statistic alternative should be used. The t-test nonparametric alternative which represents a very efficient test in making statistical conclusions is known as the Wilcoxon Signed-Rank Test, and the mentioned test was used in this particular case.

The null hypothesis of this test always assumes the equality of the median with the preset value, which is the value 3 in this case. The results of the Wilcoxon Signed-Rank Test are accounted for in Table 1 below.

Table 1: The results of the Wilcoxon Signed-Rank Test for the grading of the factors that influence the development of dealers

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The mean value of the Size of the Market equals 3.000.	Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
2	The mean value of Marketing equals 3.000.	Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
3	The mean value of Insurance equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
4	The mean value of Education equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
5	The mean value of Specialization equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the null hypothesis.
6	The mean value of Complaint(s) equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.

7	The median from the Services equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
8	The median of the Direct Sale Company equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
9	The median of the Indirect (Intermediary) Sale Company equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
10	The median of the Buyer Habits equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
11	The median of the Technological Equipment equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
12	The mean value of the Market Coverage equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
13	The mean value of Competitiveness equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
14	The mean value of Buyer Crediting equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.045	Retain the Null Hypothesis.
15	The mean value of the Sale of Diesel Vehicles equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
16	The average of Petrol Vehicle Sales equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.008	Retain the Null Hypothesis.
17	The median of Hybrid Vehicle Sales equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
18	The average of Electrical Vehicle Sales equals 3.000.	Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
The used significance level is .05.				

Source: Authors

The first column of the above table contains the Null Hypothesis in the form reading as follows: “the median of the mentioned factors equals 3.” In the continuation, the p-values were calculated, based on which the conclusions were made whether each individual null hypothesis should be rejected or not. In accordance with the standard decision-making rule (if the achieved p-value is lesser than the selected significance level, the null hypothesis should be rejected with a defined risk of error), it was concluded that, in the case of all the 18 analyzed factors, the Wilcoxon Signed-Rank Test suggested the inequality of the medians from the assumed value and the rejection of the null hypothesis. Although the applied statistical test is two-sided, which means that the rejection of the

null hypothesis does not have to imply that the sample median is greater than the assumed value, taking into consideration the previously calculated descriptive statistics, which are greater than 3 in the case of 16 out of the 18 analyzed factors, it can be concluded that the respondents consider these 16 factors to be (strongly) significant in the studied context. For the previously mentioned two factors whose average grades were below the level of the median (the sale of hybrid vehicles and the sale of electrical vehicles), the null hypothesis is also rejected, but the conclusion reads that the respondents consider that there is no influence exerted by these factors that can be considered as significant. Observed as a whole, the dominant number of the analyzed factors that are significant for the development of dealers is assessed by the respondents as very important for the development of the Serbian automotive market, so the assertion of this hypothesis can be accepted with the selected significance level of 5%.

The ancillary hypothesis (AH1): The following factors have the biggest influence on car manufacturing and sale in Serbia: the development of the dealer network, per-capita income and macroeconomic stability.

This hypothesis was tested by performing factor analysis. This known multi-variation analysis technique can be used to generate very useful inputs for decision-makers from the aspect of setting the focus on several factors instead of a large number of defined parameters (variables). As the assertion of the hypothesis implies the discovery of the key factors that are basically responsible for the movement of automobile manufacturing and sale, the application of factor analysis should ensure a solid base from the described point of view. In the described manner, instead of directing attention towards a large number of the predetermined variables and by performing the procedure for their further reduction, the conditions for the creation of the optimization of the factors singled out are met, which further contributes to the growth of business in a broader context. The first part of the application of the described technique is the calculation of the basic indicators of descriptive statistics (Table 2). The questions pertaining to the assessment of the significance of the factors deserving for the development of car manufacturing and sale in Serbia are shown in Table 2 below, together with the results of the descriptive statistics of the respondents' grades.

By providing answers to Question 14 of the Questionnaire, the respondents graded the significance of the individual factors for the development of car manufacturing and sale in Serbia, by giving the grades 1 (the insignificant factor), ..., 5 (the highly significant factor), as was the case in the previous question. In this case as well, the results of the analysis demonstrated that the grades for the significance of almost all of the mentioned factors were above the average, while simultaneously there was very high compliance amongst the grade. The four factors that might be isolated and that are in the leading positions in relation to all the others are the availability of points of sale, the car purchase funding model, the competition and the influence on fixing prices. Of the 16 analyzed factors included in this block, the Foreign Investments and Market Liberalization factors, which were not graded with a mark above 3 on average (the median value), come to the forefront, which allows us to conclude that, according to the attitudes expressed by the respondents, they have slightly lesser significance for car manufacturing and sale in Serbia. In this phase already, a fact that the largest number of the analyzed variables (factors) were considered by the respondents as very significant for the development of car manufacturing and sale in Serbia was confirmed.

Table 2: In your opinion, provide grades for the factors significant for the development of car manufacturing and sale in Serbia ranging from 1 to 5 (1-the insignificant factor, 5-the highly significant factor)

	H	Arithmetic mean	Standard deviation
The availability of points of sale (showrooms)	60	4.3000	.64572
The car purchase funding model	60	4.3333	.60132
Foreign investments	60	2.4167	1.26614
Information technology	60	3.1333	1.03280
Competition	60	4.4500	.69927
Market liberalization	60	2.4667	1.53454
Political influence	60	3.4833	1.12734
Technical progress	60	4.2667	.63424
Social richness	60	3.8667	.83294
A new product	60	3.9333	1.23325
A new market	60	3.2000	.97076
Contemporary equipment	60	4.0500	.56524
An influence on price fixing	60	4.3667	.78041
Personal income	60	4.2833	.89868
Other income	60	3.3500	.86537
Income tax	60	3.5667	1.06352
Total H (the list)	60		

Source: Authors

In the continuation of the research, correlation analysis was performed as per all the pairs of the observed variables and, in the largest number of cases, statistically significant correlational dependence (< 0.05) was determined. Apart from the fact that the connection between the different pairs of the analyzed variables whose significance was being graded was confirmed, the first level of the factor analysis from the aspect of grouping the mentioned variables into certain groups (factors) was also ensured in that way.

The next level of the performance of factor analysis implies the performance of the selected sample adequacy test – Bartlett’s Sphericity Test. In Table 3 below, the results of this test are presented, from which a conclusion is made that the given sample fulfilled the assumption of adaptation, i.e. adequacy (< 0.05).

Table 3: The results of Bartlett’s Sphericity Test

Kaiser-Meyer-Olkin’s Sample Adequacy Test		.595
Bartlett’s Sphericity Test	Chi-Square	1088.225
	Number of Freedom Degrees	120
	p-Value	.000

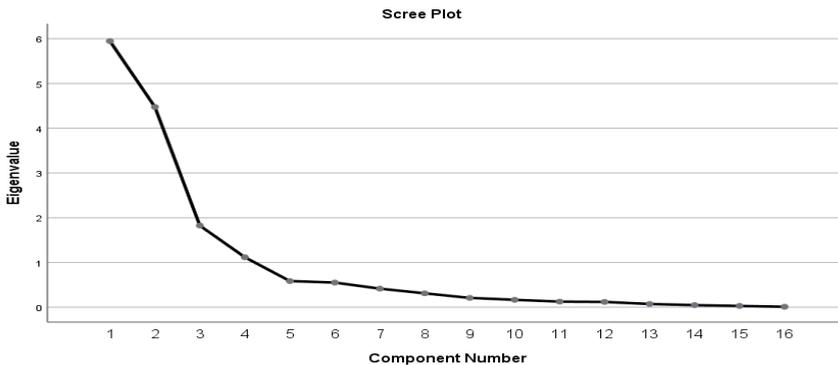
Source: Authors

In the next phase, communality values were calculated for all of the analyzed variables, based on which recommendations followed regarding which of them should be retained and which variables would be contained in the isolated factors. In order to ensure the condition that all the selected variables were contained in one single factor at the most, a rotation of the factors was performed by applying the varimax method, after which the factors by means of which the largest portion of the variability of the studied phenomenon (the development of car manufacturing and sale) could be explained were presented. Table 4 shows that as much as 83.52% of the total variability of the analyzed phenomenon can be explained by a total of the four factors selected by the main component method, which is also pointed to by the scree plot shown in Figure 1.

Table 4: The results of the main component analysis – the identification of the isolated factors

Integral part	Initial eigenvalues			Sum of Squares Extraction			Squared Loading Rotation Sums		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.947	37.170	37.170	5.947	37.170	37.170	4.336	27.099	27.099
2	4.476	27.973	65.143	4.476	27.973	65.143	4.262	26.636	53.736
3	1.823	11.396	76.539	1.823	11.396	76.539	3.274	20.462	74.198
4	1.117	6.979	83.518	1.117	6.979	83.518	1.491	9.320	83.518
5	.585	3.654	87.172						
6	.551	3.441	90.614						
7	.415	2.596	93.209						
8	.310	1.939	95.148						
9	.208	1.301	96.450						
10	.166	1.036	97.485						
11	.125	.781	98.266						
12	.119	.743	99.010						
13	.073	.455	99.465						
14	.047	.291	99.756						
15	.029	.182	99.938						
	.010	.062	100.000						

Source: Authors



Graph 1: The identification of the isolated factors – the Scree Plot

Source: Authors

In order to define the selected factors by which the analyzed phenomenon can be explained in the last phase of the factor analysis, i.e. the factors that explain the largest part of its variability, the known (usual) rule stipulating that those variables with a weight (loading) greater than 0.6 are retained inside the factors was applied. Table 5 below contains the obtained rotated solution of the selected factors with the associated variables to each one of them.

Table 5: The matrix of the rotated factors – the Varimax Method

	Integral part			
	1	2	3	4
The availability of points of sale (showrooms)	.936	.047	.043	.224
The car purchase funding model	.920	.104	-.039	.258
Foreign investments	-.138	.908	.071	.094
Information technology	.174	.793	.306	.329
Competition	.860	.117	-.041	.124
Market liberalization	.494	.220	.720	.092
Political influence	-.764	.772	.180	.310
Technical progress	.878	.236	.184	-.115
Social richness	.296	.528	.591	-.387
A new product	-.478	.408	.733	-.013
A new market	.652	.034	.274	.495
Contemporary equipment	.627	.297	.330	.171
An influence on price fixing	.076	.075	.876	.123
Personal income	.097	.311	.088	.823
Other income	-.580	.516	.529	.656
Income tax	-.450	.739	.360	.068

Source: Authors

The first factor to have been formed contains the six variables displayed in Table 6. Each of these variables is considered as exceptionally significant for the development of car manufacturing and sale in Serbia, which has previously already been confirmed by the results of the descriptive statistics of the grades for their significance assigned to them by the respondents. **By the analysis of the selected variables, it can be concluded that each one of them demonstrates direct correlation with the development of the dealer network as a whole, so this factor can exactly be named in that way.** The “availability of points of sale (showrooms)” variable has the greatest weight in this factor, which is simultaneously also one of the most significant determinants of the development of the dealer network.

Table 6: Factor 1

Variable	Entry
1 The availability of points of sale (showrooms)	.936
2 The car purchase funding model	.920
5 Competition	.860
8 Technical progress	.878
11 A new market	.652
12 Contemporary equipment	.627

Source: Authors

The next factor selected the four variables contained in Table 7, namely the variables: Foreign Investments, Information Technology, A Political Influence and Income Tax. Each of them simultaneously represents the component of the **macroeconomic stability** of a country, which consequently makes up the base for the development of car manufacturing and sale in our country.

Table 7: Factor 2

Variable		Entry
3	Foreign investments	.908
4	Information technology	.793
7	Political influence	.772
16	Income tax	.739

Source: Authors

Factor 3 (Table 8), which was formed by the performed multi-variation analysis technique, joined the variables: Market Liberalization, A New Product, and An Influence on Price Fixing, while simultaneously the greatest weight (loading) accounts for the last one. All the mentioned variables are simultaneously also directly connected with the development of the dealer network and macroeconomic stability as well, so they can be classified into both the first and the second previously formed groups (factors).

Table 8: Factor 3

Variable		Entry
6	Market liberalization	.720
10	A new product	.733
13	An influence on price fixing	.876

Source: Authors

Finally, the formed Factors joined the two variables of the Question 14 of the Questionnaire, those variables being Personal Income and Other income. In this case, the elements that basically determine the **income of the population** of every country are unambiguously in question, which further produces direct correlation with the development of car manufacturing and sale in that particular country. The dominant influence in this sense belongs to the Personal Income variable (Table 9).

Table 9: Factor 4

Variable		Entry
14	Personal income	.823
15	Other income	.656

Source: Authors

When the results of the conducted factor analysis are ultimately summed up together with the identified factors, a conclusion can be drawn that, in the context of their

influence on the development of car manufacturing and sale in Serbia, all the selected variables can be classified into the following three groups: the development of the dealer network, macroeconomic stability and per-capita income, which proves the assertion of this hypothesis.

The ancillary hypothesis (AH2): Vehicle maintenance and repair services considerably influence the purchase of cars.

In the procedure of the testing of the mentioned hypothesis, the respondents' answers contained in Question 15 were used. This group of questions pertains to the vehicle maintenance and repair services offered by car showrooms from the aspect of their influence on the purchase of a car. The testing was done as in the case of the hypothesis H0, given the fact that the identical research problem is in question. The results of the Wilcoxon Signed-Rank Test are presented in the following Table 10.

The results obtained are indicative of the fact that, in the case of 9 out of the 12 analyzed types of the vehicle maintenance and repair services which are available to the prospective clients of the car showroom, their influence on the very purchase of a car were confirmed. Namely, except for the case of the three types of the vehicle maintenance and repair services (i.e. chemical treatment, aluminum rims maintenance and repair and automatic gearbox maintenance and repair), the respondents consider all the other types of the vehicle maintenance and repair services as (very) significant from the point of view of their encouragement of/influence on the purchase of a car. Given the fact that, in 75% of the vehicle maintenance and repair service types that were analyzed, their significance from the mentioned point of view was confirmed, the assertion of this hypothesis can be considered as proven at the significance level of 5%.

Table 10: The results of the Wilcoxon Signed-Rank Test for the grading of the significance of the vehicle maintenance and repair services

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The mean value of regular vehicle maintenance and repair equals 3.000.	Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
2	The mean value of the vehicle air-conditioning equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
3	The median of tire maintenance and repair services equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
4	The mean value of chemical treatment equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.866	Retain the Null Hypothesis.
5	The median of brake maintenance and repair equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
6	The median of the vehicle exhaust pipe maintenance and repair equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.

7	The median of the vehicle chassis maintenance and repair equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
8	The median of the aluminum rim maintenance and repair equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.423	Retain the Null Hypothesis.
9	The median car maintenance and repair equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.239	Retain the Null Hypothesis.
10	The mean value of engine injectors equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
11	The mean value of electrical installations equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
12	The median of the other vehicle maintenance and repair services equals 3.000.	Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
The used significance level is .05.				

Source: Authors

The ancillary hypothesis (AH3): Performance parameters influence buyers' choice of a car.

To test this hypothesis, the section contained in Question 16 of the Questionnaire was used. This group includes the respondents' attitudes towards the influence of the individual performance parameters of a car on car buyers' choice of a car. The results of the conducted Wilcoxon Signed-Rank Test are contained in Table 11. The formal statistical test that was done confirmed the initial assumptions.

Namely, it was proven for the following performance parameters: the electric motor, the hybrid engine, change in power with change in speed, and the number of cylinders in the engine, that the null hypothesis about the equality of the median of the examined factors was rejected; but, given the fact that the average grade for the mentioned factors was below 3, it can be considered that they do not create an influence on individuals when making a choice of a vehicle.

Regarding all the other performance parameters that were analyzed, it was also confirmed that the null hypothesis was rejected; however, the average values of the grades for significance for those characteristics highly exceeded the median, which finally confirmed their (significant) influence of the choice of a vehicle. Given the fact that a statistically significant connection with the choice of a vehicle was determined in the case of 67% of the analyzed vehicle performance parameters, the assertion of this hypothesis can also be justified, with the previously used risk of error.

Table 11: The results of the Wilcoxon Signed-Rank Test for the grades for the significance of the vehicle performance parameters

Hypothesis Test Summary				
	Null hypothesis	Test	Sig.	Decision
1	The median power of the engine power equals 3.000.	Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
2	The mean value of the number of rotations equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
3	The mean value of the speed characteristics equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
4	The mean value of the loading characteristics equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.866	Retain the Null Hypothesis.
5	The median of the regulator characteristics equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
6	The median of the speed characteristics at the maximum loading equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
7	The mean value of the diesel engine equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
8	The mean value of the petrol engine equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
9	The mean value of the electric motor equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
10	The mean value of the hybrid engine equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.000	Reject the Null Hypothesis.
11	The median of changes in power with change in speed equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.013	Retain the Null Hypothesis.
12	The mean value of the number of cylinders in the engine equals 3.000.	One-Sample Wilcoxon Signed-Rank Test	.045	Retain the Null Hypothesis.
Asymptotic significances are displayed. The significance level is .05.				

Source: Authors

Conclusion

The increasingly pronounced globalization of the market has been changing the competitive structures of the world, offering increasingly strong competition on all fronts. The automotive industry has been gaining in significance in the business operations of companies of all sizes, as well as for all consumers and national economies. Business organizations must devise and apply the appropriate strategies that will enable them to absolutely use up the key potentials and resources and, in return, create and maintain advantage over their main competitors if they want to survive and develop in today's changeable and complex business environment.

The basic (H0) hypothesis and the three ancillary hypotheses (AH) have been confirmed, as well as the contemplative assumptions about the outcome of the solution to the scientific problem of the research: H0 – The greater the degree of the dealer development in Serbia, the stronger their influence on the Serbian automotive market. AH1 – The following factors have the biggest influence on car manufacturing and sale

in Serbia: the development of the dealer network, per-capita income and macroeconomic stability. AH2 – Vehicle maintenance and repair services considerably influence the purchase of cars. AH3 –Performance parameters influence buyers' choice of a car. Attracting new foreign direct investments in the Serbian automotive sector is the key to the development of the domestic economy and an increase in the competitiveness of the automotive sector, which as such will have the potential and an opportunity to become competitive with the automotive sectors of the analyzed countries of the Višegrad Group. All in all, the evidence points to the fact that future opportunities will be surpassing challenges.

As directions for further work on this research, the improvement of the preliminary solution to the optimal model that will indicate the comprehensive positive or negative influence of the individual factors of dealers' influence on the placement of cars in Serbia is proposed.

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