

DOI: <https://doi.org/10.46793/6461-101.4485>

Original Scientific Article

NEW OPPORTUNITIES FOR THE APPLICATION OF DIGITAL TECHNOLOGIES IN BUSINESS FROM THE ASPECT OF ENVIRONMENTAL PROTECTION

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Abstract: In this study and research work, new possibilities of application of software, methods, techniques and tools based on business intelligence and intelligent business systems from the aspect of sustainable development and environmental protection will be presented. In the theoretical part, the analysis of recent scientific and professional literature in the field of application of business intelligence and methods, techniques and tools in the function of business optimization and environmental protection and sustainable development was undertaken. In that part, the theoretical foundations of business intelligence, decision support systems, GIS software, OLAP technology, as well as techniques for discovering knowledge in data - Data mining - will be presented. The paper will analyze the current state of application of business intelligence concepts in business systems in the Republic of Serbia. The results of the survey conducted in small and medium-sized enterprises in Serbia, different in type of activity, ownership and organizational structure, on a representative sample unequivocally indicate that: Intelligent decision support systems functionally influence the improvement of the business of small and medium-sized business systems, forming a positive attitude about the effects of the application of the development of intelligent decision support systems in enterprises. In this context, for the needs of the research, a survey was conducted in a specific business system engaged in the production and sale of wood products, where the possibilities of applying new sophisticated technologies in the function of optimizing business operations and environmental protection and sustainable development were explored.

Keywords: *business intelligence, GIS software, Microsoft ProClarity, OLAP, data mining, green economy.*

INTRODUCTION

In today's world, modern businesses and organizations must continuously change and adapt. One of the approaches that is increasingly being used for this purpose is the digital transformation of business. In this regard, the concept is extremely important, which represents the integration of digital technologies in sustainable development, opens up the potential for solving environmental problems and creating more sustainable societies. The literature states that digitization involves the integration of digital tools and systems into various aspects of a company's operations, from management and communication to production and customer service [17]. Numerous studies in the world are trying to provide answers to the behavior of companies in the conditions of increasingly competitive business and the economic crisis. One of them shows that employers in Serbia usually fight the crisis by laying off workers and freezing wages. In the modern business world, digital transformation and sustainable development are emerging as key concepts shaping the future of our society and economy. In order to remain competitive, they must respond to

changes in the environment and customer requirements [18]. Today, digital transformation is at the forefront of business and technological strategies, and its alignment with environmental protection and sustainable development goals has become a key issue. Research indicates that recently, in the world, in the context of the economic crisis, almost half of respondents (47%) stated that their company had already laid off workers, while 46% stated that their salaries had been frozen. Digital transformation, defined as the use of digital technologies to transform business processes and social practices, is becoming a central pillar of modern development. In this context, companies and business systems today must be proactive, innovative and creative. One of the goals of this paper is to shed light on how digital technologies can accelerate the transition to more sustainable and environmentally friendly business. In the aforementioned research, 36% of respondents stated that the companies they work for have frozen financing for new projects, 33% that salaries have been reduced, while 32% of respondents stated that education costs have been cut. All this points to the fact that we live in an extremely technologically advanced but turbulent world. In this sense, a green digital transformation is emerging that combines technological and sustainability aspects and promotes innovative approaches to solving environmental and social challenges. Some authors state that it has a great impact on companies, because more competitive and intelligent companies will win the competition [12]. The literature states that the growing prevalence of digital technologies and platforms in many industries raises concerns about their negative impact on the environment, society, and economy [2]. The following Figure 1 presents the relationship between digital technologies and sustainable development and green economy..



Figure 1. Digital technologies and sustainable development [15]

Today, green digital transformation involves the use of advanced digital technologies – such as artificial intelligence (AI), the Internet of Things (IoT), blockchain and

big data analytics – to improve environmental outcomes and promote sustainable development. In this context, one of the most appropriate ways to create a competitive advantage for SMEs in Serbia, in the current conditions of the global economic crisis and recession, is the concept of business intelligence (BI). Given that companies and organizations are currently overwhelmed with data, a critical component of the success of these companies is the ability to use all data, information and knowledge [11]. It is known that business intelligence is the process of collecting significant internal and external data and transforming it into information and useful new knowledge needed by SMEs when making business decisions [14]. Research results show that business intelligence is important today for supporting business decision-making from the perspective of environmental protection and sustainable development. In companies, business intelligence promises many positive things, however, when implementing such a system, the company may encounter some obstacles or challenges. In practice, many digital business transformation projects are considered unsuccessful. Some estimate that this percentage is higher, around 70–80%, while others estimate that it is somewhat lower, around 65–70% [18].

Characteristics of technology and business intelligence tools

Modern IT today, through business intelligence and business intelligence systems (BIS), provides key information to businesses and represents an important challenge for all business systems and businesses [14]. Well-known authors state that a business intelligence system is generally known as a set of technological solutions that facilitate the collection, integration and analysis of large amounts of data for organizations in order to understand their capabilities, strengths and weaknesses [1]. According to eminent authors Liautaud & Hammond, today modern IT and the information systems (IS) developed on them are becoming a strategic tool for businesses and over time the overall success and business prospects depend on them [9]. Despite the above-mentioned advantages, practical results show that the rate of successful implementation of digital technologies is low, because implementation is not very simple in practice [10]. The key to the success of the BI concept lies in the ability to provide business users, for the purposes of making business decisions, with quick and easy access to information stored in data warehouses, which is necessary for generating multi-dimensional queries, which are most often asked in the decision-making process. One way to access this information is to use the so-called interactive analytical processing technology - OLAP. Eminent authors Golfarelli, Rizzi, Cella, point out that OLAP is the most important and most widely used component of business intelligence for these purposes [7]. The final manifestation of data warehousing is the process of discovering knowledge from data (Data Mining), that is, finding hidden trends, models, regularities and relationships between data. In addition to the above technologies and tools, other sophisticated technologies are also applied in practice in the function of business from the aspect of the green economy.

Effects of application of methods, techniques and tools of business intelligence in practice

The analysis of professional literature and practical examples confirmed that digital transformation in modern companies is not just a technological process, but a comprehensive strategic direction that can enable a company not only to achieve greater operational efficiency and innovation, but also to improve sustainable performance. The effects of the development of intelligent decision support systems in SMEs in forestry will be briefly presented below, through an informative description of the information system in forestry in the Republic of Serbia, while the main part of this part of the paper will be based on the presentation of the results of the application of an intelligent decision support system in the private forest estate "Lipovica". In this direction, all the needs of the enterprise, i.e., the forest management, were taken into account, and the best ways to realize those needs were considered. The positive effects of the application indicate that the percentage of assortment loss due to unauthorized logging, fires, and destruction by visitors has decreased by 14% compared to the previous year, which represents a significant increase in the financial profit of the company, but above all, it is seen as an indispensable process in the protection and preservation of the environment, sustainable development, goods, and human lives. Data analysis allows organizations to obtain information that helps identify specific areas in which measures can be taken to reduce environmental impact. By introducing a single information software solution into all organizational units of the company "Lipovica", multiple benefits have been achieved, communication with customers and suppliers has been facilitated, as well as internal communication within the company itself. Thus, communication between commercial and finance has now been significantly reduced, because information is entered by those who create it, while bearing responsibility for what has been entered, and both can access all the data they need themselves. Big data analysis applications are changing the way environmental impacts are measured and mapped. Thanks to the successful implementation of OLAP functionality in the Lipovica company, management concluded that in a period of 5 years it is possible to expand capacities by 24% and redistribute planting and cuttings, which would bring a total profit of 48% compared to the current period. The application of the Data mining concept led to many significant information that was of exceptional importance for supporting the decision-making process in further business, the company made certain savings and increased the profit of the Lipovica forest farm. The inclusion of green innovations in digital strategies led to greater energy efficiency, reduced emissions and smarter use of resources in the companies observed. The following diagram 2 shows the results of a survey conducted in SMEs in Serbia, different in type of activity, ownership and organizational structure, on a representative sample in order to confirm the hypothesis that: Intelligent decision support systems functionally affect the improvement of the operations of small and medium-sized business systems by forming a positive attitude about the effects of

the application of the development of intelligent decision support systems in the company. Serbian small and medium-sized enterprises are part of the value chains of European and global companies, which create and will create increasing positive pressure on the green transition and digital transformation.

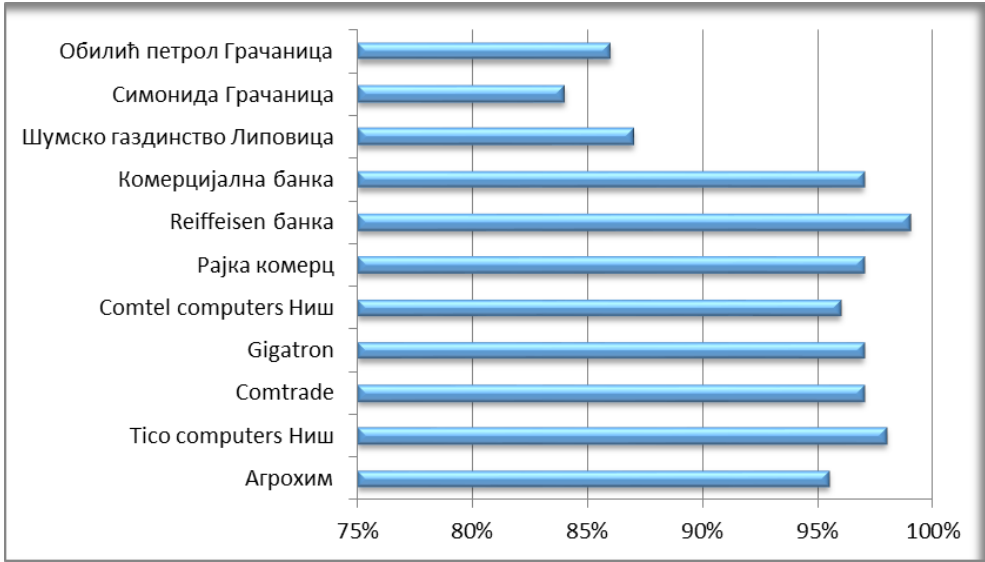


Figure 2. Business improvement using intelligent decision support systems [4]

MATERIALS AND METHOD

The paper will use the combined qualitative and quantitative research method [13]. Initially, a descriptive approach will allow us to conduct a comprehensive review of the literature, including scholarly articles, research, books, reports and online resources dealing with the concepts of applying digital transformation and sustainable development. After that, an analysis method will be applied that will allow us to study in detail practical examples of companies and business systems that successfully implement digital technologies in business from the aspect of green digital transformation. Using combined methods and the method of analysis, we will review and connect theoretical positions and facts from practice into a whole. The results, that is, the various findings of the authors and their views will be summarized using the compilation method. Based on this, we will form our own opinion on certain findings, which will contribute to a comprehensive understanding of the issues discussed in this research.

RESULTS

Research results indicate that digital technologies and artificial intelligence will completely change the nature of work in some sectors, and employees will have to get used to this change. The latest definition of artificial intelligence can be found in Gartner (2025), which defines artificial intelligence as a set of technologies and methods that enable systems to perform complex cognitive functions characteristic of the human mind in an automated manner, such as perception, learning, reasoning, and adaptation to new information. One of the predictions for the future of business is that every job will quickly become obsolete, so we will be under constant pressure to acquire new competencies [5]. Numerous analyses of business opportunities in Serbia indicate that very few companies can boast of fully using the capabilities of digital technologies BI and BIS, and the advantages provided by modern IST (English Information communication technology) and the existing state of their computer equipment. Research indicates one problem, which is the low use of digital technologies and AI tools. Although business intelligence is often mentioned in companies in Serbia today, unfortunately, the business discipline is still used negligibly little. In practice, companies often state that, in the application of digital technologies, despite the fact that employees have the appropriate competencies, they prefer to use external consultants, since managing their own teams is often more difficult and slower. The data is disappointing that only about 15-19% of employees use AI tools. As many as 54% of business users cannot find the necessary information, 43% are not sure whether the information they receive is accurate, while 77% claim that bad decisions are made solely due to a lack of information. In practice, it is found that AI users spend 38% of their available time collecting and analyzing data, while those who do not spend 72% of their available time. Research shows that the implementation of digital technologies and AI in enterprises brings many benefits, such as faster processes, improved data analysis accuracy and greater business efficiency, which allows companies to become more competitive in the market and improve their service offering. The interdisciplinary approach of artificial intelligence, which combines elements of computer science, statistics and cognitive science, provides the basis for developing solutions that support strategic decision-making and improve operational efficiency in the modern business environment (Gartner, 2025). However, despite the fact that the latest research in the world indicates that, for example, out of 43 American companies that participated in the research, 46% achieved 100% or less return on investment, 34% between 101% and 1000%, and 20% around 1001% and more, they are still not applied to enterprises in Serbia to the necessary and sufficient extent. The results show that companies and organizations that have managed to combine digital opportunities with responsible and sustainable operations prove to be more resilient, innovative and better prepared for future business challenges.

DISCUSSION

Digital transformation refers to the integration of digital technologies to increase productivity and economic efficiency. Recent research indicates that, thanks to the application of modern IT, business in the next ten years in enterprises and business systems around the world will change more than in the last fifty years. In the future, those companies that can think technologically and ethically, innovatively and responsibly at the same time, will have a competitive advantage. Green transition and digital transformation occupy the highest places in the business plans of companies and in the development agendas of countries around the world. Eminent authors Williams & Williams point out that although the mission of digital technologies, or IT, is to support the business of enterprises, in practice this may differ and may vary depending on the level of IT development in an individual enterprise [19]. The results show that companies use advanced digital technologies to identify and acquire more network resources, follow market trends and consumer needs, and accelerate the formation of green innovative ideas while building their resource networks [8]. More than 4,000 companies and 70 countries around the world have set net-zero goals, and the recent pandemic has greatly accelerated the process of digitalization. However, according to some surveys, more than 90% of larger and successful companies in Europe use some form of digital technologies, data warehousing and BI, while in Serbia the figure is still less than 10% [3]. Despite the fact that research into companies and business systems in Serbia indicates that they are increasingly encountering problems in their operations that arise due to: lack of quality information for the needs of the management and decision-making process, insufficient operational support, weak analytical data processing, poor data organization, and the like. If the above figures are presented as a payback period for the invested funds, the situation is as follows: 49% of companies recovered their BIS investments in one year or less, 32% in a period of one to three years, 19% in three or more years. The results of research around the world indicate that a typical digital transformation or business intelligence project has an average return of over 430%. In this context, it can be said that companies and business systems are today at a critical point where digital transformation can be a decisive factor for long-term survival - but only if it is closely linked to the principles of sustainability and social responsibility.

CONCLUSION

Based on the above, the conclusion is that digitization today represents one of the most important factors affecting the competitiveness and long-term success of modern companies and organizations. Business systems and organizations are increasingly overwhelmed by huge volumes of business data. In this sense, one of the

main ways in which big data and analytics in the digital economy contribute to sustainability is by providing sophisticated instruments for monitoring and monitoring the impact on the environment. The implementation of digital transformation in an enterprise can be an organizationally demanding process with major consequences for the entire organization and all its business processes. Research indicates that the process of digital transformation, if it is strategically and responsibly directed, goes beyond mere technical-modernization aspects and significantly contributes to the achievement of broader goals of sustainable development. It is important to emphasize that digital technologies alone do not guarantee success if they are not accompanied by a change in the way of thinking, acting and collaborating within the company and organization. The results of the research show that, despite the existence of individual digital tools in most companies, digital technologies such as business intelligence or artificial intelligence are still not systematically integrated into all business processes. Digital transformation is changing the fundamental rules of business of organizations, enabling a faster response to changes in the environment, improved user experience, greater operational efficiency and encouraging the development of innovation. The pursuit of a faster and more efficient way of doing business through the digitization of business processes brings numerous changes and results to the business environment. Research has shown that a successful green digital transformation is the result of a synergy between digital technology, vision and values - and it is these synergies that should become the foundation of a modern sustainable economy. Investments in digital and green technology have significant potential to improve the prospects for economic and business progress in general.

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