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Business Assessment of the Indirect Added Value of AI

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Abstract

In recent years, organizations increasingly utilize artificial intelligence solutions aiming for optimization, increase of quality, and gaining competitive advantages. Significant investments are being made in personalization and integration of intelligent technologies into companies' operations. At the same time, business organizations are concerned with return on investment, both financially and non-financially, trying to estimate the indirect added value of AI implementation in business processes. This article analyses the findings of a survey, conducted with 125 Bulgarian business enterprises, regarding the evaluation of key metrics that contribute to an increase in the business's indirect added value following the implementation of AI technologies. The main groups of investigated factors consider AI application in marketing, quality management, human-AI interaction, influence on business processes.

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1. Introduction

The application of artificial intelligence in individual business processes and the overall activity of companies is becoming an increasingly significant factor for business survival and competitiveness. In order to determine the importance and added value it provides for business development, we will determine some of its key contributions in individual business areas. First, let's look at marketing. It is defined as one of the activities that most widely use the advantages of AI. The added value here is expressed in areas such as: significantly higher level of convenience and speed when shopping and security and reliability of payments (Jarek and Mazurek, 2019); more complete user experience (Souza at al. 2019); higher consumer-brand connection (Davenport, Ronanki, 2018); AI identifies and predicts development trends (Dumitriu and Popescu, 2020), (Biolcheva, 2023).

Another significant field of application can be found in quality management. The added value of AI is aimed at: higher optimization of reliability, accuracy, efficiency and duration of quality control processes (Narasimhan, 2023); strict compliance with quality standards (Narasimhan, 2023); full automation of quality management tasks (Nosova, at al. 2022); high degree of integration and high scalability (Narasimhan, 2023).

Next, human resources stand out. AI increases precision excluding human subjectivity in personnel selection; automation of processes in human resources; personalization in pay; saving time and reducing costs for qualified personnel (Nawaz, at al.2024).

Finally, the process of communication with the organization's stakeholders is considered here. This is where the significance of AI capabilities stands out. They can be synthesized in activities such as: identification and systematization of the profiles of interested parties; providing personalized content to individual stakeholders, depending on their profile; improving interaction between stakeholders, through better communication and feedback; measure stakeholder impact (Potier, 2023).

These are only a small part of the activities that are carried out in business organizations and their increased efficiency as a result of the use of various artificial intelligence tools. Linking the individual activities causes a synergistic effect, which necessarily increases the added value of the entire organization. Although this is a known fact, there are still a number of financial and other subjective factors that impose barriers to the transition to intelligent business management for a number of companies. This provoked the authors of this paper to ask the following research question: what are the challenges of using artificial intelligence in business and what is the added value once intelligent technologies have been implemented. With this research, we aim to get feedback from high-tech companies of different sizes and internationalities and refine the main areas of added value from the use of AI that they identify. In order to reach an answer to the question posed in the following chapters, we successively consider: the background of the added value, the method of research of the respondents, the results of the research of 125 business

organizations working in the sector of high technologies or services, discussion and conclusions of the conducted research.

2. Background Of Added Value

Added value creates the additional utility and/or value that can be attributed to the final product as a result of the transformation in the organization. Obtaining a greater value, the product increases its qualities, leading to an increase in the competitiveness of the business organization (Penfield, at al. 2014). Value added has many different expressions that can be explored, both individually for specific factors and in relation to their interrelated nature. For example, qualitatively improved production obtained through increased efficiency leads to added higher consumer value (Jensen, at al. 2012). According to Ramírez and Wallin (2000), the value creation of a product depends on the product's participation in the customer's own value creation, or this is the so-called joint added value. Most often, the direct expression of added value can be measured through the financial indicators and the difference between sales revenue and all costs included in the cost price. It is easy to establish even in the short term. It is more challenging to define the indirect one with all the expressions, deviations and effects manifested in business organizations. The challenge becomes even greater when it comes to calculating the added value for the business obtained as a result of the use of artificial intelligence. The scientific literature provides information on research in which the added value is measured with the help of AI (Enholm at al. 2022), (Wamba-Taguimdje, at al. 2020), (Gregory at al. 2021) but there is not enough information on how to investigate the indirect added value, as a result of the use of artificial intelligence. This gives us reason to conduct an empirical study following business organizations that use various AI-based applications and tools and analyze in which directions they have found an increase in value.

3. Method

The research was conducted among 125 business organizations from the high-tech industry and the service sector on the territory of Bulgaria. The choice of these companies is dictated by their publicly known positive opinion towards working with artificial intelligence. The study was conducted with the assistance of the Bulgarian Association for Corporate Security (BACS) and the Southeast Digital Innovation Hub.

The survey was conducted through an online questionnaire, guaranteeing that the respondents will answer impartially and anonymously, without being influenced by outside factors. The survey includes 20 closed-ended multiple-choice questions. The first group of questions has an introductory nature and aims to establish the type and size of the respondent company. The second group of questions clarified the attitude towards AI, the types of intelligent tools used and the extent of their use by the respondents. The third group of questions asks respondents to rate from 1 to 7 (in ascending order of the number) the contribution of AI in a certain direction.

The period in which the survey was conducted was the second quarter of 2024. The results were processed using an online statistical tool. Their analysis aims to establish the general attitude of high-tech companies to the use of artificial intelligence.

4. Results

The companies, which took part in the survey are both national and international and are of different sizes. Almost half of the respondent companies are big and international. It is interesting to note that related to the question of having experience with AI, most of the small and national companies show that they have no to little experience with such types of technologies. The experience of most of the small and national companies with AI starts in the last 2 years (42% of this type of respondents). The main motivation in using AI by Bulgarian companies is the strive to increase the efficiency of production processes (76 companies or 46% of all respondents). Other motives are competitive/market pressure (36 companies), fulfilment of company goals (42 companies) and curiosity (5 companies).

The companies' experience in using AI technologies is limited. Most of the companies use chat and content generation clients, and individual tools for specific processes (70% of all companies). Figure 1 shows that 26 companies have no experience with AI and as it was discussed above these are all national and small business organizations.

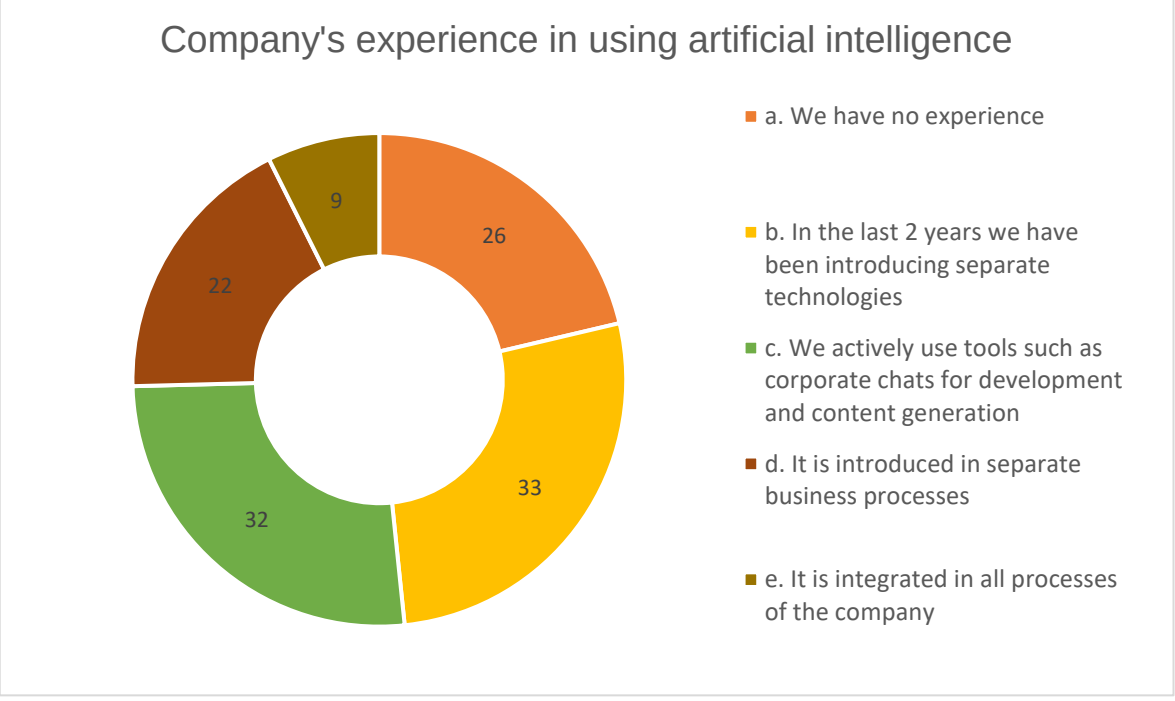

Figure 1: Experience in using AI technologies of companies in Bulgaria from the high-tech and service sectors

As to type of AI technologies used, most companies utilize Machine Learning and Natural Language Processing Models (35%), followed by Computer vision technologies (31%) and Neural Networks (20%) (see Figure 5). Both big and small companies use Machine Learning AI tech, and while this is the main type of AI technology used by small companies, the big companies use a much bigger variety of AI tools. It should be noted that Bulgaria has a recent AI strategy adopted in 2020 (Bulgaria AI Strategy Report, 2020), which aims to support the business and development of AI technology. It has several objectives, including nurturing a solid knowledge and skills base in AI, developing a strong research capacity for scientific excellence, and supporting innovations to foster the implementation of AI in practice. It also underlines ethical guidelines and regulatory frameworks that make sure AI is used responsibly. This collaboration with the European and international partners should be fostered to fall in line with other broader EU initiatives and standards. Key areas identified for AI application included healthcare, agriculture, and transportation, where AI will fuel efficiency and innovation. It also strives to establish a proper data ecosystem-to provide access to data for training AI with regard to privacy and security. AI literacy will be promoted among citizens for raising awareness about AI technologies and their possible impacts. Generally, the strategy is supposed to make Bulgaria competitive in the global landscape of AI and we expect that the use of AI technologies in the future will grow exponentially.

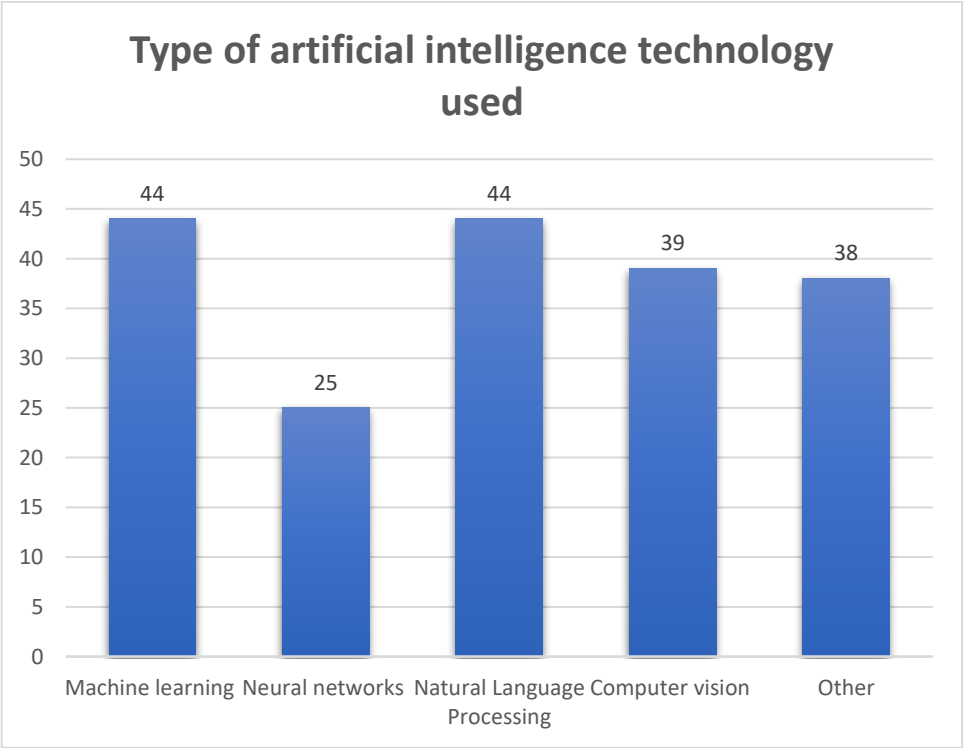

Figure 2: Type of AI technology used by Bulgarian companies in the high-tech and service industries

The main challenges that the companies face in using AI technologies are the reliability of the obtained results (41%), the acquisition of a quality database (40%), the trust of staff and partners (39%), the training of staff (35%). These challenges confirm some of the findings of the EU Commission on the perspectives on artificial intelligence in Bulgaria (see Topolsky, K., 20224). A critical issue is the need for a robust digital infrastructure that can support advanced AI applications. Furthermore, there is a shortage of skilled professionals trained in AI technologies, which hampers growth. The country also grapples with insufficient funding for AI research and development, limiting the ability of local startups to innovate and compete.
Huma-AI interaction is also a significant challenge for Bulgarian companies (see Figure 3).

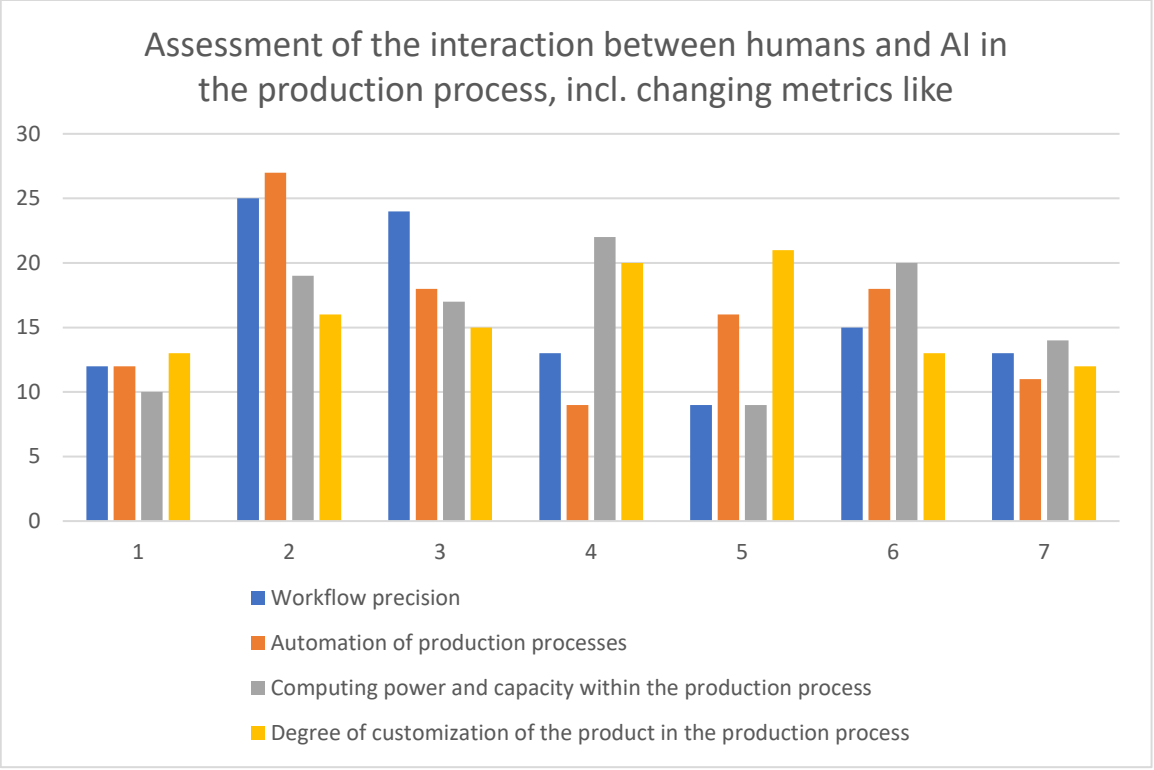

Figure 3: Interaction of human-AI interaction in the production process of Bulgarian companies in the high-tech and service industries

Between 42% and 48% of the respondents evaluate the human-AI interaction in workflow precision and automation of production process with marks 1 to 3. The better human-AI interaction is noticed in the fields of computing power and capacity within the production process and degree of customization of the product in the production process. Over 50% of companies evaluate this type of interaction with marks from 4 to 7. Bulgarian companies consider that the use of AI increased the degree of automation in production and/or (decreasing) production time, but not

significantly. The companies (68%) evaluated the help of AI in increasing the automation and decreasing the production time with average marks (3-5).
Even lower are the marks of companies in their evaluation how AI supported the optimization of precision of work and adherence to standards, monitoring the technical condition of the machines, refining the process in terms of type and qualities of the materials and working process (see Figure 4). 53% of companies evaluate the optimization of working process with marks from 1 to 3; with the same low marks (1-3) 52% of companies evaluate refining the process in terms of type and qualities of materials; 51% of companies evaluate with marks 1-3 the use AI in optimization of monitoring the technical condition of the machines and
49% of companies evaluate with marks 1-3 the use AI in optimization of precision of work and adherence to standards.

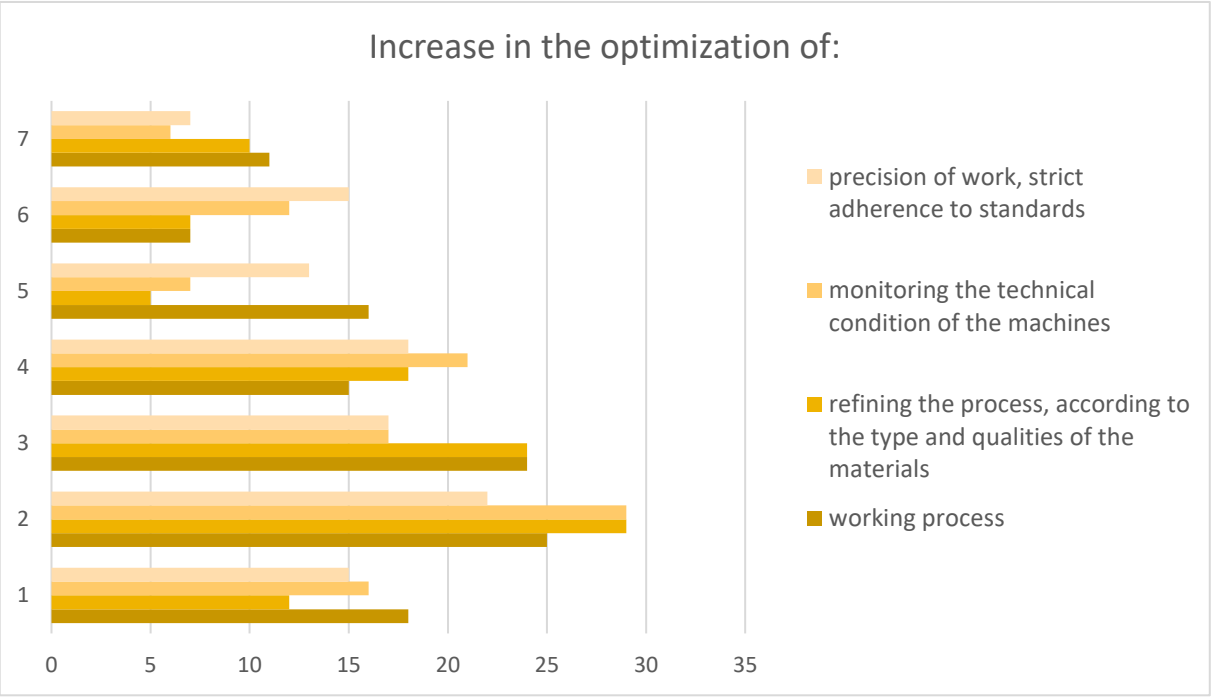

Figure 4: Increase of optimization in specific business processes using AI in Bulgarian companies in the high-tech and service industries

The survey results show that compared to technical optimization of processes, economic optimization is achieved to a higher extent. Economic optimization is investigated in terms of reducing costs of raw materials, labor costs, Increasing profit. 77% of companies evaluate the economic optimization achieved by AI implementation with marks higher than 3. Half of the companies interviewed, pointed mark 4 (29 companies) and 5(26 companies) for that kind of optimization. Companies see the biggest advantages of AI in relation to marketing processes – quality of product/services delivered to customers, level of convenience and speed

when shopping, increasing the level of personalization of the customer experience, increasing the consumer-brand connection, creating innovation in design, incl. through electronic virtual reality systems, increasing the reputation and transparency in companies' activities.

AI has transformed the marketing landscape in Bulgaria and provided unparalleled opportunities to enterprises to begin reimagining their processes, improve customer relationships, and generate outstanding experiences:

- Personalized Marketing: AI enables companies to gather and analyze vast amounts of customer data, allowing for highly targeted and personalized marketing campaigns.
- Improved Customer Segmentation: AI, by finding unique customer segments based on preference, demographic, and behavioral sources, allows for the tailoring of marketing at distinct audience levels.
- Better Customer Experience: AI-driven chatbots and virtual assistants will be able to provide instantaneous customer support, answer queries, and resolve issues with efficiency, thereby increasing overall customer satisfaction.
- Predictive analytics: AI can predict customers' future behaviors so that businesses can anticipate the needs and provide proactive solutions to reinforce customer relationships.
- Intelligent Content Creation: AI can create personalized content, like product suggestions and email campaigns tailored to the customer's needs, thereby enhancing customer engagement.
- Social Media Management: AI-powered tools can automate tasks on social media, monitor sentiment analysis, and spot influencers to help companies effectively reach their target audience.
- Data-Driven Decision Making: AI delivers rich insights into customer behavior and market trends that really help businesses make informed decisions and deploy resources judiciously.
- Enhanced Marketing Automation: AI streamlines repetitive marketing tasks, freeing up marketers to focus on more strategic initiatives.
- Improved Customer Loyalty: With the delivery of personalized experiences and quick responses to customer queries, AI will enhance customer loyalty and reduce churn.
- Competitive Advantage: Companies that apply AI properly can get an edge over their competition by proposing more relevant and catchy marketing campaigns.
- Cost Reduction: AI will automatically perform tasks and improve processes, which reduces many costs for marketing departments.
- Real-Time Insights: AI enables companies to monitor and analyze marketing performance in real-time, allowing for quick adjustments and optimizations.
- Scalability: AI can handle large volumes of data and scale marketing efforts to meet growing customer demands.

- Innovation: AI motivates innovation, enabling new marketing methods and tools that were previously unimaginable (see Figures 5 and 6.)

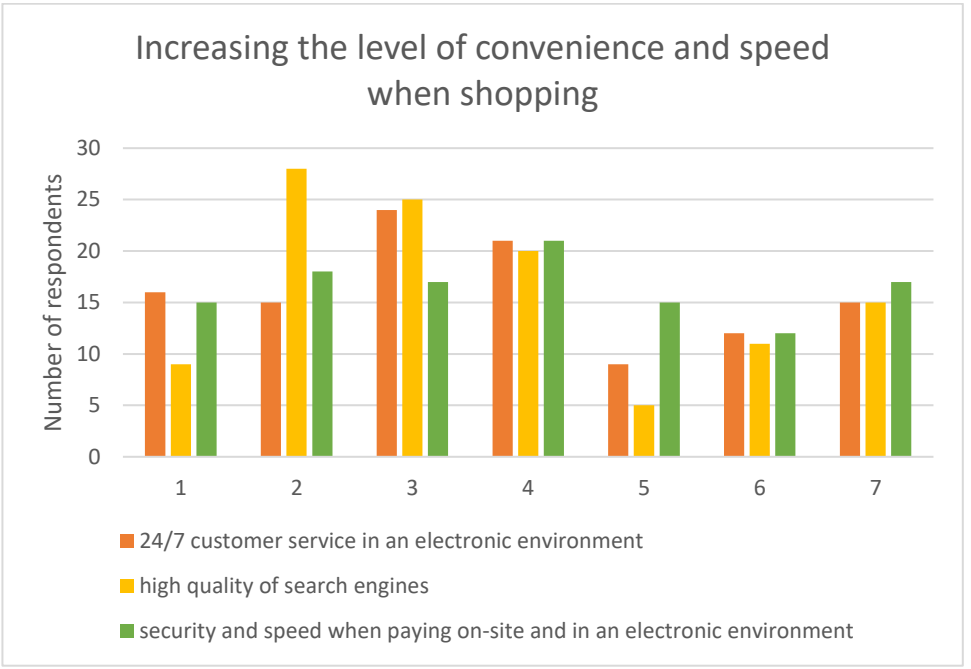

Figure 5: Increased level of convenience and speed when shopping by using AI from Bulgarian companies in the high-tech and service industries

Figure 6: Increasing the level of personalization of customer experiences by introducing AI in the marketing process by Bulgarian companies in the high-tech and service industries

5. Discussion and Conclusion

The results of the research show that various artificial intelligence tools are permanently entering the practice of the respondents, most often using machine learning, and for a large part of them also applications with other intelligent tools. Answering the first part of the research question posed in this article, we must say that businesses still face a number of challenges in both the introduction and use of smart tools. This is primarily due to the fact that there is a lack of a quality base on which to start the processes related to the training of intelligent systems. However, the most important thing in the article is to establish in which directions the added value is expressed, as a consequence of the use of AI. In this regard, the following summary can be made: AI adds value in all research areas related to the group of cognitive factors:

- A higher degree of automation and optimization, including the work process, work precision and compliance with set norms and standards;
- Higher direct return and economic optimization, including reduction of costs of raw materials, materials and labor and increase of profit;
- Better marketing, including a stronger connection between consumer and brand; increasing the level of personalization of the customer experience.

All this gives reason to conclude that companies using artificial intelligence report increased added value, both in terms of its direct return and through indirect indicators, including in the form of increased positive reputation. This conclusion can give grounds for switching to intelligent business management for business organizations that are still hesitant to implement it.

Acknowledgements

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