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# From Awareness to Action: Preparedness of SMEs for Artificial Intelligence Implementation in North Macedonia and Serbia

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**Abstract:** Artificial Intelligence (AI) is growingly recognized as a critical factor in fostering innovation and strengthening competitiveness within contemporary enterprises. As regards digital transformation, AI technologies are reshaping traditional operating models and enabling the optimization of core operating processes across various sectors. Small and medium-sized enterprises (SMEs) in the Republic of North Macedonia and the Republic of Serbia despite being key drivers of economic activity and employment, encounter considerable challenges in integrating AI into their daily operations, in contrast to larger enterprises that typically possess greater resources and structural capacities for technological adoption. The focus of the paper is to assess the level of awareness, viewpoints, and preparedness of entrepreneurs from both countries regarding the implementation of AI within their business strategies. Accordingly, the research examines the main sources of information available to SMEs, the extent to which planning processes incorporate AI adoption, the perceived limitations and associated risks, as well as the need for adequate professional expertise and institutional support to advance digital transformation.

***Keywords:*** *artificial intelligence (AI), digital transformation, small and medium-sized enterprises (SMEs), business policy.*

## Introduction

During the digitalization age, artificial intelligence (AI) is gaining prominence as a transformative force within contemporary business environments. It is instrumental in redefining operational models and enabling comprehensive improvements in organizational performance. Increasingly recognized as a significant driver of innovation and market competitiveness, the integration of artificial intelligence (AI) spans multiple business domains, enabling the automation of routine activities, efficient data processing, market trend prediction, and more informed strategic planning. Artificial intelligence offers a several advantages over information based on financial statement analysis (Mitrović et al., 2025).

Regarding digital change, it is very important to have collaboration among enterprises, policymakers, and researchers in facing the challenges and risks of information transformation, as well as ascertaining that its benefits are distributed equally among all stakeholders. This necessitates a collaborative and multidisciplinary strategy that includes the creation of new rules, regulations, and frameworks to enable the digital transformation of enterprises and communities (George, 2024). The European Commission, in April 2021, proposed the EU's inaugural artificial intelligence (AI) legislation, which outlined a classification system based on levels of risk. Artificial intelligence technologies applicable to various domains are systematically analysed and classified in accordance with their potential risk to users. The different risk degrees mean more or less artificial intelligence (AI) compliance requirements (European Parliament, 2023).

Artificial intelligence (AI) has been gaining an increasingly integral role of business operations, with its growing application over recent years thoroughly remodelling industrial landscapes across the globe.

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The opportunity to apply artificial intelligence (AI) as an operating tool to improve business policy development remains largely obscure in countries such as Macedonia and Serbia. The potential of artificial intelligence (AI) is recognized in enterprises in these regions as a significant tool in creating policies that align with dynamic market conditions, optimizing operational efficiency, and predicting future trends. Nevertheless, the degree to which AI is affecting policymaking in these enterprises and the challenges they face in adopting it remains poorly understood. Therefore, this paper explores how artificial intelligence (AI) technologies are remodelling business policy making with regards to Macedonia and Serbia. The paper's objective is examining the use of artificial intelligence (AI) in policymaking, assessing its practical consequences, and proposing actionable recommendations for enterprises seeking to utilize artificial intelligence (AI) technologies in pursuit of sustainable development. Recently, the implementation of artificial intelligence (AI) technologies has accelerated notably in operating activities, leading to the transformation of industries on a global scale. Despite this global trend, in countries as Macedonia and Serbia the strategic use of AI for business policy development remains relatively limited and insufficiently investigated. artificial intelligence (AI) though the enterprises in these regions greatly acknowledge the AI potential to enhance policy formulation by aligning strategies with rapidly changing market conditions, improving operational performance, and enabling more accurate forecasting the practical application and depth of its influence remain underexplored. Based on data analysis and strategic planning for the long term, there is a developing recognition of AI's capacity to support decisions. However, many enterprises continue to face significant limitations to adoption, including limited expertise, infrastructure, and institutional support. Thus, this paper seeks to investigate the role of artificial intelligence (AI) in shaping business policy making within the specific socio-economic contexts of Macedonia and Serbia considering the aforementioned challenges. It aims to analyse both the practical implications of artificial intelligence (AI) adoption and the current level of integration, while offering evidence-based recommendations for enterprises aiming to harness artificial intelligence (AI) technologies as a means of fostering innovation, resilience, and sustainable development. The objective of this paper is to assess the perceptions and preparedness of SMEs in the Macedonia and Serbia regarding the adoption and integration of artificial intelligence (AI) within their operating strategies. The research puts special emphasis on assessing the level of awareness among SMEs concerning the potential benefits of artificial intelligence (AI), identifying key sources of information, evaluating the extent of artificial intelligence (AI) implementation strategic planning, and exploring the primary barriers that hinder adoption. Furthermore, the paper investigates the growing need for professional guidance and focuses on the role played by public institutions in promoting digitalization among SMEs.

In countries such as the Republic of Serbia and North Macedonia, the readiness of small and medium-sized enterprises (SMEs) to implement artificial intelligence (AI) is still insufficiently explored. Both countries are in the process of institutional alignment with European standards: Serbia is already implementing its second Artificial Intelligence Development Strategy for the period 2025–2030, while North Macedonia is developing a national ICT strategy that includes a component for the improvement and integration of artificial intelligence (AI). The Republic of Serbia and North Macedonia were selected for analysis due to their similar economic and institutional characteristics, such as the level of development and the process of European integration.

Given the transformative potential of artificial intelligence (AI) in improving operational efficiency, productivity, and long-term sustainability, addressing these dimensions is essential for developing effective support frameworks and facilitating meaningful artificial intelligence (AI) adoption among SMEs. To guide the research process, the paper outlines five key research questions:

1. To what extent do SMEs believe that artificial intelligence (AI) can enhance business efficiency and contribute to growth and sustainability in the Republic of North Macedonia and the Republic of Serbia?
2. Are there significant variations in the degree of awareness about the possibilities of applying artificial intelligence (AI) between enterprises in the Republic of North Macedonia and the Republic of Serbia?
3. How does the number of years an enterprise has been operating affect its level of awareness about AI applications and its perception of the need for implementation?
4. Does the business sector influence the perception of artificial intelligence (AI) contribution to the growth and sustainability of enterprises?

5. Are there differences in the perception of the need for organizational changes to implement artificial intelligence (AI) depending on the country of origin, age, and sector of the enterprise?

## Materials and Methods

The development of digital technologies is contributing to artificial intelligence being central to the work of enterprises, introducing fundamental changes in the way SME traditionally work. The Organization for Economic Co-operation and Development (OECD) provides a widely recognized definition of an AI system as a "machine-based system capable of making predictions, recommendations, or decisions that affect real or virtual environments, based on a set of objectives defined by humans." (OECD, 2019, 7). According to the Chen et al. (2023), AI systems lack inherent understanding and rely on human decisions in design, engineering, and supervision. With varying degrees of adaptability and autonomy in its application, artificial intelligence brings revolutionary changes to the functioning of the economy and society (Strategija razvoja veštačke inteligencije u Republici Srbiji za period 2025–2030 godine (Službeni glasnik RS, br. 5/25. (2025)). Continuous learning can be specified as a requisite for AI (Samoili et al., 2021). The AI's effects will likely differ widely across different occupations, depending on whether substitution or complementariness between AI and human labour dominate, and to what degree occupations can be reorganized to incorporate new tasks (Fossen et al., 2024). Speculated by Chalmers et al. (2021) is that AI technologies might enable some operation with high technological skills and venture capital firms to gain large financial returns with comparably little effort. This cutting-edge technology promises to fundamentally transform service delivery paradigms, optimize operational processes, and significantly improve efficiency across various industries (Jeremić and Luka, 2024). AI can serve as a new form of input and process other inputs, remodelling the cost structure of a company (Desai, 2019).

Small and medium-sized enterprises (SMEs) have been the focus of extensive research. Wahyuningsih et al. (2024) examined the impact of factors such as education, enterprise size, business duration, accounting training, and accounting knowledge on the utilization of accounting information within SMEs. Mitrović et al. (2024) have conducted research whose approach involves a comprehensive literature review of AIS and organizational performance, along with an examination of the pandemic's effects on both aspects within SMEs. The study findings demonstrate specific consequences of the pandemic on AIS and organizational performance. An important question arises to consider SME and AI through different issues. SMEs in the regions of North Macedonia and Serbia, often face constraints that hinder their access to these technologies, in contrast to large companies that already invest significant resources in the process of developing and applying AI technologies. Moreover, the current solutions offered for digitalization of SMEs are standalone and not incorporated, due to their specific requirements (Telukdarie et al., 2023).

Data shows that in Serbia the significance of digital transformation is acknowledged across all industries and levels of work and is mostly viewed as a prospect that transforms companies to a large extent (Savic et al., 2019). Acord the second Strategy for the Development of Artificial Intelligence (AI) in Serbia for the period 2025-2030 has already been adopted. The previous strategy for the period 2020-2025 laid the foundations and paved the way for the development of AI in Serbia in several key and priority areas, while the current strategy creates the framework for the further development of AI, enabling Serbia to follow modern trends in this area. One of the fundamental aims of the Strategy is to provide a significant incentive for the further development of scientific research, innovation, education, business promotion, economic growth and improve the quality of life of all citizens through special measures (Strategija razvoja veštačke inteligencije u Republici Srbiji za period 2025–2030 godine (Službeni glasnik RS, br. 5/25. (2025)). Serbia has launched the first National AI Platform in the Republic of Serbia at the State Data Centre in Kragujevac, and with the launch of that platform, it has joined the 26 countries that have a national platform for the development of artificial intelligence and is one of the few that have their own Institute for Artificial Intelligence (21 TV, 2025). The Office for IT and e-Government of Serbia and the French company Eviden signed an agreement for HPC (supercomputer) and artificial intelligence development, the project for the digitalization of medical administration, as well as the AI development and application tools that should assist Serbia to flourish in various sectors, from energy, transport and the smart cities' development (Serbia Business, 2025). In addition to providing appropriate infrastructure for the intensive development of the IT market, start-up scene, and venture capital, the country aims to make Kragujevac

a regional centre of modern technology (Bloomberg Adria, 2025).

In North Macedonia, as a result of the global trends in digitalization, at the initiative of the Fund for Innovation and Technological Development, in September 2021 a working group, was formed whose goal is to create the first National Strategy for Artificial Intelligence in the country (FITD, 2021). In North Macedonia, the National ICT Strategy is currently being developed, where in the priority area 'Business, Innovation and New Technologies', a component for the development of AI with an action plan is envisaged. The action plan will determine whether it is necessary to adopt a separate AI strategy or a dynamic roadmap for the promotion and encouragement of the use of AI-based tools. Also, the Ministry of Digital Transformation of North Macedonia, for the second half of 2025, envisages the transposition of the EU AI Act in a form that will encourage the integration and enhancement of AI in the Macedonian ICT ecosystem (Bloomberg Adria, 2025).

Two surveys were conducted using the survey method in the period from February to August 2025. The sample for both *Research 1* and *Research 2* consisted of 100 respondents, surveyed by a random sample, employees and enterprises in North Macedonia and the Republic of Serbia. The research included employees in micro and small and medium enterprises (SMEs*). Research 1* consists of 15 questions, *Research 2* of 20 questions, and the first 3 questions in both surveys refer to data on respondents. *Research 1* refers to the impact of AI on SMEs, while *Research 2* deals with the impact of AI in creating business policies of SMEs. Respondents' views were evaluated on a Likert scale from 1 to 5. Grade 1 signified the least agreement, whereas grade 5 signified the greatest agreement.

Table 1 shows comparative data on the samples. An equal number of respondents come from North Macedonia and the Republic of Serbia (*Research 1* and *Research 2*). In the selected sample structure, the largest number of survey respondents work in an enterprise that has been operating for 6-10 years (44%-*Research 1* and 36%-*Research 2*), which operates in the Services sector (40%-*Research 1*and 32%-*Research 2*).

**Table 1.** Data on respondents (*Research 1 and Research 2*)

| | Research 1 | | Research 2 | |
|---|---|---|---|---|
| | Number of respondents | % | Number of respondents | % |
| Where does your enterprise operate? | | | | |
| North Macedonia | 50 | 50% | 50 | 50% |
| Serbia | 50 | 50% | 50 | 50% |
| How long has your enterprise been actively operating? | | | | |
| 1 – 5 years | 20 | 20.0% | 29 | 29.0% |
| 6 – 10 years | 44 | 44.0% | 36 | 36.0% |
| 11 – 20 years | 24 | 24.0% | 20 | 20.0% |
| More than 20 years | 12 | 12.0% | 15 | 15.0% |
| In which industry or sector is your enterprise actively working? | | | | |
| Trade | 19 | 19.0% | 17 | 17.0% |
| Manufacturing | 13 | 13.0% | 22 | 22.0% |
| Services | 40 | 40.0% | 32 | 32.0% |
| IT and Technology | 6 | 6.0% | 9 | 9.0% |
| Agriculture | 3 | 3.0% | 1 | 1.0% |
| Construction | 11 | 11.0% | 12 | 12.0% |
| Education | 8 | 8.0% | 7 | 7.0% |

Source: Authors

In addition to descriptive statistical analyses, including mean, standard deviation, minimum, and maximum values, this paper employed the Mann-Whitney U test and the Kruskal-Wallis test. The SPSS version 23 statistical package for social sciences was used with a statistical significance of 0.05 for the purposes of statistical data processing.

## Results and Discussions

The statements' frequency about the impact of AI on SMEs is shown in Table 2. The respondents expressed the highest degree of accordance when answering the question - do you think that the introduction of AI will contribute to accelerated growth and sustainability of your enterprise in the future (Mean=3.97). His is supported by Goralski and Tan (2020), who argue that artificial intelligence can serve as a powerful driver of global efforts to foster economic development while ensuring its sustainable management. The respondents expressed the lowest level of agreement in their answers to the question - do you think you have enough knowledge to practice AI in your enterprise (Mean=2.52). Bharadiya's (2023) study revealed several aspects regarding the integration and use of artificial intelligence in enterprises. This study confirms that limited in-depth knowledge about artificial intelligence and its value creation processes represents a significant barrier.

**Table 2.** *Respondents' views on the impact of AI on SMEs (Research 1)*

| Questions | Min | Max | M | SD |
|---|---|---|---|---|
| Are you familiar with the opportunities offered by AI for improving business activities? | 1 | 5 | 3.11 | 1.27837 |
| Do you plan to apply AI in your enterprise? | 1 | 5 | 3.65 | 1.12254 |
| Are you sufficiently informed to decide to introduce AI in your enterprise? | 1 | 5 | 3.33 | 1.045 |
| How informed are you about the opportunities offered by artificial intelligence for optimizing business processes? | 2 | 5 | 2.99 | 1.05883 |
| Do you think you have enough knowledge to practice AI in your enterprise? | 1 | 5 | 2.52 | 1.0491 |
| Do you think you will need professional help and support to acquire knowledge about AI? | 1 | 5 | 3.83 | 1.08297 |
| Do you think there is sufficient support from state institutions for entrepreneurs to implement AI? | 1 | 5 | 2.72 | 1.46391 |
| Is there interest in being involved in support programs for implementing AI if they are introduced? | 1 | 5 | 3.79 | 1.2415 |
| Do you think that the introduction of AI will contribute to accelerated growth and sustainability of your enterprise in the future? | 1 | 5 | 3.97 | 1.03918 |

Note: Min (Minimum), Max (Maximum), M (Mean), SD (Standard Deviation)

Source: Authors

The statements' frequency about the impact of AI in creating operating policies of SMEs is shown in Table 3. The respondents expressed the highest degree of agreement when answering the question - do you think that the application of AI will have a positive impact on increasing the efficiency of the enterprise's work (Mean=4.17).

The findings presented above are in accordance with the study by Hamada et al. (2021), investigating the AI use of to improve operating efficiency and effectiveness in companies in Kazakhstan. Their research identified the main obstacle to AI adoption as the hesitance of managers in SMEs to implement AI technologies, further exacerbated by the significant costs involved in their deployment. The respondents indicated minimal agreement regarding the answer to the question - are you familiar with the opportunities offered by AI in creating business policies (Mean=2.69). According to Lauterbach (2019), a significant gap persists in the transparency surrounding the identification of key risks associated with AI, as well as in clarifying the regulatory strategies for mitigating them. Moreover, the absence of a comprehensive, collaborative framework encompassing all relevant stakeholders hinders the establishment of unified principles for the design, governance, and ethical deployment of AI technologies.

**Table 3.** *Respondents' views on the impact of AI in creating business policies of SMEs (Research 2)*

| Questions | Min | Max | M | SD |
|---|---|---|---|---|
| Are you familiar with the opportunities offered by AI in creating business policies? | 1 | 5 | 2.69 | 1.16076 |
| What is the impact of AI in creating business policies? | 1 | 5 | 3.08 | 1.27667 |
| Are you sufficiently informed to decide on implementing AI in shaping business policies in your enterprise? | 1 | 5 | 3.4 | 0.99494 |
| What are the capabilities of your employees for applying for AI? | 1 | 5 | 2.76 | 1.07422 |
| Would you agree to participate in training for using AI tools and technologies? | 1 | 5 | 4.01 | 1.16771 |
| Are changes needed in your enterprise to implement AI? | 1 | 5 | 4.06 | 1.26187 |
| Do you think there is a need for the reorganization of teams or work structures to enable the adoption of AI in shaping business policies? | 1 | 5 | 4.04 | 1.3478 |
| Does your enterprise plan to increase the use of AI in the future? | 1 | 5 | 3.75 | 1.08595 |
| Do you think that AI will have a greater impact on business policies in the next 5 years? | 1 | 5 | 3.99 | 0.99995 |
| Do you think that the application of AI will have a positive impact on increasing the efficiency of the enterprise's work? | 1 | 5 | 4.17 | 0.92174 |

Note: Min (Minimum), Max (Maximum), M (Mean), SD (Standard Deviation)

Source: Authors

Below are the results of the Mann-Whitney U test. Using the Mann-Whitney U test, statistically significant differences in the opinions of respondents from different countries were found in connection with *Research 1*, namely the question - how informed are you about the opportunities offered by AI for optimizing business processes ($p<0.05$). Specifically, the mentioned test identified a statistically significant difference in the values of the dimensions of respondents coming from North Macedonia (Md=2.50) compared to respondents coming from the Republic of Serbia (Md=5.00), while this difference is of low intensity (U=972.5, z=-2.027, p=0.043, r= 0.2027). The optimization of business processes plays a crucial role in improving efficiency and competitiveness in today's dynamic industrial environment (Chen et al. (2023)).

In addition, for *Research 2*, using the same test, she identified statistically significant differences in the opinions of respondents who come from different countries with the questions - what are the capabilities of your employees for applying for AI and - are changes needed in your enterprise to implement AI. Specifically, the mentioned test identified a statistically significant difference in the values of the dimensions of respondents coming from North Macedonia (Md=3.50) compared to respondents coming from the Republic of Serbia (Md=2.75), while this difference is of low intensity (U=887.5, z=-2.635, p=0.008, r= 0.2635) for the question - what are the capabilities of your employees for applying for AI. Zhu et al. (2020) found that leaders should carefully consider employees' awareness of AI, their considerations regarding the technology, and their overall viewpoints, as these factors can influence whether employees fully accept the AI journey or decide to resign—taking with them valuable knowledge and skills. Likewise, the aforementioned test identified a statistically significant difference in the values of the dimensions of respondents coming from North Macedonia (Md=3.50) compared to respondents coming from the Republic of Serbia (Md=2.75), whereby this difference is of approximately medium intensity (U=852, z=-2.995, p=0.003, r= 0.2995) for the question are changes needed in your enterprise to implement AI (Table 4). SME managers must place growing emphasis on integrating emerging tools, such as AI, into their business operations to fully capitalize on their potential benefits. However, the inherently subjective and complex nature of this adaptation process poses significant challenges for conducting comprehensive analyses of its key determinants (Lemos et al., 2022).

**Table 4.** *Mann-Whitney U test results for Research 1 and Research 2*

*Research 1*

| | How informed are you about the opportunities offered by AI for optimizing business processes? |
|---|---|
| Mann-Whitney U | 972.500 |
| Wilcoxon W | 2247.500 |
| Z | -2.027 |
| Asymp. Sig. (2-tailed) | 0.043 |

*Research 2*

| | What are the capabilities of your employees for applying for AI? | Are changes needed in your enterprise to implement AI? |
|---|---|---|
| Mann-Whitney U | 887.500 | 852.000 |
| Wilcoxon W | 2162.500 | 2127.000 |
| Z | -2.635 | -2.995 |
| Asymp. Sig. (2-tailed) | 0.008 | 0.003 |

Note: Grouping Variable: *Where does your enterprise operate?*

Source: Authors

Statistically significant differences in respondent answers across the two surveys were revealed by the Kruskal-Wallis test. In *Research* 1, in connection with the answer to the question - how informed are you about the opportunities offered by AI for optimizing business processes according to the years of operation of the enterprise n=100, Chi-Square = 12.623, df=3, p=0.006 (Table 5). By reviewing the mean (average) values of the ranks of the groups, it was observed that the agreement with the answer to the question - how informed are you about the opportunities offered by artificial intelligence for optimizing business processes is at the highest level among respondents whose enterprise they are employed in has been active for more than 20 years (Mean Rank=66.67), and least among those whose enterprise has been operating for 6-10 years (Mean Rank=42.95). Chen et al. (2023) also examines the role of AI in streamlining and improving business operations.

In *Research* 2, in connection with the answer to the question - what are the capabilities of your employees for applying for AI according to the years of operation of the enterprise n=100, Chi-Square = 9.388, df=3, p=0.025 (Table 5). By reviewing the mean (average) values of the ranks of the groups, it was observed that agreement with the answer to the question - what are the capabilities of your employees for applying for AI is at the highest level among respondents whose enterprise they are employed in has been active for 1-5 years (Mean Rank=58.79), and least among those whose enterprise has been operating for 11-20 years (Mean Rank=34.78). Bharadiya (2023) identified the primary obstacle to the adoption of artificial intelligence as the lack of preparedness among managers of SMEs to implement AI technologies. 21 TV, 2025 the findings indicate that top management support and the overall working environment moderate the relationship between managerial satisfaction and the effectiveness of business operations. Also in this research, in connection with the answer to the question - are changes needed in your enterprise to implement AI according to the years of operation of the enterprise n=100, Chi-Square = 9.177, df=3, p=0.027 (Table 5). By reviewing the mean (average) values of the ranks of the groups, it was observed that agreement with the answer to the question - are changes needed in your enterprise to implement AI is at the highest level among respondents whose enterprise they are employed in has been active for 11 - 20 years (Mean Rank=59.58), and least among those whose enterprise has been operating for 1 - 5 years (Mean Rank=39.34). Once again, the lack of extensive understanding about AI and its value generation processes is highlighted (Bharadiya et al., 2023).

**Table 5**. *Kruskal Wallis test results for Research 1 and Research 2*

*Research 1*

| | How informed are you about the opportunities offered by AI for optimizing business processes? |
|---|---|
| Chi-Square | 12.623 |
| df | 3 |
| Asymp. Sig. | 0.006 |

*Research 2*

| | What are the capabilities of your employees for applying for AI? | Are changes needed in your enterprise to implement AI? |
|---|---|---|
| Chi-Square | 9.388 | 9.177 |
| df | 3 | 3 |
| Asymp. Sig. | 0.025 | 0.027 |

Note: Grouping Variable: How long has your enterprise been actively operating?

Source: Authors

The Kruskal Wallis Test is further in *Research 1*, in connection with the answer to the question - how informed are you about the opportunities offered by artificial intelligence for optimizing business processes according to the business sector of the enterprise n=100, Chi-Square = 20.907, df=6, p=0.002 (Table 6). By reviewing the mean (average) values of the ranks of the groups, it was observed that agreement with the answer to the question - how informed are you about the opportunities offered by artificial intelligence for optimizing business processes is at the highest level among respondents whose enterprise in which they are employed performs activities in the IT and Technology sector (Mean Rank=83.08), and least among those whose enterprise operates in the Services sector (Mean Rank=38.18). AI techniques are transforming not only the business world but also a wide range of other industry sectors (Bharadiya et al., 2023). Also in this research, in connection with in response to the question - do you think that the introduction of AI will contribute to accelerated growth and sustainability of your enterprise in the future according to the business sector of the enterprise n=100, Chi-Square = 17.506, df=6, p=0.008 (Table 6). By reviewing the mean (average) values of the ranks of the groups, it was observed that the agreement with the answer to the question - do you think that the introduction of AI will contribute to accelerated growth and sustainability of your enterprise in the future processes is at the highest level among respondents whose enterprise operates in the Agriculture sector (Mean Rank=71.83), and the least among those enterprises whose employees perform activities in the IT and Technology sector (Mean Rank=32.00). Artificial Intelligence (AI) plays an essential role across different fields in addressing complex challenges. However, certain critical areas continue to pose difficulties for humans—for example, agriculture, which faces issues such as crop diseases, inadequate storage management, and ineffective pesticide control. AI offers promising solutions to these and many other problems (Jindal et al.,2021).

In *Research 2*, in connection with the answer to the question - do you think there is a need for the reorganization of teams or work structures to enable the AI adoption in shaping business policies according to the business sector of the enterprise n=100, Chi-Square = 14.367, df=6, p=0.026 (Table 6). By reviewing the mean (average) values of the ranks of the groups, it was observed that agreement with the answer to the question - do you think there is a need for the reorganization of teams or work structures to enable the adoption of AI in shaping business policies is the highest among the respondents whose enterprise in which they are employed performs activity in the IT and Technology sector (Mean Rank=82.00), and least among those whose enterprise operates in the Agriculture sector (Mean Rank=34.50). In recent years, artificial intelligence has exerted a profound influence across a wide range of industrial sectors, underscoring the necessity for enterprises to adapt to this transformative momentum and advance toward sustainable development. The study conducted by Espina-Romero et al. (2023) aimed to examine the industrial sectors most affected by artificial intelligence during the period 2018–2022. The findings reveal the increasing impact of artificial intelligence in sectors such as technology, finance, healthcare, environmental management, and construction. Geographically, the most significantly influenced sectors are located in Europe and Asia, whereas those in the Americas, Africa, and Oceania have experienced comparatively lesser effects. The AI effect is anticipated to exhibit substantial variability across different professions, depending on the predominance of either substitution or complementarity between AI and

human labour, as well as the extent to which occupational roles can be reorganized to accommodate new tasks (Fossen et al., 2024).

**Table 6**. *Kruskal Wallis test results for Research 1 and Research 2*

*Research 1*

| | How informed are you about the opportunities offered by AI for optimizing business processes? | Do you think that the introduction of AI will contribute to accelerated growth and sustainability of your enterprise in the future? |
|---|---|---|
| Chi-Square | 20.907 | 17.506 |
| df | 6 | 6 |
| Asymp. Sig. | 0.002 | 0.008 |

*Research 2*

| | Do you think there is a need for the reorganization of teams or work structures to enable the adoption of AI in shaping business policies? |
|---|---|
| Chi-Square | 14.367 |
| df | 6 |
| Asymp. Sig. | 0.026 |

Note: Grouping Variable: *In which industry or sector is your enterprise actively working?*

Source: Authors

## Conclusions

In the current operating environment, AI is coming to the fore as a significant factor in the transformation of operating policies and processes. Numerous enterprises around the world are already using AI for data analysis, process automation, and other different segments where AI facilitates the work process. Global trends in artificial intelligence show that countries that invest in AI, especially in education and raising awareness about the use, benefits, but also dangers of AI, are already enjoying the benefits of this technology. According to the findings of the analysis, for the two Balkan countries of North Macedonia and Serbia, this is a unique moment for work dedicated to the development of AI in order to accelerate the transformation from a service to a product industry and to develop products and solutions that will be competitive on the global market. Both countries from the Western Balkans are in the initial phase of development, but have significant potential to accelerate their progress in the function of economic growth and technological development. On this path, we could conclude that Serbia is one step ahead of North Macedonia.

SMEs increasingly recognize AI as a tool for enhancing efficiency, optimizing resources, and improving decision-making processes. The study results indicate that all the respondents acknowledged the AI potential to improve operational efficiency. However, there is a clear unawareness among the respondents on the possibilities that AI offers in shaping operating policies, which points to the need for additional education and increased awareness among SMEs and employees.

The attitudes toward AI awareness and its potential uses showed statistically significant differences between respondents from the Republic of North Macedonia and the Republic of Serbia. Notably, respondents from Serbia reported a higher level of awareness compared to those from North Macedonia. Meaningful statistical differences were also identified in the workforce expertise for AI application and in perceptions of the need for organizational changes to enable AI implementation. The findings point that the respondents from Macedonia exhibit a greater need for adaptation and support in the process of integrating AI into operating policies compared to their counterparts in Serbia. Generally positive outlook of AI's impact on efficiency, growth, and business transformation exists, confirming that AI is expected to provide increased enterprise performance. However, the respondents still lack sufficient understanding with the specific AI opportunities for business policy development, showing a gap between perceived potential and actual knowledge. The perceptions and awareness regarding the implementation of artificial intelligence (AI) are significantly influenced by the sector of activity, geographical location, and operational duration of an enterprise. Suggested by the findings is that companies operating within the IT

sector are the most informed, organizationally prepared for AI adoption and transformation, and are better positioned to integrate AI technologies. Nevertheless, despite their preparedness, these enterprises approach the long-term benefits of AI implementation with caution. The emerging enterprises tend to exhibit a higher degree of flexibility and openness toward adopting innovative solutions and organizational changes. Analogously, mature enterprises demonstrate a greater resistance to change, often attributable to entrenched operating practices and resistance to organizational change. These insights reaffirm the prerequisite of designing customized AI implementation strategies customized according to the specific needs and characteristics of individual enterprises. AI, as a modern tool within the broader framework of digital transformation, contributes to enhancing operational efficiency, improving business processes, and strengthening market competitiveness. However, the successful implementation of such technologies depends on several critical factors, most notably the existence of a clearly defined strategy, an adequate level of digital literacy, and robust institutional support.

The technological maturity inequality, awareness, and access to resources between the Republic of North Macedonia and the Republic of Serbia emphasize the need for context-specific approaches to the implementation and integration of AI in business operations. In this regard, the following strategic directions and policy recommendations are proposed to facilitate the adaptation and practical application of AI in varying economic and institutional contexts: Development of a national AI strategy in the Republic of North Macedonia; Creation of appropriate legal regulations**;** Education and training for entrepreneurs and employees within companies; Promotion of public-private partnerships, start-up initiatives, and innovation; Implementation of pilot projects and development of flexible business models; Establishment of ethical standards and evaluation systems to assess the impact of AI in both the Republic of North Macedonia and the Republic of Serbia. Although the findings cannot be fully generalised due to the limited sample, they provide a good basis for future research in other sectors and in a wider international context. Following a systematic approach and the implementation of these recommendations, AI can become a primary driver of competitiveness, innovation, and sustainable economic development of the region.

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**Conflict of interests**

The authors declare no conflict of interest.

**Data availability statement**

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

**Institutional Review Board Statement**

Not applicable.

**Author Contributions**

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