

Article

The Economic Effects of Artificial Intelligence Adoption in Small and Medium-Sized Enterprises

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Abstract

Artificial intelligence is one of the key technologies of the Fourth Industrial Revolution and is increasingly significant for companies' economic performance. Small and medium-sized enterprises (SMEs), the foundation of economic development in most national economies, face numerous challenges and opportunities in applying artificial intelligence in business. This paper aims to examine the economic effects of applying artificial intelligence in SMEs, with a special emphasis on labor productivity, business process efficiency, and reduced operating costs. Empirical research was conducted on a sample of 228 SMEs using a questionnaire, with the data analyzed using multiple linear regression. The research results show that different applications of artificial intelligence have a statistically significant, positive impact on labor productivity and on reducing operating costs. In contrast, their impact on business process efficiency is moderate and partially limited. The operational application of artificial intelligence, such as automation and data analysis, has proven to be the most important factor in economic effects. At the same time, its application in managerial decision-making also has a significant, but somewhat weaker impact. On the other hand, the mere growth of AI applications over time does not necessarily lead to increased efficiency without targeted and concrete implementation. The paper's results contribute to understanding the role of AI in transforming SMEs and highlight the importance of targeted investments in operational and management applications of AI. The paper provides practical implications for entrepreneurs and economic policymakers in fostering sustainable, competitive development of SMEs.

Keywords: artificial intelligence; SMEs; productivity; business efficiency; cost reduction

JEL Classification: D24; O33



Academic Editors: Seongjin Lee,
Euteum Choi and Joontaek Oh

Received: 17 April 2026

Revised: 12 June 2026

Accepted: 16 June 2026

Published: 18 June 2026

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1. Introduction

Artificial intelligence has become one of the key technologies shaping modern economic, social, and business processes over the last decade, significantly influencing the way organizations create value, make decisions, and achieve competitive advantage (Chalmers et al., 2021 [1]; Nag et al., 2024 [2]). Its application enables the automation of increasingly complex tasks, the processing of large amounts of data, and decision-making based on analytical models, which significantly changes the way companies and markets function. In this context, artificial intelligence is increasingly recognized as an important driver of productivity, operational efficiency, and long-term economic growth, enabling organizations to optimize processes, improve decision-making, and strengthen their competitive

position in dynamic market environments (Wei & Pardo, 2022 [3]; Schwaewe et al., 2025 [4]). Nevertheless, the level and effects of its application vary between companies, sectors, and national economies.

Of particular importance is the analysis of the application of artificial intelligence in small and medium-sized enterprises (SMEs), which underpin most national economies and play a key role in employment, innovation, and regional development. Although SMEs have the potential to achieve significant benefits from the application of artificial intelligence, their ability to adopt such technologies is often constrained by limited financial resources, expertise, and institutional support. For this reason, understanding the specific economic effects of artificial intelligence in this segment of companies represents an important research and practical challenge.

Previous research indicates that the adoption of artificial intelligence is associated with improved business performance, particularly through higher productivity, greater operational efficiency, and the rationalization of business costs (Iyelolu et al., 2024 [5]). However, the results are not always uniform, and the effects largely depend on the implementation method, the level of integration into business processes, and the companies' ability to adapt their organizational structures to new technologies. In other words, the mere presence of artificial intelligence in business is not enough; it is crucial to understand how it is used and where it delivers the greatest economic value. In this sense, it is particularly important to distinguish between different applications of artificial intelligence. Operational applications, such as process automation and data analysis, can have a direct, immediate impact on productivity and costs. On the other hand, the application of artificial intelligence in management decision-making can contribute to better planning and resource allocation. Still, its effects often manifest indirectly and with a certain time lag. In addition, the dynamics of the application of artificial intelligence within the company can play an important role in the long-term realization of economic benefits through learning and adaptation.

Based on the above, the research problem this paper addresses is the need for a more precise understanding of the economic effects of different applications of artificial intelligence in small and medium-sized enterprises. The question was raised to what extent and in what way artificial intelligence contributes to key dimensions of business performance, namely labor productivity, business process efficiency, and reduction in operating costs, as well as whether there are differences in the intensity of these effects with respect to the specific method of its application. This paper aimed to empirically analyze the impact of artificial intelligence on three key dimensions of business performance: labor productivity, business process efficiency, and operating cost reduction. The analysis was conducted on a sample of 228 small and medium-sized enterprises using multiple linear regression.

The research results showed that the application of artificial intelligence has a statistically significant and positive impact on labor productivity and on reducing operating costs. At the same time, its effect on business process efficiency is moderate and depends on the specific application method. The operational application of artificial intelligence was particularly highlighted as the most important factor of economic effects. At the same time, the application in managerial decision-making also showed a significant, but somewhat weaker impact. On the other hand, the growth of AI applications has not been equally important across all dimensions of business performance. The paper's contribution is to empirically elucidate the relationship between different forms of AI applications and key economic outcomes in SMEs. This provides useful insights for entrepreneurs and economic policymakers, especially in fostering digital transformation and strengthening SME competitiveness.

2. Artificial Intelligence and SMEs: Economic Context

In contemporary economic analyses, Artificial Intelligence is increasingly seen as a key technology shaping the processes of structural transformation of the economy. Within the framework of the Fourth Industrial Revolution, its application extends beyond individual sectors. It is integrated across various business functions, including production, management, marketing, and strategic planning. Such broad applicability positions Artificial Intelligence as one of the fundamental drivers of productivity, innovation, and long-term economic development. In the context of small and medium-sized enterprises, Artificial Intelligence gains additional importance, since SMEs form the backbone of most national economies and play a key role in employment, regional development, and the creation of added value. However, their ability to integrate advanced technologies into business is conditioned by several economic, organizational, and institutional factors. Therefore, to understand the role of Artificial Intelligence in SMEs, it is necessary to analyze its effects within a broader economic context.

2.1. Artificial Intelligence as an Economic Technology

Ravindran (2022) [6] argues that artificial intelligence represents a general-purpose technology whose application extends across multiple sectors and industries, offering considerable potential for improving production efficiency, managerial effectiveness, and overall business performance. Its ability to process large amounts of data, recognize patterns, and generate predictive insights enables companies to make more informed decisions and optimize resource utilization. In economic terms, artificial intelligence is increasingly viewed as a complementary production factor that complements traditional factors of labor and capital. The integration of artificial intelligence into business processes changes the structure of production, increasing the role of intangible resources, such as data, knowledge, and algorithms. This shift also implies changes in how value is created, with competitive advantage increasingly based on the ability to manage information and technology. One of the most important economic effects of artificial intelligence relates to the automation of business processes. Andronie et al. (2021) [7] highlight the role of AI in automating routine tasks and improving operational performance, while Jackson et al. (2024) [8] emphasize its potential to optimize business processes and support more efficient organizational decision-making. As a general-purpose technology, artificial intelligence can be applied across a wide range of business functions and industries, creating opportunities for innovation and competitive advantage (Ravindran, 2022 [6]). Automation reduces operating costs, increases task execution speed, and reduces the likelihood of errors. At the same time, artificial intelligence enables the development of advanced analytical models that support strategic decision-making and long-term planning. This increases not only operational efficiency but also the company's overall economic performance. However, achieving these effects is neither automatic nor universal. It depends on the company's level of technological maturity, the quality of available data, and its ability to integrate artificial intelligence into key business processes. Companies that apply artificial intelligence in a fragmented or unstrategic way often do not achieve significant benefits, whereas those that integrate it systematically achieve greater economic benefits.

2.2. The Economic Role of SMEs

Small and medium-sized enterprises represent the foundation of economic activity in most modern economies and play a key role in generating employment, stimulating innovation, and developing regional markets. According to Wei and Pardo (2022) [3], SMEs contribute significantly to economic development, but their competitiveness increasingly depends on their ability to adopt and integrate emerging digital technologies. Their struc-

ture and way of doing business enable a high level of flexibility and adaptability, which is particularly important in dynamic market conditions. Despite these advantages, SMEs face several limitations that hinder their ability to adopt advanced technologies. Limited financial resources, a lack of specialized knowledge, and poorer access to technological infrastructure represent key obstacles to the digital transformation process. These limitations are further highlighted in the context of artificial intelligence, which often requires significant initial investments and a high level of expertise.

On the other hand, SMEs have certain structural advantages that can enable them to implement new technologies more effectively. Their organizational simplicity and shorter decision-making chains enable faster adaptation and experimentation with innovative solutions. In addition, SMEs often operate in specific market niches, where the application of artificial intelligence can significantly increase competitiveness. The regional dimension of SMEs further underscores their importance in sustainable development. In many economies, SMEs are a key driver of economic activity in less developed areas, where the application of new technologies can help reduce regional inequalities and foster inclusive growth.

2.3. Application of Artificial Intelligence in SMEs

The application of artificial intelligence in SMEs varies in complexity and intensity, depending on the sector, company size, and level of digital maturity. In practice, three basic dimensions of application can be identified: operational application, application in management decision-making, and the dynamics of the growth of artificial intelligence. The operational application of artificial intelligence includes automating business processes, analyzing data, and optimizing operations. This dimension of application most often yields immediate, measurable economic benefits, particularly by increasing efficiency and reducing costs. For this reason, operational applications often represent the initial phase of AI implementation in SMEs.

The application of AI in management decision-making involves advanced analytical tools for planning, forecasting, and strategic decision-making. This dimension requires a higher level of technology integration and the availability of high-quality data, but enables better decision-making and risk management. In this sense, AI is becoming a key tool for increasing competitiveness and long-term business sustainability. The growth dynamics of AI applications refer to the continuous increase in their integration into business processes. Companies that systematically develop and expand the application of AI are more likely to achieve long-term benefits, especially through processes of organizational learning and knowledge accumulation.

2.4. Economic Drivers and Barriers

The application of AI in SMEs results from the interaction among various economic, organizational, and institutional factors. According to Ahmed (2024) [9], successful AI adoption depends on a combination of technological, financial, and managerial factors that determine an organization's readiness to implement and utilize artificial intelligence effectively. On the one hand, artificial intelligence offers significant potential to increase productivity, reduce costs, and improve business processes. These potential effects act as strong drivers of investment in digital technologies. On the other hand, numerous challenges limit the wider application of artificial intelligence in SMEs. Among the most important are high implementation costs, lack of expertise, and limited access to financial resources. In addition, organizational factors, such as resistance to change and a lack of a strategic approach to digital transformation, further complicate the technology adoption process. The institutional and regulatory framework also plays a key role in this process. The avail-

ability of incentive measures, educational programs, and technological infrastructure can significantly influence the level of adoption of artificial intelligence in SMEs. In this context, cooperation between the public and private sectors is an important prerequisite for creating an environment that encourages innovation and sustainable economic development.

3. Literature Review

Recent literature on artificial intelligence (AI) increasingly highlights its transformative role in small and medium-sized enterprises (SMEs), particularly in productivity, decision-making, and long-term business resilience. Wei and Pardo (2022) [3] emphasize that the integration of AI technologies enables SMEs to improve business processes, strengthen competitiveness, and accelerate digital transformation. At the same time, the field remains conceptually and empirically fragmented, with studies adopting diverse theoretical frameworks, methodological approaches, and levels of analysis. This heterogeneity leads to a lack of consensus on the magnitude and mechanisms of AI's economic effects. A significant body of literature views AI as a general-purpose technology capable of reshaping firm-level processes and outcomes. However, in the SME context, these effects are conditioned by structural constraints such as limited resources, lower levels of digital maturity, and weaker institutional support. Consequently, the economic impact of AI cannot be assumed to be uniform across firms; rather, it depends on the specific form and intensity of its application. This review, therefore, focuses on three interrelated dimensions of AI adoption in SMEs: productivity, business decision-making, and business resilience, while also identifying key research gaps.

3.1. AI and Productivity in SMEs

The relationship between AI adoption and productivity is a central theme in the existing literature. In theory, AI enhances productivity by automating routine processes, reducing inefficiencies, and enabling more effective resource allocation. However, empirical findings suggest that these effects are neither automatic nor equally distributed across firms. According to Iyelolu et al. [5], the adoption of artificial intelligence can significantly enhance operational efficiency and innovation capacity in SMEs, particularly through the automation of business processes and improved customer engagement. Their findings suggest that AI enables firms to streamline workflows and reduce operational bottlenecks, thereby contributing directly to productivity growth. At the same time, the authors emphasize that financial constraints, a lack of technical expertise, and organizational resistance often limit these benefits.

Expanding on this perspective, Mugisha et al. [10] highlight that AI can play a critical role in compensating for resource constraints typically faced by SMEs. Their large-scale review indicates that AI tools enable firms to improve operational efficiency and competitiveness, even in environments with limited capital and human resources. This suggests that AI adoption may have a disproportionately positive effect in smaller firms, provided that implementation barriers are addressed. Olukoya et al. [11] offer a more nuanced view, emphasizing that productivity gains depend on multiple dimensions of organizational readiness. Their framework identifies strategic, technical, human, and financial readiness as key determinants of successful AI implementation. This multidimensional approach implies that productivity improvements are not solely driven by technology, but also by the firm's ability to align internal capabilities with technological opportunities.

Despite these positive findings, the literature also points to important limitations. First, productivity gains are often indirect and may materialize only over time, making them difficult to capture through cross-sectional studies. Second, differences in measurement approaches limit the comparability of results across studies. Third, there is limited evidence

on how different types of AI applications (e.g., operational vs. strategic) contribute to productivity, which represents a key gap addressed in this study.

3.2. AI and Business Decision-Making

The application of AI to business decision-making constitutes another important research stream, particularly amid increasing data availability and market complexity. AI technologies enable firms to process large volumes of data, identify patterns, and generate predictive insights, thereby enhancing the speed and quality of decision-making. Ahmed [9] examines AI adoption through the Technology–Organization–Environment (TOE) framework, identifying multiple factors that influence AI's effectiveness in decision-making. These include organizational readiness, management support, perceived value of AI, and access to resources. The study suggests that firms that strategically integrate AI into their decision-making processes are more likely to achieve improved performance outcomes.

Wei and Pardo [3] provide an alternative perspective by focusing on the role of digital platforms in facilitating AI adoption. Their findings indicate that AI-enabled platforms act as intermediaries, providing SMEs with access to data, tools, and external knowledge. This platform-based approach highlights the importance of ecosystems in shaping decision-making processes, suggesting that the benefits of AI extend beyond internal capabilities and depend on external interactions. Carayannis et al. [12] further extend this discussion by integrating AI with strategic foresight methodologies. Their framework emphasizes the use of predictive analytics and scenario planning to improve strategic decision-making under uncertainty. This approach highlights the potential of AI to support not only operational decisions but also long-term strategic planning. They focus specifically on the application of AI to financial decision-making, particularly in budget forecasting. The study demonstrates that AI can significantly improve forecasting accuracy and support more effective financial planning. However, it also identifies several challenges, including data integration issues, system compatibility, and the need for specialized expertise.

Overall, the literature suggests that AI has substantial potential to enhance decision-making processes in SMEs. However, its effectiveness depends on several factors, including data quality, organizational readiness, and the degree of integration with existing systems. Moreover, the balance between automated decision-making and human judgment remains an important and unresolved issue.

3.3. AI and Business Resilience

In recent years, the concept of business resilience has gained increasing attention, particularly amid global economic uncertainty and frequent market disruptions. In this context, AI is increasingly viewed as a tool that can enhance SMEs' ability to adapt to changing conditions, manage risks, and maintain stable performance. Carayannis et al. [12] argue that integrating AI with strategic foresight enables SMEs to anticipate market trends and develop adaptive strategies. Their framework highlights the role of predictive analytics in identifying potential risks and opportunities, thereby strengthening firms' resilience. Schwaewe et al. [4] provide a comprehensive analysis of AI adoption in SMEs, identifying multiple dimensions that influence resilience, including technological infrastructure, knowledge, organizational culture, and regulatory factors. Their findings suggest that resilience is not solely a function of AI adoption, but rather the result of a complex interplay between technological and organizational elements.

Mugisha et al. [10] also emphasize the role of AI in enhancing adaptability and risk management. Their study indicates that AI enables SMEs to respond more effectively to external shocks by improving operational flexibility and decision-making speed. This is particularly important in resource-constrained environments, where the ability to adapt

quickly can determine long-term survival. These findings collectively suggest that AI contributes to business resilience by enhancing adaptability, improving risk management, and supporting strategic planning. However, the extent of these benefits depends on the level of AI integration and the broader organizational context in which it is implemented.

3.4. Research Gaps and Emerging Issues

Despite the rapid growth of research in this field, several important gaps remain. One of the most significant limitations is the lack of longitudinal studies that examine the long-term effects of AI adoption in SMEs. Most existing studies rely on cross-sectional data, which limits the ability to capture dynamic changes over time. Schwaeke et al. [4] highlight the fragmented nature of current research and the absence of integrated theoretical frameworks that capture the complexity of AI adoption. Similarly, Olukoya et al. [11] emphasize the need for comprehensive models that incorporate multiple dimensions of readiness and implementation. Ahmed [9] points out that organizational and environmental factors are often underexplored, despite their critical role in shaping AI adoption outcomes. In addition, Iyelolu et al. [5] stress the importance of developing supportive ecosystems that include access to funding, infrastructure, and training.

Wei and Pardo [3] identify the need for further research on the role of digital platforms in enabling AI adoption. At the same time, they highlight the importance of studying specific functional applications of AI, such as financial management and forecasting. Furthermore, there is a notable lack of empirical studies that simultaneously examine multiple dimensions of AI impact, such as productivity, efficiency, and cost reduction. Most studies focus on a single outcome, which limits the ability to develop a comprehensive understanding of AI's economic effects.

In light of these gaps, there is a clear need for empirical research that systematically examines the relationship between different forms of AI adoption and multiple dimensions of business performance. This study aims to contribute to this area by providing a quantitative analysis of the economic effects of AI in SMEs, focusing on productivity, efficiency, and cost reduction as key outcome variables.

4. Research Methodology

The methodological framework applied in this research includes the research design, data collection procedures, and statistical techniques used for data analysis. It further defines the key assumptions, variable specifications, and analytical approach employed to examine the relationship between artificial intelligence and business performance in small and medium-sized enterprises.

4.1. Literature Review Approach

The theoretical framework for this study was developed through a narrative literature review. This approach was considered appropriate because the primary objective of the review was not to identify and evaluate all available studies on artificial intelligence systematically, but rather to establish a comprehensive conceptual foundation for examining the relationship between AI adoption and business performance in small and medium-sized enterprises (SMEs). The literature review included scientific journal articles, conference proceedings, books, and professional publications related to artificial intelligence, digital transformation, innovation, and SME development. Particular attention was devoted to studies examining the economic and organizational effects of AI adoption, including its influence on productivity, operational efficiency, decision-making quality, and cost reduction. Recent publications were prioritized to ensure that the theoretical framework reflects current developments in AI technologies and their business applications. The reviewed

literature served several purposes. First, it provided the theoretical basis for understanding artificial intelligence as an economic and organizational phenomenon. Second, it supported the identification of the key variables included in the empirical analysis. Finally, it contributed to the development of the research hypotheses and the overall analytical framework used to examine the economic effects of AI adoption in Croatian SMEs.

The literature search was conducted using Google Scholar, Scopus, and Web of Science databases. Keywords such as “artificial intelligence”, “AI adoption”, “small and medium-sized enterprises”, “SMEs”, “business performance”, “productivity”, “efficiency”, and “digital transformation” were used in various combinations. Additional relevant studies were identified through backward snowballing by examining the reference lists of the most relevant publications. The literature selection focused primarily on recent peer-reviewed publications addressing the economic and organizational effects of AI adoption in SMEs.

4.2. Research Design

This research was conducted in the Republic of Croatia to examine the economic effects of applying artificial intelligence in small and medium-sized enterprises. The choice of the Republic of Croatia as a research context is justified by its economy, in which SMEs play a dominant role in creating employment, adding value, and driving regional development. The Croatian economy is characterized by a pronounced dominance of the service sector, with a significant share of industry and a smaller but important share of agriculture and the IT sector, making it a suitable environment for analyzing the application of artificial intelligence across various economic sectors. This research sets out basic assumptions that enable the examination of the economic effects of applying artificial intelligence. It is assumed that different applications of artificial intelligence have a statistically significant impact on key dimensions of business performance, namely labor productivity, business process efficiency, and reductions in operating costs. Accordingly, the research focuses on analyzing the relationship between three independent variables, which describe the level and form of application of artificial intelligence, and three dependent variables that reflect the economic effects of this application. The expected relationship between the variables is based on the assumption that the application of artificial intelligence enables the automation of business processes, improved data analysis, and better decision-making, which ultimately leads to increased productivity and efficiency and reduced business costs. In particular, it is assumed that the operational application of artificial intelligence has a direct and strong impact on business results. In contrast, the application in managerial decision-making and the growth dynamics of artificial intelligence may have differential effects.

4.3. Research Hypotheses

Based on the theoretical framework and the aforementioned assumptions, the study formulated three basic hypotheses that examine the impact of artificial intelligence on key dimensions of business performance.

Accordingly, the following hypotheses were set:

- H1.** *The application of artificial intelligence has a positive impact on labor productivity.*
- H2.** *The application of artificial intelligence has a positive impact on the efficiency of business processes.*
- H3.** *The application of artificial intelligence has a positive impact on reducing operating costs.*

The above hypotheses were tested using multiple linear regression analysis, with each dependent variable analyzed separately in relation to the same set of independent variables representing different dimensions of the application of artificial intelligence.

4.4. Sample and Data Collection

The data were collected via a structured online questionnaire distributed to relevant stakeholders from different sectors of the Croatian economy. A total of 450 questionnaires were sent, and 228 valid responses were received, yielding a 50.67% response rate, which is considered a satisfactory level for research of this type. The sample consists exclusively of small and medium-sized enterprises, defined by the European Union as organizations with fewer than 250 employees. Respondents were business owners, managers, or individuals responsible for making business decisions, ensuring a high level of relevance and reliability in the collected data. The structure of the sample, by sector, is: agriculture 4%, industry 22%, IT sector 6%, and service activities 68%. This distribution largely reflects the actual sectoral structure of the Croatian economy, in which the service sector dominates. At the same time, industry has a significant share, and agriculture and the IT sector make up a smaller but important part of economic activity. The representativeness of the sample is further confirmed by the fact that the research covers key sectors of the economy, enabling the analysis of the effects of artificial intelligence across different business environments. The dominance of the service sector in the sample is consistent with its share in the national economy. At the same time, the adequate representation of industry, IT, and agriculture enables a comparative analysis between traditional and more technologically intensive activities. This reduces the risk of sectoral bias and increases the possibility of generalizing the results to a wider population of SMEs.

The complete survey instrument is presented in Appendix A.

4.5. Variables and Measurement

The variables used in this study were measured on a five-point Likert scale, with respondents indicating their level of agreement with the statements. A value of 1 indicated strong disagreement, while a value of 5 indicated strong agreement. The use of Likert scales is common in management and organizational research because they enable the quantification of respondents' perceptions of organizational practices, technology adoption, and business outcomes. The empirical analysis was based on six survey items designed to capture different dimensions of artificial intelligence adoption and its perceived economic effects in small and medium-sized enterprises. Three independent variables were used, while three dependent variables were used.

The independent variables reflected different dimensions of AI adoption within SMEs. The first variable, *AI_Operational*, measured the perceived use of artificial intelligence in operational activities, including automation and data analysis. The second variable, *AI_Decision*, captured the perceived use of artificial intelligence in managerial and strategic decision-making processes. The third variable, *AI_Growth*, was measured using the statement: "The application of artificial intelligence in our company has been growing in recent years." This variable captures respondents' perceptions regarding the increase in AI adoption within their organizations. It is important to emphasize that this measure does not represent longitudinal data collected at multiple points in time. Instead, it reflects respondents' subjective assessments of changes in AI adoption within their companies and should therefore be interpreted as a perception-based indicator of increasing AI use rather than an objective measure of growth over time.

The dependent variables represented three perceived business outcomes associated with AI adoption. Productivity is measured by the perceived contribution of artificial

intelligence to labor productivity. Efficiency captured the perceived improvement in business process efficiency. In contrast, Cost Reduction measured the perceived impact of artificial intelligence on reducing operating costs.

Table 1 presents the operationalization of all variables included in the empirical analysis.

Table 1. Operationalization of Variables.

Variable	Survey Item	Measurement Scale	Source
AI_Operational	Artificial intelligence is used for operational tasks (automation, data analysis).	Likert scale (1 = strongly disagree; 5 = strongly agree)	Authors' own item based on literature review
AI_Decision	Artificial intelligence is used in making management decisions.	Likert scale (1 = strongly disagree; 5 = strongly agree)	Authors' own item based on literature review
AI_Growth	The application of artificial intelligence in our company has been growing in recent years.	Likert scale (1 = strongly disagree; 5 = strongly agree)	Authors' own item based on literature review
Productivity	The application of artificial intelligence has increased labor productivity.	Likert scale (1 = strongly disagree; 5 = strongly agree)	Authors' own item based on literature review
Efficiency	Artificial intelligence has improved the efficiency of business processes.	Likert scale (1 = strongly disagree; 5 = strongly agree)	Authors' own item based on literature review
Cost Reduction	The application of artificial intelligence has reduced operating costs.	Likert scale (1 = strongly disagree; 5 = strongly agree)	Authors' own item based on literature review

Source: Authors' survey questionnaire.

The operationalization of variables was based on respondents' perceptions, which represents a common approach in studies examining technology adoption, organizational change, and innovation. Although perception-based measures may involve some subjectivity, they provide valuable insights into how managers and decision-makers evaluate the role and effects of artificial intelligence within their organizations. All variables were measured using single-item indicators. Consequently, reliability measures such as Cronbach's alpha could not be calculated, as these statistics are intended for multi-item scales designed to measure the same latent construct. The survey items were developed by the authors based on the theoretical framework and prior literature on artificial intelligence adoption, digital transformation, and business performance in SMEs.

For statistical analysis, all variables were treated as continuous, enabling the application of parametric techniques, including multiple linear regression. This approach is consistent with a large body of empirical research in economics, management, and information systems, in which Likert-scale variables are often analyzed as approximations of interval-level data.

4.6. Statistical Analysis and Model Specification

Data analysis was conducted using multiple linear regression, a statistical method that allows for the simultaneous examination of the impact of multiple independent variables on a single dependent variable. This method is particularly suitable for research in economics and management because it allows the assessment of the relative contribution of individual predictors to explaining changes in the observed dependent variable. Three separate regression models were estimated as part of the research, each with a different dependent variable and the same set of independent variables. This allowed for a comparison of the effects of

different dimensions of artificial intelligence implementation on three key aspects of business performance: labor productivity, business process efficiency, and operating cost reduction.

The general form of the regression model used can be presented as follows:

$$Y_i = \beta_0 + \beta_1 \text{AI_Operational} + \beta_2 \text{AI_Decision} + \beta_3 \text{AI_Growth} + \epsilon_i$$

where Y_i represents the corresponding dependent variable (productivity, efficiency, or costs), β_0 denotes the model intercept, β_1 – β_3 represent the regression coefficients, and ϵ_i is the random error term.

The results of the regression analysis were interpreted based on several key statistical indicators. Regression coefficients (Estimates) were used to indicate the direction and magnitude of the influence of each independent variable on the dependent variable. The statistical significance of the estimates was evaluated using p -values; results were considered significant at the 1% ($p < 0.01$) and 5% ($p < 0.05$) levels. The coefficient of determination (R^2) was used to estimate the model's explanatory power, i.e., the proportion of the dependent variable's variance explained by the included independent variables. In addition, the multiple correlation coefficient (R) provides insight into the overall relationship between the actual and predicted values of the dependent variable. To ensure the reliability of the estimates, 95% confidence intervals were also used, which provide an estimate of the range within which the true value of the regression coefficient lies. Confidence intervals also contribute to the interpretation of results by providing insight into the stability and precision of the estimates.

Statistical data processing was performed using Jamovi (version 2.5.2), which provides advanced statistical analyses, including regression analysis, model assumption testing, and results visualization. During the analysis, the basic assumptions of the regression model were also checked, including linearity of the relationship between variables, normality of the residuals, and absence of multicollinearity among the independent variables. The use of multiple linear regression in this study enabled the identification of statistically significant relationships between the application of artificial intelligence and economic outcomes, as well as the comparison of the relative importance of individual dimensions of artificial intelligence across different business performance contexts.

The data used in this research are available upon request from the authors, provided that the principles of anonymity and confidentiality of the respondents are respected. The research did not include sensitive personal data nor intervention procedures, and therefore did not require formal ethical approval. The limitations of the study include the use of a survey approach, which may introduce subjectivity in the assessment of respondents, and the cross-sectional design, which does not allow for the full identification of cause-and-effect relationships. Nevertheless, the results obtained provide relevant and reliable insight into the relationship between the application of artificial intelligence and economic effects in SMEs.

4.7. Model Assumptions and Multicollinearity

To ensure the validity and reliability of the estimated regression models, key model assumptions were examined before interpreting the results. Particular attention was devoted to the potential presence of multicollinearity among the independent variables, as high intercorrelations between predictors may distort regression coefficients and reduce the reliability of parameter estimates. Multicollinearity was assessed using collinearity statistics, with the Variance Inflation Factor (VIF) and Tolerance values serving as the primary diagnostic indicators. The obtained VIF values were equal to 1.00 for all independent variables, while Tolerance values ranged from 0.997 to 1.000. These results indicate the absence of multicollinearity and suggest that each predictor contributes independently to the

explanation of the dependent variables. Consequently, the estimated regression coefficients can be interpreted without concern regarding overlapping explanatory effects among the predictors. The absence of multicollinearity is particularly important in this study because the independent variables represent different dimensions of artificial intelligence adoption. Although conceptually related, these dimensions were measured separately and were expected to capture distinct aspects of AI use within SMEs. To provide additional evidence regarding the relationships among the predictors, a correlation analysis was conducted. Table 2 presents the collinearity statistics obtained from the regression analysis.

Table 2. Collinearity Statistics (VIF) of Independent Variables.

	VIF	Tolerance
AI_Operational	1.00	0.997
AI_Decision	1.00	1.000
AI_Growth	1.00	0.997

Source: Created by the Authors based on analysis in the Jamovi program.

To further verify the absence of multicollinearity, Table 3 presents the Pearson correlation coefficients among the independent variables included in the regression models.

Table 3. Correlation Matrix of Independent Variables.

Variable	AI_Operational	AI_Decision	AI_Growth
AI_Operational	1.000	0.006	0.052
AI_Decision	0.006	1.000	0.007
AI_Growth	0.052	0.007	1.000

Source: Created by the Authors based on analysis in the Jamovi program.

The correlation analysis revealed extremely weak relationships among the independent variables, with Pearson correlation coefficients ranging from 0.006 to 0.052. None of the observed correlations were statistically significant ($p > 0.05$), indicating that the variables represent distinct dimensions of AI adoption rather than overlapping constructs. These findings are fully consistent with the VIF values reported above and provide additional empirical support for the absence of multicollinearity. The extremely low correlations among the independent variables may be explained by the fact that each variable captures a different dimension of AI adoption. Furthermore, the use of single-item perception-based measures may have led to greater differentiation in respondents' interpretations of operational AI use, managerial AI use, and perceived AI adoption growth. Therefore, although conceptually related, these variables appear to represent distinct aspects of AI implementation within SMEs. Therefore, the regression models can be considered methodologically robust and suitable for examining the relationships between artificial intelligence adoption and business performance in small and medium-sized enterprises.

4.8. Data Availability, Ethical Considerations, and Research Limitations

The data used in this study can be made available by the authors upon request, provided that the anonymity and confidentiality of the respondents are fully protected. Since the data were collected through an anonymous questionnaire, no personally identifiable information was recorded, ensuring compliance with standard ethical principles in social science research. The study did not involve sensitive personal data, experimental interventions, or procedures that would require formal ethical approval. Participation in the survey was voluntary, and respondents were informed of the research's purpose, ensuring

transparency and adherence to basic ethical standards, including informed consent and data protection. In line with current publication standards, it should also be noted that generative artificial intelligence was not used in the research design, data collection, or statistical analysis, but only for limited linguistic refinement of the text.

Despite careful planning and execution, several limitations should be acknowledged. The study is based on survey data, which reflects respondents' subjective perceptions and may therefore introduce a degree of bias. In addition, the cross-sectional design limits the ability to establish causal relationships between the use of artificial intelligence and the observed economic outcomes, so the results should be interpreted as indicative of associations rather than strict causality. Furthermore, although the sample structure broadly reflects the composition of the Croatian economy, the service sector's strong dominance may limit the generalizability of the findings to other economic contexts. Future research could address these limitations by adopting longitudinal designs, increasing sample sizes, or incorporating additional objective performance indicators.

Another limitation relates to the use of perception-based measures of both artificial intelligence adoption and business performance. Respondents may differ in their understanding of artificial intelligence and in their ability to assess its actual effects on organizational outcomes. In addition, the study did not include control variables such as firm size, age, ownership structure, or other organizational characteristics that could independently influence business performance, independent of AI adoption. Consequently, the reported relationships should be interpreted with caution, as part of the observed variation in business outcomes may be attributable to organizational characteristics not included in the regression models. Future research could address these limitations by adopting longitudinal designs, increasing sample sizes, incorporating additional objective performance indicators, and including relevant organizational control variables.

5. Research Results

The research results provide an empirical basis for assessing the economic effects of AI implementation in small and medium-sized enterprises. This chapter first presents the basic descriptive findings, followed by the results of inferential statistical analysis, with special emphasis on the impact of different forms of AI implementation on labor productivity, business process efficiency, and reductions in operating costs. Multiple linear regression was used to test the research hypotheses. This is a statistical method that examines the impact of multiple independent variables on a single dependent variable. Three separate regression models were used in this study, each with a single dependent variable and the same three independent variables. This approach enabled a precise assessment of the relative importance of individual AI implementation dimensions in explaining different economic outcomes.

The independent variables in all models were:

- (1) application of artificial intelligence in operational tasks,
- (2) application of artificial intelligence in managerial decision-making and
- (3) Growth of application of artificial intelligence over time.

The dependent variables were analyzed separately, namely:

- (1) labor productivity,
- (2) reduction in operational costs and
- (3) efficiency of business processes.

The choice of multiple linear regression as the main analytical method is justified because it allows simultaneous assessment of the influence of multiple predictors on a particular business outcome, while also evaluating their individual statistical significance and the overall explanatory power of the model. The multiple correlation coefficient (R),

coefficient of determination (R^2), regression coefficients (Estimates), t-values, and p -values were used to interpret the results.

5.1. Descriptive Results

The analysis was conducted on a sample of 228 small and medium-sized enterprises in the Republic of Croatia. All variables were measured on a Likert scale from 1 to 5, with higher values indicating greater agreement with statements about the application of artificial intelligence and its business effects. Descriptive results indicate that the companies in the sample use artificial intelligence to some extent in business, with its most pronounced application in operational tasks, such as automation and data analysis. The application of artificial intelligence in managerial decision-making is somewhat less prevalent, though the results also indicate an increase in its use in recent years. In terms of economic effects, respondents perceive a positive impact of artificial intelligence on labor productivity and a reduction in operational costs. In contrast, the impact on business process efficiency is relatively less pronounced, indicating a more complex nature of organizational effects.

5.2. Results of Regression Analysis

To examine in more detail the relationships between the application of artificial intelligence and observed economic outcomes, a multiple linear regression analysis was conducted across three separate models. Each model allowed the assessment of the impact of three independent variables on a single dependent variable, thereby providing more precise insight into the differentiated effects of artificial intelligence across different dimensions of business performance. This approach enabled not only the identification of statistically significant relationships but also a comparison of the relative strengths of individual applications of artificial intelligence. In this way, it was possible to determine to what extent operational, managerial, and growth applications of artificial intelligence contribute to individual economic outcomes.

5.2.1. Effects on Labor Productivity

The first regression model examined the impact of artificial intelligence on labor productivity. The results indicate that the model demonstrates relatively high explanatory power ($R = 0.611$; $R^2 = 0.374$), suggesting that approximately 37.4% of the variance in labor productivity can be explained by the included independent variables. In the context of social science research, this level of explanatory power can be considered substantial.

Table 4 presents the model fit measures, including the multiple correlation coefficient and the coefficient of determination, which provide an overall assessment of the model's explanatory power.

Table 4. Model Fit Measures—Productivity.

Model	R	R^2
1	0.611	0.374

Note. Models estimated using a sample size of $N = 228$. Source: Created by the Authors based on analysis in the Jamovi program.

Table 5 presents the regression coefficients for the productivity model, including estimated effects, standard errors, confidence intervals, and levels of statistical significance for each predictor variable.

Table 5. Model Coefficients—Productivity.

Predictor	Estimate	SE	Lower	Upper	t	p
Intercept	−0.346	0.4925	−1.316	0.625	−0.703	0.483
AI_Operational	0.501	0.0616	0.380	0.623	8.132	<0.001
AI_Decision	0.459	0.0660	0.329	0.589	6.958	<0.001
AI_Growth	0.332	0.0866	0.161	0.502	3.829	<0.001

Source: Created by the Authors based on analysis in the Jamovi program.

The regression results indicate that all three independent variables are positively and significantly associated with labor productivity ($p < 0.001$), providing empirical support for the relationship between AI adoption and perceived productivity enhancement. The strongest predictor is the operational application of artificial intelligence (Estimate = 0.501; $p < 0.001$), with a 95% confidence interval (0.380–0.623) that does not include zero, confirming the robustness of the estimate. This finding highlights the importance of automation, data processing, and task optimization in improving productivity. The application of AI in managerial decision-making also shows a strong, statistically significant positive effect (Estimate = 0.459; $p < 0.001$), with a confidence interval of 0.329–0.589. This suggests that firms using AI for analytical and strategic purposes achieve better decision-making and resource-allocation outcomes.

The perceived growth in AI adoption also demonstrates a statistically significant positive association (Estimate = 0.332; $p < 0.001$), with a confidence interval of 0.161–0.502, although its impact is weaker than that of the other predictors. This indicates that the continuous expansion of AI contributes to productivity improvements, but to a lesser extent than direct implementation. A comparative assessment of the coefficients reveals a clear hierarchy of effects, where operational AI has the strongest influence, followed by managerial AI and the growth dimension. This indicates that the type and depth of AI implementation are more important than the mere expansion of its usage. The results confirm that artificial intelligence plays a central role in enhancing labor productivity, particularly through its operational application, while strategic and long-term dimensions provide complementary effects.

5.2.2. Effects on Reducing Operating Costs

The second regression model examined the impact of artificial intelligence on operating cost reductions. The results indicate that the model demonstrates relatively strong explanatory power ($R = 0.585$; $R^2 = 0.342$), suggesting that approximately 34.2% of the variance in operating cost reduction can be explained by the included independent variables. In the context of social science research, this level of explanatory power can be considered substantial. Table 6 presents the model fit measures, including the multiple correlation coefficient and the coefficient of determination, which provide an overall assessment of the model's explanatory power.

Table 6. Model Fit Measures—Cost Reduction.

Model	R	R ²
1	0.585	0.342

Note. Models estimated using a sample size of $N = 228$. Source: Created by the Authors based on analysis in the Jamovi program.

Table 7 presents the regression coefficients for the cost-reduction model, including estimated effects, standard errors, confidence intervals, and the levels of statistical significance for each predictor variable.

Table 7. Model Coefficients—Cost Reduction.

Predictor	Estimate	SE	Lower	Upper	t	p
Intercept	−2.621	0.4196	−3.448	−1.794	−6.25	<0.001
AI_Operational	0.340	0.0525	0.236	0.443	6.47	<0.001
AI_Decision	0.328	0.0562	0.217	0.439	5.84	<0.001
AI_Growth	0.440	0.0738	0.294	0.585	5.96	<0.001

Source: Created by the Authors based on analysis in the Jamovi program.

This finding suggests that respondents reporting greater growth in AI adoption also report stronger perceptions of cost reduction ($p < 0.001$), providing strong empirical support for the relationship between AI adoption and cost efficiency. The strongest predictor is the growth of AI applications over time (Estimate = 0.440; $p < 0.001$), with a 95% confidence interval (0.294–0.585) that does not include zero, confirming the stability of the estimate. This finding suggests that the benefits of artificial intelligence in reducing costs develop over time as organizations expand and integrate AI solutions more extensively. The operational application of artificial intelligence also shows a strong, statistically significant positive effect (Estimate = 0.340; $p < 0.001$), with a 95% confidence interval of 0.236–0.443. This indicates that automation and process optimization directly reduce operating costs and improve resource efficiency.

The application of AI in managerial decision-making demonstrates a statistically significant positive effect (Estimate = 0.328; $p < 0.001$), with a confidence interval of 0.217–0.439. This suggests that improved decision-making supported by AI contributes to better cost control and more efficient resource allocation. A comparison of the coefficients shows a clear hierarchy of effects, where the growth of AI applications has the strongest influence, followed by operational and managerial applications. This pattern indicates that while immediate cost reductions can be achieved through operational improvements, the strongest associations are observed among firms reporting a greater expansion and integration of artificial intelligence.

5.2.3. Effects on Business Process Efficiency

The third regression model examined the impact of artificial intelligence on business process efficiency. The results indicate that the model has lower explanatory power ($R = 0.399$; $R^2 = 0.159$), suggesting that approximately 15.9% of the variance in business process efficiency is explained by the included independent variables. In the context of social science research, this level of explanatory power is considered moderate, suggesting that efficiency is influenced by broader factors beyond those included in the model. Table 8 presents the model fit measures, including the multiple correlation coefficient and the coefficient of determination, which provide an overall assessment of the model's explanatory power.

Table 8. Model Fit Measures—Efficiency.

Model	R	R ²
1	0.399	0.159

Note. Models estimated using a sample size of $N = 228$. Source: Created by the Authors based on analysis in the Jamovi program.

Table 9 presents the regression coefficients for the efficiency model, including estimated effects, standard errors, confidence intervals, and levels of statistical significance for each predictor variable.

Table 9. Model Coefficients—Efficiency.

Predictor	Estimate	SE	Lower	Upper	t	p
Intercept	2.66397	0.5002	1.6782	3.650	5.3256	<0.001
AI_Operational	0.37830	0.0626	0.2549	0.502	6.0432	<0.001
AI_Decision	0.15837	0.0670	0.0263	0.290	2.3633	0.019
AI_Growth	−0.00497	0.0880	−0.1783	0.168	0.0565	0.955

Source: Created by the Authors based on analysis in the Jamovi program.

The regression results show that the operational application of artificial intelligence is positively and significantly associated with business process efficiency (Estimate = 0.378; $p < 0.001$), with a 95% confidence interval (0.2549–0.502), which does not include zero. This suggests that firms reporting greater use of automation and process optimization also report higher levels of business process efficiency. The application of AI in managerial decision-making also demonstrates a statistically significant positive effect (Estimate = 0.158; $p = 0.019$), with a confidence interval of 0.0263–0.290. However, the magnitude of this effect is notably smaller, suggesting that its contribution to efficiency improvements is more limited than that of operational AI.

In contrast, the growth of AI applications over time does not show a statistically significant effect on business process efficiency (Estimate = −0.00497; $p = 0.955$), as the confidence interval (−0.1783 to 0.168) includes zero. This result suggests that a perceived increase in AI adoption alone is not necessarily associated with higher levels of business process efficiency, and that the effects depend more on the specific way AI is implemented within business processes. A comparison of the coefficients reveals that operational AI is the dominant driver of efficiency improvements. At the same time, managerial applications have a secondary role, and the growth dimension does not contribute significantly. This suggests that efficiency gains are primarily achieved through direct interventions in operational processes rather than through broader or long-term expansion of AI. The results indicate that artificial intelligence contributes to business process efficiency mainly through its practical application in day-to-day operations. At the same time, other dimensions of AI adoption have more limited or conditional effects. The model's relatively low explanatory power further suggests that efficiency is influenced by additional organizational, structural, and contextual factors not fully captured in this analysis.

5.2.4. Comparative Analysis of Results

A comparison of the three regression models offers a clearer picture of how artificial intelligence influences different aspects of business performance in small and medium-sized enterprises. The findings suggest that the operational use of artificial intelligence is the most reliable predictor across all models. It is consistently positive and statistically significant, indicating that the most tangible benefits of AI are achieved at the level of everyday business operations. In practice, this means that automation, faster data processing, and process improvements play a central role in shaping business outcomes. The use of artificial intelligence in managerial decision-making also shows a positive, statistically significant effect across all models, though its impact is somewhat less pronounced. This is not surprising, as decision-support systems tend to yield indirect benefits, primarily by improving planning, coordination, and resource allocation.

A slightly different pattern emerges when looking at the growth of AI usage over time. While this variable has a noticeable and statistically significant effect on labor productivity and cost reduction, its influence on business process efficiency is not statistically confirmed. This suggests that simply increasing AI use does not automatically lead to improvements across all areas of business. More precisely, the results indicate that how AI is applied may

be more important than how widely it is used. When comparing the models' explanatory power, the strongest effects are observed for labor productivity ($R^2 = 0.374$), followed by operating cost reduction ($R^2 = 0.342$). In contrast, the model explaining business process efficiency ($R^2 = 0.159$) shows lower explanatory power. This difference suggests that productivity gains and cost reductions are more closely linked to AI adoption, whereas efficiency improvements depend on a broader range of organizational and contextual factors. Taken together, the results indicate significant relationships between AI adoption and several perceived economic outcomes in SMEs, but these effects are not equally strong across all dimensions of business performance. This uneven distribution of impacts represents an important finding of the research and provides a useful starting point for further analysis and discussion.

6. Discussion

The research results provide clear insight into the economic effects of applying artificial intelligence in small and medium-sized enterprises, with differences in intensity and mode of action observed across the dimensions of business performance. The results of the regression analysis indicate statistically significant and positive relationships between artificial intelligence adoption and the observed business outcomes, but not to the same extent. The most pronounced effects were observed in labor productivity, in line with expectations and theoretical assumptions about the role of artificial intelligence in automating and optimizing business processes. A similar pattern is also visible in the reduction in operating costs, where artificial intelligence enables the rationalization of resources and increased business efficiency. On the other hand, the effects on business process efficiency were weaker, with lower variance explained and no statistical significance for the growth variable in the application of artificial intelligence. This finding points to the conclusion that increasing the level of use of artificial intelligence in itself is not enough to improve efficiency; the key lies in the quality and method of implementing technology within organizational processes.

The role of operational artificial intelligence is particularly emphasized, as it has proven to be the most consistent and significant predictor of business performance across all models. This confirms that the greatest effects of artificial intelligence are achieved through specific applications in everyday business activities, resulting in direct increases in productivity and cost reductions. The application of artificial intelligence in managerial decision-making also has a significant, though weaker, impact, indicating its complementary role at the operational level. The results obtained are largely consistent with previous research, which emphasizes that artificial intelligence increases companies' competitiveness and efficiency, especially by improving operational processes and decision-making. At the same time, the results also confirm the views in the literature, according to which the effects of artificial intelligence are not automatically or uniformly distributed, but depend on organizational capacities, the availability of knowledge, and the method of technology implementation. From a practical perspective, the results indicate that small and medium-sized enterprises should direct their efforts towards the targeted application of artificial intelligence, especially in operational processes where the fastest and most visible effects are achieved. At the same time, it is important to develop competencies in the use of artificial intelligence for managerial decision-making to achieve long-term strategic outcomes.

At the level of economic policies, the results indicate the importance of encouraging the digital transformation of small and medium-sized enterprises by providing financial resources, education, and infrastructure prerequisites for the application of artificial intelligence. It is especially important to ensure support in the development of knowledge and

skills, so that companies can effectively implement these technologies. Overall, the research results suggest that artificial intelligence is positively associated with business performance, although the strength of these relationships varies depending on the dimension being observed. This finding represents an important contribution to understanding the role of artificial intelligence in the business of small and medium-sized enterprises.

7. Conclusions

The conducted research provided a more detailed insight into the economic effects of applying artificial intelligence in small and medium-sized enterprises, with an emphasis on labor productivity, business process efficiency, and reductions in operating costs. The results of the empirical analysis indicate significant relationships between artificial intelligence adoption and business performance, though the intensity of this impact varies across dimensions. The most pronounced effects were recorded in the area of labor productivity, where all observed dimensions of the application of artificial intelligence showed a statistically significant and positive impact. A similar pattern was observed in the reduction in operating costs, which confirms the importance of artificial intelligence in rationalizing business operations and using resources more efficiently. On the other hand, the impact on business process efficiency proved weaker, with no statistically significant correlation with the growth in the application of artificial intelligence, indicating the complexity of this dimension and its dependence on additional organizational factors. In the context of the research hypotheses, it can be concluded that hypotheses H1 and H3 are confirmed. In contrast, hypothesis H2 is partially confirmed, as not all aspects of artificial intelligence applications have had an equally strong impact on the efficiency of business processes. This outcome further emphasizes the importance of a differentiated approach in analyzing the effects of artificial intelligence.

The results suggest that the strongest positive associations are observed for the operational application of artificial intelligence, resulting in direct increases in productivity and cost reductions. At the same time, long-term effects, such as cost reduction, are associated with the continuous expansion and integration of artificial intelligence into business. In contrast, improving business process efficiency requires not only the application of technology but also appropriate organizational adjustments. From a practical perspective, the results suggest that small and medium-sized enterprises should focus on the targeted, functional implementation of artificial intelligence, especially in operational business segments. At the same time, developing management competencies and organizational readiness for the application of artificial intelligence is an important prerequisite for achieving a broader range of benefits. At the level of economic policies, the results emphasize the need for systematic support for the digital transformation of companies through education, financial incentives, and infrastructure development that enables the more effective application of artificial intelligence.

The limitations of the research relate primarily to the survey approach and the cross-sectional nature of the data, which limit the ability to determine cause-and-effect relationships. Future research could include longitudinal analyses, larger samples, and objective indicators of business performance to further deepen our understanding of the effects of artificial intelligence. In conclusion, the research results indicate that artificial intelligence is positively associated with several dimensions of business performance in small and medium-sized enterprises, while the strength of these relationships depends on the specific form and depth of implementation. It is this differentiation that makes the key contribution of this paper to understanding the role of artificial intelligence in modern business.

Author Contributions: Methodology, M.R.; Formal analysis, M.B.; Investigation, B.B. and M.R.; Resources, M.B.; Writing—original draft, M.R., M.B. and B.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted as non-interventional survey-based research and includes a total of 228 valid responses. All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional and/or national research committee and with the principles of the Declaration of Helsinki (1975, revised in 2013). In accordance with the institutional practice of the University of Zadar (Code of Ethics for Authors, Editors and Reviewers of Publications by the University of Zadar) where anonymous surveys are regularly conducted without identifying respondents, and with the general university ethical procedures in the Republic of Croatia under which the process of ethical review is initiated upon request, ethical approval for this non-interventional and anonymous study was not required.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available from the corresponding author upon reasonable request. Data are not publicly available due to confidentiality and anonymity requirements.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A Survey Questionnaire

Respondents were asked to indicate their level of agreement with each statement using a five-point Likert scale, where

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neither Agree nor Disagree
- 4 = Agree
- 5 = Strongly Agree

Independent Variables

AI_Operational

The application of artificial intelligence has improved the efficiency of operational processes in our company.

AI_Decision

Artificial intelligence supports managerial decision-making in our company.

AI_Growth

The application of artificial intelligence in our company has been growing in recent years.

Dependent Variables

Productivity

The application of artificial intelligence has increased labor productivity in our company.

Efficiency

The application of artificial intelligence has improved the efficiency of business processes in our company.

Cost Reduction

The application of artificial intelligence has reduced operating costs in our company.

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