



“Relationship between Artificial Intelligence and Business Performance in SMEs”

by

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Abstract

Artificial Intelligence is an emerging technology in industry sectors. It helps to reduce human errors in accounting, gives a faster response to customers, and reduces the material costs in industries. The main purpose of this study is to analyze the relationship between the Artificial Intelligence adoption in industries and business performance, particularly in small and medium-sized industries. The business performance refers to productivity, profit, and cost reduction in companies. In this study, we use a quantitative research method to analyze the data. The data used in this study are secondary in nature. The collected data was analyzed by using IBM SPSS to obtain accurate results. In this study Pearson Correlation test in SPSS is used to examine the relationship between the variables. Based on our results, it can be understood that Artificial Intelligence only contributes a very low level in Small and Medium Sized industries. Overall, this study adds to the existing knowledge on this field and gives reasonable insights for industries to develop their business using Artificial Intelligence.

Table of Contents

Introduction	4
Research Objective	6
Research Question	6
Literature Review	6
Artificial Intelligence adoption in SME's	6
AI and Business Productivity	7
AI and Profit	8
AI and Cost Reduction.....	9
Challenges and Limitations of AI adoption	10
Research Gap	12
Theoretical Framework and Statement of Hypothesis.....	12
Dynamic Capability Theory	12
Resource-Based View (RBV).....	13
Conceptual Framework.....	13
Research Methodology	14
Research Philosophy	14
Research Design	15
Sampling and Data Collection	15
Development of Variables	16
Ethical Consideration	16
Data Analysis	17
Data preparation.....	17
Inferential Statistics	17
Tests of Normality.....	17
Objective 1: Productivity and Years using AI	18
Objective 2: Profit and Years using AI.....	19
Objective 3: Cost reduction and Years using AI	20
Test Hypothesis.....	20
Discussion.....	21
Theoretical Implementaion	22
Practical Implementaion	22
Limitations	23

Future Research Directions.....	23
Conclusion.....	24
Reference list	26

Introduction

Artificial Intelligence has now become an essential technological innovation, playing an essential role in the growth and development of small and medium-sized enterprises. It strengthens business performance by improving data processing, transparency, security, and information traceability capabilities. Artificial intelligence enhances the resilience and operational efficiency of supply chains. Furthermore, Artificial Intelligence plays a crucial role in the decision-making ability of SME's, thereby enabling them to achieve greater competitiveness and long-term organizational sustainability (Syed Abdul Rehman Khan, 2024). During the COVID-19 pandemic, SMEs utilized AI technologies such as customer behavior analysis, Supply chain monitoring, Automated customer service, and Inventory management in their businesses. Artificial Intelligence reduces financial risk, employer-related risks, operational risks, and partnership risks in SME's businesses. Artificial Intelligence predicts consumer requirements and helps to improve online communications. Artificial Intelligence increased SMEs' organizational stability by helping them improve decision-making power and increase productivity. Artificial Intelligence also increases online sales profits in SMEs. Compared to small enterprises, medium enterprises achieve better benefits from Artificial Intelligence technologies (Nick Drydakis, 2022).

Artificial Intelligence has also transformed SME's interact with customers through improved customer communications, improving customer satisfaction, and improving online marketing activities. Artificial Intelligence helps SMEs develop effective business models and enhance market responsiveness. The main challenge is a lack of financial resources. The establishment of Artificial Intelligence technologies requires considerable financial investment, particularly for system instalments and maintenance. Due to these costs, SMEs face significant challenges in adopting Artificial Intelligence techniques in their business (Leon Oldemeyer [2024]. Adoption of Artificial Intelligence in their business activities, 80.39% of Small and Medium Enterprises planned to increase their workforce, and 86.45% of planned to increase their sales within the year following AI adoption. These results indicate that AI adoption has contributed SME's confidence in the technology by alleviating concerns regarding its negative consequences. AI is increasingly viewed as a strategic enabler of business development. Artificial Intelligence has the potential to deliver substantial benefits to Small and Medium Enterprises when effectively utilized in business activities (David Dowell et al, 2026).

Recent evidence suggests that Artificial Intelligence significantly increases trading performance by implementing trades at high speed, using algorithms for high profit, and identifying market trends. Artificial Intelligence is extensively used in cybersecurity systems, risk prediction tools, and trading to process large amounts of data quickly and accurately in financial marketing. Application of Artificial Intelligence in the financial marketing sector predict the early detection of fraud and real-time monitoring of financial transactions, Mohammad El Hajj [2023].

According to Parisa Jourabchi Amirkhizi [2025], Gen Artificial Intelligence helps in reducing environmental impacts by improving intelligent resource allocation.

AI has provided substantial opportunities. The effectiveness of Artificial Intelligence does not solely depend on its computational sophistication, algorithms, or technical architecture; rather, it is equally influenced by how humans interact with Artificial Intelligence and utilize the technology. Achieving the full effectiveness of Artificial Intelligence requires limiting unnecessary human intervention, while granting AI an appropriate level of autonomy to perform its functions and make data-driven decisions (Minjeong Ham and Jaeyoung Park, 2026).

Research conducted among Pakistan, Small and Medium Enterprises indicates that employee capability, vendor support, customer pressure, and management support have been identified as significantly influencing the adoption of Artificial Intelligence. However, the study highlights that policymakers should invest in financial incentives, low-interest financing, and comprehensive training programs to support Small and Medium Enterprises to adopt Artificial Intelligence and strengthen their capabilities (Raheem Bux Soomro et al, 2025).

Similarly, the AI implementation differs across countries due to differences in infrastructure, policy environments, and digital literacy. In stark contrast are India and Sri Lanka, which share a rapid, network-type diffusion of innovation. At the same time, Bangladesh and Nepal remain more inclined towards the individual acceptance level of innovation based upon ease of use and perceived benefits”, SSM Sadrul Huda [2025].

AI adoption is more strongly found in industries that are focused on improving efficiency, as well as those are innovation-oriented, Sanjit K [2025]. A major challenge to AI adoption in Small and Medium Enterprises is the inadequate availability of high-quality data. The effective implementation of machine learning algorithms requires access to an accurate and well-structured

data set. Small and Medium Enterprises often experience difficulties in collecting and utilizing this data compared to large enterprises. Therefore, develop SME's specific solutions that overcome data limitations (Thang Le Dinh et al, 2025).

Numerous studies have concentrated on examining the challenges involved in the adoption of Artificial Intelligence technologies and the benefits organizations derive from their implementation. In contrast, the present research extends beyond these dimensions by investigating the manner in which Artificial Intelligence contributes to the growth and development of small and medium enterprises.

Research Objective

The main aim of this study is to analyze the impact of Artificial Intelligence adoption on Small and Medium Scale industries' business performances. Accordingly, this study attempts to address the following research objectives.

- To examine the relationship between years using Artificial Intelligence and business productivity.
- To analyze the relationship between years of Artificial Intelligence implementation and company profit.
- To examine the relationship between annual cost reduction and years of Artificial Intelligence implementation.

Research Question

- “What is the relationship between company productivity and years using AI?”
- “What is the relationship between company profit and years using Artificial Intelligence?”
- “What is the relationship between annual cost reduction and the years during which AI technology was implemented in that organization?”

Literature Review

Artificial Intelligence adoption in SME's

In SMEs, the level of Artificial Intelligence adoption remains at a relatively early and nascent stage. The application of Artificial Intelligence is not yet fully integrated across organizational

functions; instead, it's primarily utilized for specific, task-oriented purposes within limited operational areas, Julia Schwaeye [2024].

Similarly, Esther Sanchez [2025] argues that In Small and medium-sized industries, there is a lack of well established definition of Artificial Intelligence adoption. There is a scarcity of longitudinal research that systematically tracks the progression of AI development over time. Furthermore, the difficulty in clearly differentiating Artificial Intelligence applications from other digital technologies creates conceptual ambiguity. These factors contribute to the limited and inconsistent adoption of Artificial Intelligence in SMEs.

The extent of AI investments also varies among organizations. (Marius Schonberger, 2023) observes that Industries differ considerably towards investing in Artificial Intelligence technologies. While some SME's are productive in pursuing early AI implementation to develop their business growth, others prefer a more cautious and phased implementation of AI. Furthermore, some SME's remains unconvinced about the necessity of Artificial Intelligence adoption. These different perspectives in industries highlight the importance of developing a flexible and context-sensitive approach to encourage AI adoption and successful integration.

According to Saeed Badghish [2024], the adoption of Artificial Intelligence within small and medium-sized enterprises contributes substantially to increased productivity, improved operational performance, and the development of long-term competitive capabilities. The research further reveals that Artificial Intelligence technologies are increasingly accepted by SMEs because AI tools are relatively easy to use and compatible with existing business processes and operational systems. Moreover, the successful implementation of Artificial Intelligence largely depends on the availability of skilled employees, adequate training programs, and the overall organizational readiness of the enterprise. The study also notes that competitive business environments and favorable government support policies act as major catalysts encouraging SMEs to adopt and utilize AI-driven technologies for sustainable growth and improved business performance.

AI and Business Productivity

Artificial Intelligence has the potential to improve industry productivity by automating business processes. "Machine Learning algorithms can analyze vast amounts of data, such as customer preferences and behavior, to offer tailored recommendations and suggestions for travel itineraries, accommodation, and activities", Miguel-Ángel García-Madurga [2023]. Similarly, Rose Oluwaseun Adetunji [2026] explains that BizAssistBot facilitates the automation of routine

operational activities in SMEs. It improves customer engagement by improving communication properly. In addition, the system is developed with a simple and intuitive interface, making it accessible and easy to operate even for users with minimal knowledge about Artificial Intelligence. However, the relationship between AI and Productivity is not always consistent. “The integration of AI into the knowledge base of a firm does not always have positive effects on labour productivity or the innovative output. The interplay between the distance to the frontier, the type of technology that is integrated, and the size of the firms plays a major role here. AI method knowledge does behave differently and even opposite to the AI application knowledge” (Kopka et al, 2024).

AI and Profit

Artificial Intelligence is enhancing financial performance by improving the forecasting accuracy and supporting better strategic decision-making. Md Hasan Zamil [2025] found that Artificial Intelligence analytical systems generate more precise financial forecasts than conventional forecasting approaches. The study further states that Artificial Intelligence supports SMEs in forecasting future cash flows and helps to improve budget planning. Artificial Intelligence detects market fluctuations at an early stage. In addition, the research emphasizes that Artificial Intelligence technologies help organizations identify potential crises situation in advance and improve their preparedness for uncertain business conditions. However, the author identifies inadequate technological infrastructure, high implementation costs, and insufficient training as major challenges to the successful adoption of Artificial Intelligence technology in SMEs.

Similarly, “Gen AI and language models are deployed in firms where practitioners have to participate in the decision-making process in order to provide adequate explanations to maintain judicial transparency and reduce machine or human errors. The investors and stakeholders are responsible for utilizing GAI to create more business opportunities. The use of GAI and LLMs in various industries to manufacture new products or provide services has to confirm to the idea of human identity, rights, freedom, cultural diversity and inclusiveness” Arpan Kumar Kar [2023].

“Various cobots have been widely applied in various areas. In this areas include communication robots in public areas. These logistic or supply chain robots move materials inside a building and articulated or industrial robots assists in automating tasks that are not ergonomically sound, such as assisting individuals in carrying large parts, or assembly lines. Since the cobots and robot can both undertake similar tasks, the differences between the two approaches were demonstrated to

highlight their usage and to show which is better than the other in certain scenarios”, Alberto Borboni[2023]. Artificial Intelligence is not reducing job opportunities, it reshapes the employment structure. Artificial Intelligence automation techniques are displacing the routine work. It automatically creates new skill oriented opportunities. Net employment impact of AI depends on the level of digital integration within the economy, Yang Shen [2024].

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AI and Cost Reduction

Artificial Intelligence contribute to cost reduction by enhancing resource utilization and operational efficiency. Panteha Farmanesh [2025] found that Artificial Intelligence positively influences green innovation practices within Small and medium-sized industries. Artificial Intelligence contributes to the reduction of industrial waste and enhances the efficiency and utilization of organizational resources, thereby supporting environmentally sustainable business operations.

Similarly, Mélanie Roux [2023] reports that the use of Artificial Intelligence enables SMEs to monitor energy consumption effectively and to anticipate crises in advance. Low carbon management has positive impact on sustainable business performance, long term competitiveness, and overall operational efficiency.

“AI technologies are increasingly being integrate into the chemical industry to optimize processes, improve efficiency, and enhance safety. These technologies help in predictive maintenance, quality control, and real time monitoring, leading to reduced production costs and improved product quality. However, challenges such as data privacy and security concerns may arise with the adoption of Artificial Intelligence in this industry” Shiza Malik [2024].

Digitalization offers numerous benefits to European organizations, particularly SME's continue to experience a slowdown in adopting digital technologies. Furthermore, both Artificial Intelligence and Robotics are positively associated with innovation, underscoring their significant role in enhancing firms and innovation (Agusti Segarra Blasco et al, 2025).

The adoption of Artificial Intelligence in SMEs significantly enhances digital value creation in a notable manner. Technological orientation serves as a crucial mediating mechanism in this relationship, acting as an important enabling factor that strengthens the overall impact of Artificial Intelligence on value generation, Muhammad Farhan Jalil [2024].

Artificial intelligence contributes certainly to the long term sustainability of organizations by improving business flexibility, strategic adaptability, and operational resilience. It also promotes continuous organizational development by enabling more effective decision making, improved operational efficiency, and adaptive strategic planning capabilities, Shohoni Mahabub [2025]. Artificial Intelligence increases the competitiveness of industries. It provides services based on the customer's requirements, Ruben Machucho [2025]. Generative Artificial Intelligence effectively promotes innovation and collaboration within the digital supply chain, thereby leading to substantial enhancement in social and governance performance. "Enterprises can harness the potential of Generative AI (GAI) to enhance their Environmental, Social, and Governance (ESG) performance, particularly when digital innovation aligns with their strategic objectives" (Shaofeng Wang and Hao Zhang, 2025).

Challenges and Limitations of AI adoption

"SMEs need to cope with important adoption hurdles while using existing Gen AI interfaces and/or customizing GenAI applications. This may include mitigating the threat to employees professional identities, dealing with the complexity and opacity of algorithms, and reducing algorithmic aversion", Kumaran Rajaram [2024]. Excessive dependence on Artificial Intelligence systems increases the risk of decision-making overly being influenced by algorithmic outputs. Moreover, opacity of algorithmic processes reduces transparency in how decisions are generated and justified. Furthermore, managerial and executive understanding of Generative Artificial Intelligence tools remains limited, affecting effective utilization. The field of Gen AI is still in a developmental stage, it necessitates further comprehensive and rigorous research to establish stronger empirical and theoretical grounding, Oscar Lopez-Solis [2025].

The strong adoption of Artificial Intelligence in business is depends not only on technological capabilities, but also on organizational, ethical, and business disciplines. For effective Artificial Intelligence integration, strong training, leadership support, and a governance mechanism are very important, Stephanie Kelley [2022].

Organizations adopting Artificial Intelligence benefit from improved strategic flexibility and rapid responsiveness to market changes. However, the lack of adequately skilled employees with Artificial Intelligence -related competencies continues to constitute a significant challenge in the industry, Irshadullah Asim Mohammed [2025]. According to Petra Apell [2023], Artificial Intelligence-based healthcare innovations are advancing at a rapid pace; however, their adoption and implementation remain uneven across regions and industries. Furthermore, Artificial Intelligence plays a crucial role in building trust among healthcare professionals by improving confidence in data-driven clinical judgements and promoting evidence-based medical practices.

“I can assist in bridging the gap between green innovation capabilities and carbon-neutral practices in the context of SMEs striving for sustainability. SMEs may overcome obstacles and increase the effect of their green innovation initiatives by utilizing AI. SMEs with green innovation potential may create environmentally friendly goods, services, and procedures. However, it can be difficult and resource-intensive to integrate and incorporate these innovations into regular operations. AIDBMI may help with these issues by identifying inefficiencies, streamlining processes, and optimizing resource consumption via the use of machine learning and sophisticated analytics” (Aqueeb Sohail Shaik et al, 2023). “Top management support significantly impacts behavioral intention to adopt AI, inferring that top insurance companies are familiar with the technology and its benefits. Executives may help in AI adoption and implementation by getting involved in the process and allocating resources. For digital innovation such as AI, a company’s senior leaders must use AI as a strategic core competency as they can predict their staff’s purpose, vision, policy, and direction”, Somya Gupta [2022].

In the Slovak Republic, the implementation of Artificial Intelligence plays a positive role in the effective management of business risks among Small and Medium Enterprises. The result indicates that the effectiveness of Artificial Intelligence differs across different categories of business risks. Artificial Intelligence demonstrated a positive influence on the management and financial risks, while its impact on operational risk management was comparatively limited (Jan Dvorsky, 2025).

According to Apoorva Vikrant Kulkarni [2024], Artificial Intelligence supports social sustainability by enabling accurate and rational decision-making, improving customer satisfaction, and reducing the work pressure of employees. However, the research also highlights certain risks, like job displacement concerns. In addition, AI system involves a large amount of personal data, and SMEs are required to adopt proper ethical frameworks for data security and transferability. The study also emphasizes that organizations should ensure adequate training for employees and strengthen digital infrastructure to support the effective and responsible implementation of Artificial Intelligence technologies.

Research Gap

Overall, existing studies in this field predominantly focus on the benefits that SMEs derive from the adoption of Artificial Intelligence technologies, as well as the associated challenges and constraints; several important research gaps remain. However, existing research primarily focused on years using AI adoption and technological capabilities, while comparatively limited research has specifically examined the AI adoption, productivity levels, and profit enhancement resulting from AI implementation. This study is therefore primarily directed towards addressing this gap in the literature by focusing on these underexplored dimensions. Moreover, a considerable proportion of prior research has largely concentrated on large industries and the advanced technological systems associated with them. Comparatively limited attention has been given to SMEs, despite representing a crucial driving force of economic activity and national development. The growth and advancement of these industries significantly contribute to overall economic expansion and sustainability. The present study examines the adoption and utilization of Artificial Intelligence techniques in SMEs, with particular emphasis on their impact on productivity enhancement, profit growth, and annual cost reduction. There are also limited studies in quantitative research. Therefore current study investigate relationship between years of using AI adoption and indicators such as productivity, profit, and cost reduction. By addressing these dimensions, the study aims to bridge a reasonable gap in the existing literature.

Theoretical Framework and Statement of Hypothesis

Dynamic Capability Theory

Ling Zhong [2026], Dynamic capability theory explains that when industries integrate with AI based on environmental change, then only sustainable advantage arises. Beyond Yuan [2022],

Dynamic Capability Theory argues that in fast-changing environmental conditions, organizations cannot attain sustained success by depending only on their existing resources and old techniques. They must continuously modify and update their functionalities in response to external changes to remain competitive and ensure long-term survival and performance. Based on this theoretical perspective, the present study analyzes the extent to which the adoption of Artificial Intelligence has influenced the reduction of annual operational expenditures within organizations following its implementation.

Resource-Based View (RBV)

This theory was first developed by Barney (1991). It provides a theoretical foundation for this current research. The Resource-Based View is created on two core principles: firm heterogeneity and path dependence. RBV is a strategic management theory that focuses on a firm's nature, and resources constitute the primary unit of analysis (Andy Lockett et al., 2009). Organizations differ in terms of their performance. The theory indicates that resources are rare and non-substitutable. It explains how Artificial Intelligence implementation can create a sustainable advantage and develop the performance of MSMEs.

The adoption of Artificial Intelligence in workforce management can considerably increase the revenue of MSME's. In addition, the integration of intelligent business practice and AI-enabled marketing strategies serves as a critical mechanism of revenue growth and enhances decision-making capabilities (Mukesh Kumar et al, 2024). Based on the above, the following hypotheses are proposed.

H0: There is no significant relationship between annual company profit and years using AI

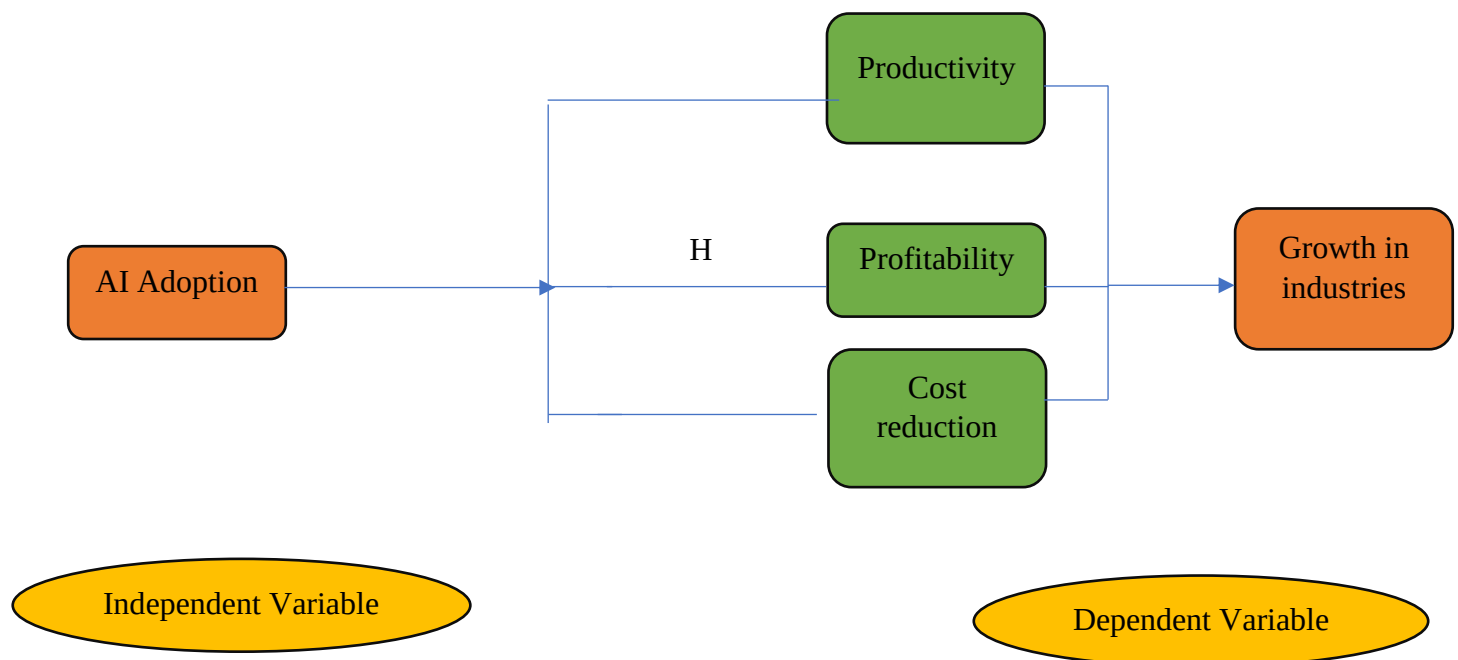
H1: There is a significant relationship between annual company profit and years using AI

Conceptual Framework

Using Artificial Intelligence in business, is significantly increases profitability and performance, Marcelo dos Santos Povoas [2025]. AI reduces maintenance requirements and expenditure in industries, Zhijuan Zong [2024].

Artificial Intelligence enhances industry performance through the automation of tasks and the enhancement of data processing. In addition, it brings about significant development in productivity by increasing operational efficiency and efficient decision-making capability (Dr. Shaifali Garg et al 2024).

In this study, Artificial Intelligence adoption is an independent variable, and the productivity, profit, and cost reductions are dependent variables. The conceptual framework aims to correctly link the dependent and independent variables.



Research Methodology

Research Philosophy

This study adopts the principles of the positivist paradigm, identifying methodological and empirical analysis. Within this philosophical approach, the researcher adopts a clear distance from the research context, avoiding personal involvement, and acts as an impartial observer in the investigation. Positivism is a philosophical approach based on the belief that reality exists independently of human insights (Kamil Erkan Kabak et al., 2024). Positivism relies on evidence that can be objectively observed and systematically examined. Within this paradigm, knowledge is generated by data collection and empirical testing rather than influenced by the researcher's personal interpretation. Positivism is guided by a hypothetico-deductive approach, in which the researchers first develop a hypothesis and then use empirical evidence to examine whether this

hypothesis is supported or not (Imogen Wells and Domenico Giacco, 2024). A positivist paradigm is appropriate for this present study, as the philosophy supports systematic investigation. This study aims to hypothesize relations based on the collected data.

Research Design

This current study adopts a quantitative method to provide appropriate results. The main objectives of this study are to focus on organizations' productivity and profit. Quantitative measurements necessary to ensure accurate and reliable research outputs. Quantitative research method is structured to evaluate hypotheses, identify relationships between variables, and measure research evidence. Quantitative research method is based on using numerical data, which are collected by a standardized data collection method, including structured surveys and experiments (Weng Marc Lim, 2025).

This study is based on secondary data sourced from the Kaggle database. The data was originally adopted from a survey administered to industry owners and managers. Because they only knew how Artificial Intelligence technologies function in their business activities. The survey aimed to investigate the organizational processes and implementation practices associated with Artificial Intelligence adoption.

The questionnaire part has a lot of key variables related to the objectives of this study. Variables like annual revenue, productivity percentage, profit percentage, and years using AI techniques are highly related to this research. These variables are effectively related to the core objective of this study. This data set measures the appropriate result to the organizational operations after using Artificial Intelligence in their business

Sampling and Data Collection

This study uses a purposive sampling method for data collection, and participants are selected based on the criteria highly related to the objectives of this study, Dalowar Hossan [2023]. The study is specifically designed to focus on organizations affiliated with artificial intelligence adoption, while excluding entities that are unrelated to technology-oriented operations.

In addition, the data set used in this research was not collected directly by the researcher; instead, it was derived from multiple secondary sources, such as global Artificial Intelligence adoption reports, digital transformation studies, and other relevant online repositories. The data set consists

of systematically structured organizational indicators relating to Artificial Intelligence adoption, automation, practice, investment activities, production performance, and the impact of Artificial Intelligence implementation on employees and organizational processes.

The data is organized in the form of how the industries function. This data is chosen for this study because of its accuracy and purity. This is very suitable for quantitative analysis. This data give a accurate statistical results for organizational functions.

Development of Variables

In this study, the independent variable is Artificial Intelligence adoption. Artificial Intelligence adoption refers to the level at which industries put artificial intelligence technologies into their business functional processes, decision-making processes, and overall managerial systems, Suddin Lada [2023]. The first dependent variable in this research is productivity. Productivity is how organizations develop their employees and technology into efficient results, Yuyan Luo [2024]. The second dependent variable, profit, is adopted from Eman Ibrahim Abde [2025]. Artificial intelligence increases profit by reducing expenditure, and decrease man power. The third dependent variable is cost reduction. It refers decrease in operational and managerial expenditure attained through the use of Artificial Intelligence techniques in organizations, Suman Adhikari [2024].

Ethical Consideration

This research was conducted using secondary data collected from the Kaggle database. This study does not involve direct contact with any human participants, interviews, or collection of primary data. The dataset was publicly available, and ethical standards were carefully followed throughout the data selection, analysis, and reporting. This ensured that the research was conducted responsibly and maintained research credibility and academic integrity. The study adheres to the data governance principles of the UK Data Protection Act (2018) and the ethical guidelines of the University of Wales Trinity Saint David.

Data Analysis

Data preparation

Data preparation and all initial analysis are made with IBM SPSS. The unwanted rows and columns are deleted. This study used 150 data. This study used a secondary data set; all responses in this data set are fully completed. It was confirmed that all the participants' answers are fully completed.

Inferential Statistics

In this study, the relationship between the Artificial Intelligence adoption and industry performance are examine by the correlation test in SPSS. Mildred Muhyila [2024], “Correlation is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship (Bonett, 2008). Correlation is a statistical technique used in bivariate analysis. Correlation analysis assesses the strength and direction of the relationship between two continuous variables”.

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
profit	.439	149	<.001	.581	149	<.001
productivity change percentage 1	.393	149	<.001	.668	149	<.001
cost reduction percentage	.116	149	<.001	.924	149	<.001
years using ai	.225	149	<.001	.802	149	<.001

a. Lilliefors Significance Correction

Before conducting correlation analysis normality of the variable is evaluated using the Shapiro-Wilk test. The output highlights that productivity (W=0.668, P=<0.001), profit (W=0.581, P=<0.001), cost reduction (W=0.924, P=<0.001), and years using AI (W=0.802, P=<0.001) did not meet the required assumption of normal distribution. Therefore, the normality test was not satisfied. Spearman's rank-order correlation was selected for identifying the relationship between the two variables.

To achieve the objectives, the Spearman's Rank correlation test is used to examine the relationship between productivity, profit, cost reduction and years using Artificial Intelligence. The primary objective of this statistical test was to investigate the relationship between these two variables.

Correlations

			profit	years using ai	productivity change percentage 1	cost_reduction_perc ent
Spearman's rho	profit	Correlation Coefficient	1.000	.186*	.227**	-.011
		Sig. (2-tailed)	.	.023	.005	.894
		N	149	149	149	149
	years using ai	Correlation Coefficient	.186*	1.000	.099	-.061
		Sig. (2-tailed)	.023	.	.231	.458
		N	149	149	149	149
	productivity change percentage 1	Correlation Coefficient	.227**	.099	1.000	.105
		Sig. (2-tailed)	.005	.231	.	.205
		N	149	149	149	149
	cost_reduction_percent	Correlation Coefficient	-.011	-.061	.105	1.000
		Sig. (2-tailed)	.894	.458	.205	.
		N	149	149	149	149

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Objective 1: Productivity and Years using AI

Statistic	Result
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Spearman's rho(p)	0.099
p-value	0.231
N	149

The above table represents the output of Spearman's Rank Correlation test to examine the relationship between productivity and years using AI. The output indicates a weak positive correlation ($p = 0.231$). According to Jan Hauke and Tomasz Kossowski (2011), the p-value was greater than 0.05; the relationship between productivity and years using Artificial Intelligence is not statistically significant. Therefore, in this selected sample, there is no linear relationship between the Artificial Intelligence implementation and the productivity range among Small and Medium-sized enterprises.

To achieve the second objective, the Pearson correlation test is used to examine the relationship between company profit and the years of using Artificial Intelligence. The main purpose of this statistical analysis was to examine the relationship between these two variables.

Objective 2: Profit and Years using AI

Statistic	Result
Spearman's rho(p)	0.186
p-value	0.023
N	149

The Spearman's Rank correlation analysis was conducted to examine the relationship between the years using Artificial Intelligence in business and the company's profit. The results indicate that there is a weak positive correlation ($p=0.023$). According to Jan Hauke and Tomasz Kossowski (2011), the p-value was less than 0.05, which is considered statistically significant. Therefore, the relationship between profit and years using Artificial Intelligence is statistically significant. Therefore, in this selected sample, there is a linear relationship between the Artificial Intelligence implementation and the profit levels. This result indicates that organizations with more years of Artificial Intelligence usage experience a slightly higher profit level.

Objective 3: Cost reduction and Years using AI

To achieve the third objective, the Spearman's Rank correlation test is used to determine the relationship between cost reduction and the years of using Artificial Intelligence. This statistical test aimed to examine the relationship between these two variables. Both variables were measured using a three-point scale, where one denotes low, two denotes medium, and three indicates a high level. Use of these scaling methods enabled the quantitative analysis of the relationship between the company's cost reduction and the years of using Artificial Intelligence.

Statistic	Result
Spearman's rho(p)	-0.061
p-value	0.458
N	149

The above Spearman's Rank correlation table explains the relationship between the years using Artificial Intelligence in business and the company's cost reduction. The results revealed a very weak negative correlation ($p=0.458$) between the company's cost reduction and years using AI. According to Jan Hauke and Tomasz Kossowski (2011), the p-value was greater than 0.05, which is considered not statistically significant. Therefore, the relationship between company cost reduction and years using Artificial Intelligence is not statistically significant. Therefore, in this selected sample, there is no linear relationship between the Artificial Intelligence implementation and the company cost reduction levels. This result indicates that organizations with more years of Artificial Intelligence usage do not positively affect the company's cost reduction.

Test Hypothesis

H0: There is no significant relationship between annual company profit and years using AI

H1: There is a significant relationship between annual company profit and years using AI

Statistic	Result
Spearman's rho(p)	0.186
p-value	0.023

N	149
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A Spearman's rank correlation test was performed to analyze the relationship between the annual profit of the company and the years using Artificial Intelligence techniques. The results indicate that there is a weak positive correlation, but it is statistically significant. Therefore, the null hypothesis H_0 is rejected and the alternative hypothesis H_1 is accepted. It indicates that an increase in the number of years using Artificial Intelligence leads to a slight increase in the company's profit level.

Discussion

RO1:

A Spearman's Rank correlation test was conducted to examine the relationship between the years using Artificial Intelligence and the company's productivity. The results show a weak positive correlation ($p = 0.231$). Therefore, there is no significant relationship between years of using AI and the company's productivity among Small and Medium-sized Enterprises.

RO2:

The Spearman's Rank Correlation test was conducted to analyze the relationship between the company's profit and the years using Artificial Intelligence. The results revealed a weak positive correlation ($p = 0.023$), which indicates that there is a statistically significant relationship between the two variables. This indicates that Small and Medium-sized enterprises with a longer duration of Artificial /intelligence implementation report slightly higher profit levels

RO3:

A Spearman's Rank correlation test was conducted to analyze the relationship between the years using Artificial Intelligence and the company's cost reduction. The results indicate that there is a very weak negative correlation ($p=0.458$). Therefore, the result shows a very weak and negative correlation; there is no significant relationship between years of using AI and the company's productivity among Small and Medium-sized industries.

Theoretical Implementaion

The results of this study positively contribute to the existing literature on the Artificial Intelligence adoption and business performance in Small and Medium organizations. These results provide limited support for Dynamic Capability Theory. According to this theory, industries enhance long-term performance by continuously adopting their resources to react to technological and environmental changes. The length of time an organization has used Artificial Intelligence does not affect operational costs. Small and Medium Enterprises require additional organizational capabilities, employee training, and a strong integration strategy.

The Results provide partial support to Resource-Based View Theory (RBV). Organizations achieve competitive advantages through the effective utilization of rare and well-organized resources. The statistically significant and positive relationship between the profit and years using AI indicates that long-term AI adoption can improve the financial performance of SME's. The weak strength of this relationship indicates that AI implementation by itself is insufficient to create a competitive advantage. Rather, AI should be integrated with complementary resources such as management practices and skilled employees to enhance its benefits.

Overall, this study highlights that the relationship between AI implementation and business performance in SME's is more complex than previously assumed. Although prolonged AI adoption produces modest improvements in an organization's profits, its influence on cost reduction and productivity remains limited. The business value of Artificial Intelligence is not only in the duration of the adoption, but also in the effectiveness of the implementation

Practical Implementaion

The results of this study have important practical implications for Small and Medium organizations managers, owners, and policymakers to enhance the implementation of Artificial Intelligence. The positive relationship between the duration of AI and the company's profit highlights that AI is more likely to emerge over time. Small and Medium organizations' owners and managers should therefore adopt a long-term perspective towards Artificial Intelligence adoption in their business performance.

This study also indicates that Artificial Intelligence adoption alone increases industry productivity and cost reduction. This research suggests that simply adopting AI technologies in business is insufficient for enhancing performance. Managers and owners should invest in digital competency

development, employee training, and management practices to ensure their employees are capable of utilizing AI technologies, or not.

Artificial Intelligence developers and technology providers should notice the resource constraints faced by Small and Medium organizations. They should design scalable, cost-effective, and user-friendly AI solutions to easily utilize these technologies in SME's business performance. Solutions that fulfill the operational needs and strategic objectives of Small and Medium-Sized industries.

The findings emphasize the importance of creating an enabling environment that supports Artificial Intelligence implementation among SME's. Given the limited operational advantages observed in this study, government agencies should introduce targeted initiatives like tax incentives, financial assistance, subsidized AI training programs to reduce the barriers associated with Artificial Intelligence adoption. These initiatives could strengthen SME's capacities to use Artificial Intelligence effectively in their business.

Overall, the results of this study suggest that a successful implementation of Artificial Intelligence among Small and Medium-Sized enterprises is not only based on adopting the technology itself, but also on enhancing the organizational capabilities and institutional environment, and managerial support is required to convert AI investments into sustained business development.

Limitations

This study has several limitations. The research was conducted using a quantitative research method based on a secondary data set collected on Kaggle. And the data did not cover all the industries; instead, it only covered Small and Medium Sized industries. This study fully focused on the adoption of Artificial Intelligence in SMEs' business performance. The performance varies based on the research; in this research, profit, cost reduction, and productivity are identified as performance. Adoption of Artificial Intelligence refers to years of using Artificial Intelligence techniques in business operations. Despite these limitations, this research gives useful insights into the relationship between Artificial Intelligence adoption and organizational performance.

Future Research Directions

This research provides valuable insights into the relationship between the Artificial Intelligence adoption and business performance among SME's. The study highlights several opportunities for future research that could develop a practical and theoretical understanding of Artificial Intelligence adoption. Future studies should expand the assessment of business activities by

incorporating financial and non-financial indicators. The current study focused on profitability, productivity, and cost reduction; future research could explore additional outcomes like customer relationship, service quality, and environmental sustainability.

Future studies should employ more advanced analytical methods to analyze the complex pathways by AI influence organizational performance. Studies involving Small and Medium-Sized Enterprises from the financial services, agriculture, manufacturing sectors, healthcare, and retail industries, as well as comparisons between emerging and developed economies. The findings indicate that there is no significant relation between productivity and cost reduction. Therefore, introducing AI in business is not enough to improve performance. Future research should adopt more comprehensive methodological approaches, richer data sets, and advance theoretical and practical understanding of Artificial Intelligence adoption among SME's. These efforts would contribute to the development of more robust theoretical models.

Conclusion

The main purpose of this study is to examine the relationship between the duration of Artificial Intelligence and the industrial activities in terms of productivity, profit, and cost reduction within Small and Medium-Sized enterprises. As a normality assumption was not satisfied, Spearman's Rank Correlation test was conducted to examine the relationships. In conclusion, it was found that there is no statistically significant relationship between the duration of Artificial Intelligence and productivity, and the company's cost reduction. When examining the profit and the duration of the Artificial Intelligence variable, it was found that there is a weak but positive relationship between the two variables. Therefore, the null hypothesis H0 (There is no significant relationship between annual company profit and years using AI) is rejected, and the alternative hypothesis H1(There is a significant relationship between annual company profit and years using AI) is accepted. This research concludes that industries that have been using Artificial Intelligence in their business activities for a long period experience only a marginal level improvement in their profit. This study indicates that Small and medium-sized industries have not yet adopted Artificial Intelligence technologies in their business properly. Overall, this study concludes that AI implementation demonstrates a limited positive association with SME business activities. Longer AI adoption is associated with modest improvements in organizations profit. These results suggest that Artificial

Intelligence adoption, measured solely by years of use, is not by itself a strong predictor of overall business performance among SME's

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