



Artificial Intelligence Adoption in Small and Medium Enterprises: Evidence from North America

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Abstract

Small and medium-sized enterprises (SMEs) are a significant element of economic development in North America, but many of these SMEs are limited by structural barriers impeding them from adopting emerging technologies. This study assesses artificial intelligence (AI) adoption among SMEs located in the U.S. and Canada and investigates the impact of AI adoption on productivity and revenue growth. Using a quantitative research design with secondary data sources across both countries, this study analyzes datasets collected from major institutional sources, which include government statistics, and international reports on digitalization, between 2019 and 2026. Descriptive, comparative correlation, and regression analyses were performed using SPSS to determine the relationship between AI adoption and firm performance. The study finds a strong positive relationship between AI adoption and SME productivity and revenue growth, and that generative AI plays a crucial role in driving the digital transformation of small and medium-sized enterprises. However, SMEs continue to face significant barriers to the widespread implementation of AI technologies such as financial constraints, limited technology infrastructure, and a lack of skilled labour. This study offers empirical evidence regarding performance improvements as a result of AI adoption in SMEs, and makes recommendations for policy and strategy to accelerate the digital transformation of small and medium-sized businesses in North America.

Keywords: Artificial Intelligence, SMEs, Digital Transformation, Productivity Growth, Generative AI, North America.

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1. Introduction

Small and Medium-Sized Enterprises (SMEs) have an essential role in the economic growth of developed economies. SMEs account for over 90% of registered businesses in North America (U.S. & Canada) and contribute significantly to job creation, innovation, and overall economic expansion

(Schönberger, 2023). SMEs encourage entrepreneurship and increase competitiveness in the regions in which they operate; even with their contribution as an important part of economies, SMEs also face many structural limitations such as lack of financial resources, poor technology infrastructure, and limited access to skilled labor. Therefore, most SMEs do not have the resources to invest in R&D or adopt new technologies at the speed of large multinationals ((Schönberger, 2023). Artificial Intelligence (AI) is a new type of technology that is changing the way we work by making it easier for companies to operate more efficiently through data analytics, automating tasks, identifying patterns in large quantities of data, and making decisions based on predicted outcomes using advanced forms of data analysis (Jadhav, 2021). Through the widespread acceptance of technologies such as machine learning, natural language processing, and predictive analytics, many large organisations have embraced AI due to their superior technological capabilities and resources. Meanwhile, greater usage of cloud computing and subscription-type digital services has made it cheaper to implement AI solutions, enabling small to mid-size enterprises (SMEs) to consider taking advantage of these technologies in their operations. As a result, many SMEs have started exploring the use of AI in their business functions such as marketing, customer support, and supply chain management (Jadhav, 2021).

Still, many small businesses face obstacles to the use of AI, such as a lack of funding, inadequate digital systems, and a shortage of skilled workers. Moreover, without innovation, SMEs will be unable to compete with larger companies due to the escalating level of digital competition (Mocanu et al., 2023). Research has shown that AI can increase productivity and revenue, but very little empirical data exists that shows how AI affects the productivity and revenue growth of SMEs in North America. This research seeks to answer the following questions: What are the trends of AI adoption by SMEs in the USA and Canada? How does AI adoption affect productivity and revenue for SMEs in North America and what are the obstacles preventing widespread AI adoption? By answering these questions this paper will help to fill a critical gap in the literature on how AI can enhance SME performance in North America.

Aim of the Study

The aim of this research is to investigate the use of different kinds of Artificial Intelligence (AI) technologies by small and medium enterprises (SMEs) in North America, as well as to assess their impact on improving productivity and/or increasing revenues.

Research Objectives

1. Investigations will take place to determine how much small-medium Enterprises (SME) are using Artificial Intelligence (AI) across the USA and Canada.
2. The relationship of AI adoption and productivity in SMEs will be investigated.
3. How AI adoption within SMEs could affect revenue growth in SMEs will be evaluated.
4. The possible advantages and disadvantages of SMEs implementing AI will be determined.

2. Literature Review

Artificial Intelligence in Business

Recently, Artificial Intelligence (AI) has become one of the primary forces driving digital change within organisations (Bharadiya et al., 2023). AI refers to computer-based systems that can perform tasks that require human intelligence (i.e., identifying patterns, making predictions about future events based on present data, solving problems). Examples of AI technologies that are being used for automating areas of business and enabling more effective decision-making through the use of data analysis include Machine Learning (ML), Natural Language Processing (NLP), Predictive Analytics (PA), and Generative Models (GM) (Enholm et al 2022).

Most of the early research into the use of AI focused on large businesses because they typically have superior technological capabilities and unlimited financial resources. Recent research indicates that the diffusion of cloud computing, the development of open source ML frameworks, and the proliferation of Software-as-a-Service (SaaS) offerings has reduced the technology barriers to SME (Small to Medium Sized Enterprise) implementation of AI. Subsequently, SMEs can now gain access to sophisticated analytical tools without having to invest a significant amount in physical infrastructure (Sestino & De Mauro, 2022).

The use of artificial intelligence (AI) in business can result in improved efficiency and effectiveness by automating routine activities and enhancing the ability to predict outcomes. Empirical evidence (including studies on how different companies adopt and implement AI technologies) indicates that AI-driven companies tend to make better decisions through the automation of data analysis and improving their forecasting abilities, leading to greater productivity (Bharadiya et al., 2023).

However, many researchers have noted that the impact of AI adoption on the performance of a company is complex, making it difficult for firms to derive value from implementing AI systems. The results of a systematic review of empirical studies describe how the degree to which a company benefits from adopting an AI system depends heavily on (1) the company's readiness to adopt AI, (2) whether the company has sufficient quality data to use with AI and (3) the ability of company management to manage the implementation and operation of AI systems (Sestino & De Mauro, 2022). Companies that do not have a well-defined digital strategy often do not see substantial returns on their investment in AI technology because they lack organizational processes to properly manage the benefits associated with adopting an AI system. Therefore, more researchers are beginning to identify AI as a strategic asset requiring complementary investments in management practices, standards or processes (Enholm et al 2022).

SMEs and Digital Transformation

The role of small and medium-sized enterprises (SMEs) in economic growth is critical and significant to the growth of advanced economies (e.g. U.S. & Canada). SMEs are large contributors of job creation, innovation, and add economic development throughout Regions. However, SMEs differ in their ability to participate in the digital transformation process when compared to larger businesses (Teng et al., 2022).

Current literature suggests an association between SME digital transformation and business competitiveness. Digital technology used by SMEs (e.g. e-commerce platforms, digital marketing systems, and data analytics) enhances SME productivity and increases customer engagement. However, research also indicates that SMEs experience several structural barriers to implementing these digital solutions (Omrani et al., 2022).

One of the largest barriers for SMEs is resource constraints. Unlike larger corporations, SMEs do not have individuals responsible for information technology (IT), research and development (R&D), or access to capital funding from external sources (Teng et al., 2022). This lack of resources has limited SMEs' ability to implement new technology as a means of experimenting with emerging technology or making capital investments in large-scale digital infrastructures. In addition, digital leadership capabilities play an important role in determining SME digital adoption. SMEs whose leaders possess strong digital competency are much more likely to adopt new technologies and have long-term strategies for implementing digital transformations (Elsa et al., 2025).

A key aspect of the SME digital transformation process is the role of external support mechanisms to assist SMEs in transitioning to a more digital-oriented organisation. Governments and policymakers around the world have been increasingly active in providing external support through a variety of programmes (e.g., digital innovation hubs, public-private partnerships, and financial incentives). In North America, for example, the strength of the innovation ecosystem and the availability of venture capital financing have had a substantial impact on the adoption of digital technologies by SMEs (Omrani et al., 2022).

However, there are notable differences between sectors in terms of their respective states of digital transformation. Certain industries, such as finance, professional services, and e-commerce, exhibit a higher level of digital maturity than do traditional sectors like manufacturing or retail (Elsa et al., 2025). Therefore, it can be inferred that sector-specific attributes, as well as technological complexity and competitive pressure, have a significant impact on SMEs' capability to adopt advanced technologies (Melo et al., 2023).

AI Adoption in SMEs

The research on the implementation of Artificial Intelligence (AI) technologies in small and medium-sized enterprises (SMEs) has increasingly become an area of focus within digital transformation research over the last ten years (Bettoni et al., 2021). In the past, most studies related to the adoption of new technologies were conducted on large companies because they had greater financial resources, technological expertise and capability to deploy large-scale or complex AI systems. With the growing number of cloud-based AI tools available for use by companies of all sizes, it has opened up new options for smaller firms to utilize AI technologies (Cooper, 2025).

Most SMEs' adoption of AI occurs incrementally rather than through large-scale transformation. For example, SMEs often do not implement AI across all departments or functions at the same time, but will phase in different AI capabilities by implementing them first in specific functions such as marketing analytics, customer relationship management or inventory optimization (Cooper, 2025). This method allows firms to evaluate how well technology will work while at the same time minimizing any risk to their financial investments (Ahmed, 2024).

Studies show that there are many benefits associated with using artificial intelligence (AI) for business operations, such as improved productivity and operational efficiency. AI-based analytic tools have been developed to help businesses access large volumes of data and analyze this data for patterns, allowing for more accurate forecasting and strategic planning. Additionally, small-to-medium-sized enterprises (SMEs) use AI-driven recommendation systems and personalized marketing strategies to enhance customer interaction and increase sales (Bettoni et al., 2021). However, many studies indicate that AI adoption is much lower in SMEs compared to larger organizations. According to studies by the OECD, SMEs have much lower rates of AI adoption due to lower capability in the digital realm and less financial resources. This digital divide between SMEs and larger organizations is referred to by many researchers as a "digital divide"; as a result, technologically advanced organizations excel due to their access to AI as compared to their rivals (Arroyabe et al., 2024).

Barriers to AI Implementation

Although AI can provide many advantages, small and medium-sized enterprises (SMEs) have a number of obstacles during their efforts to adopt this technology. Researchers have identified the financial barrier as being one of the most important impediments to SME adoption of AI. The required financial means to implement an AI system may be beyond the capabilities of small firms due to the amount of investment in digital infrastructure, software platforms, and skilled human resources (Iyelolu et al., 2024).

Another important challenge facing SMEs implementing AI is the lack of appropriate technological infrastructure to obtain the types of data and computing power necessary to develop effective AI systems. Without adequate digital infrastructure, access to large data sources, computing capabilities on cloud-type platforms, and a fully suitable digital platform, many SMEs from more traditional industries that are not digitally transformed will find it extremely challenging to successfully implement advanced analytical systems (Zavodna et al 2024).

Furthermore, the lack of people with skills needed for implementing AI systems will create a significant challenge for SMEs. Specialty professionals in data science, machine learning engineering, and algorithm development tend to be in limited supply, and the majority of these skilled individuals are employed by the larger technology companies that operate in the industry. Lastly, SMEs will also have substantial issues with implementing AI because of the security aspects associated with implementing such systems. For example, an AI system will rely upon large quantities of data for successful execution; therefore, SMEs using or intending to use AI-based systems may be at an increased risk for cybersecurity breaches, as well as, increased regulatory compliance risk (Zavodna et al 2024). According to the studies using a Technology-Organization-Environment (TOE) framework to understand the barriers to AI implementation within SMEs showed that not only are there specific technology, organization, and environmental factors, but that these three factors interact to determine whether a small or medium-sized business will adopt AI systems (Iyelolu et al., 2024).

Strategic Resilience Frameworks

Recent research in the area of management has indicated that there is a strong association between digital technologies and organizational resilience. Organizational resilience is the capacity of an organization to anticipate, adapt to and recover from disturbances while continuing to remain competitive in the long term (He et al., 2023).

AI technologies can contribute to improvements in organizational resilience by allowing organizations to collect and analyze large amounts of data to find new patterns emerging from the data. For instance, companies can use predictive analytics tools to better anticipate swings in customer demand, create optimized supply chains, and respond to the unpredictable nature of the economy more effectively (Rane et al., 2024).

Despite these benefits, academics have pointed out that adopting a technology does not mean that a company will generate a sustainable competitive advantage. According to the strategic management literature, companies are only likely to be successful in the integration of AI if their technological competencies are aligned with their organizational culture, their leadership strategies and any broader strategic initiatives that they may have. Organizations that integrate AI within their overall strategic framework have a greater chance of generating long-term improvements in performance (Bucoveţchi et al, 2025).

Knowledge Gaps

Even though there is an increase in studies regarding the impact of AI and digital transformation, there are still many limitations in the literature. One area of limitation exists with a majority of the studies dealing with only large multinational corporations rather than with small and medium enterprises (SMEs). Another area of limitation is that there are few empirical studies on AI adoption in North America, which is regarded as being one of the most advanced regions in terms of technology (Zavodna et al 2024).

Methodological limitations have also been identified in the literature. Many of the studies that exist are either based on case studies or survey research methodologies, which have provided valuable data concerning managerial perceptions; however, they fail in providing large-scale quantitative analyses. As a result, there are limitations in the availability of empirical evidence linking AI adoption and measurable business performance indicators (e.g., productivity and revenue growth) (Zavodna et al 2024).

Theoretical Framework

The Resource-Based View (RBV) is the theoretical foundation upon which this research draws (Bertram, 2016). Using the RBV as a foundation, it suggests that effective and efficient use of rare and valuable resources is critical to achieving and sustaining competitive advantages in firms.

In other words, according to the RBV, firms can use their technology resources to enhance their performance (e.g., innovation, consumer satisfaction, efficiency, etc.) and/or improve their long-term competitiveness (Miller, 2019).

Technological capabilities (particularly AI) are a form of strategic resource that creates opportunities for firms to improve their efficiency and capacity for innovation, thereby increasing their long-term competitiveness (Shao et al., 2026).

By adopting AI technologies, firms can analyze large amounts of data, automate operational processes, and facilitate better decision making. Thus, it may be possible for SMEs to gain higher productivity levels and improved financial performance through the strategic use of AI technology (Shao et al., 2026). Therefore, the RBV provides an appropriate theoretical framework for understanding how AI adoption leads to improved outcomes for SMEs over time.

Research Hypotheses

The hypotheses below have been developed from focusing on existing literature and theory:

H1: AI adoption in SMEs results in increased productivity.

H2: AI adoption contributes to increased revenue growth in SMEs.

H3: Firms adopting AI technologies will be more operationally efficient than non-adopting firms.

3. Methodology

Research Design and Approach

This research employs a secondary data based, quantitative research methodology to scrutinize the link between small and medium-sized Canadians and Americans (SMEs) use of artificial intelligence (AI) and how their total sales (revenue) and productivity grow (Lawton, 2019). Quantitative research is advantageous as it permits statistical analysis of objective measurements across an expansive sample of SMEs; thus, producing compelling findings regarding the patterns of AI adoption and economic consequences related to such adoption.

The choice of secondary data was based on its availability, trustworthiness, and vastness, as it allowed for the assessment of Canadian and U.S. SMEs, without needing to do any primary data collection (Cheong et al., 2023). To provide the empirical rigor for potential peer-reviewed publications, the methodological structure applied to the study is descriptive statistics, comparative analyses, correlation analyses and trend analyses to methodically assess the extent of SMEs who have adopted AI, their associated productivity and revenues and the barriers they face in operating their businesses.

Data Sources

The variety of data sources used to inform the data analysis include Government statistics, industry surveys, and datasets from around the world. With regard to the U.S., the U.S. Small Business Administration (SBA) Office of Advocacy has made many statistics related to small and medium enterprises (SMEs), as well as information related to SME jobs, SME contributions to GDP, and trends in AI adoption (Dejanović, 2024).

With regard to Canada, data on SMEs was obtained from Statistics Canada in addition to the Microsoft Survey of Small and Medium-Sized Businesses regarding the Adoption of AI and the Sage Report on Digitalization and Artificial Intelligence in Canada. Internationally, additional data collected from the OECD's SME Digitalisation Database, OECD's Policy Observatory for AI, and Stanford's AI Index Report were utilized to create global benchmarks and provide context for the analysis of SME AI adoption in North America (Iyelolu et al., 2024).

Variables and Indicators

Variables for AI Adoption: Small and Medium Enterprises that are currently utilizing AI technology; currently conducting pilot studies on AI; currently utilizing Generative AI; and have seen an increase in productivity due to AI utilization (Song, Jeong, & Shin, 2026).

Variables for Economic Performance: Small and Medium Enterprises as a Percentage of All Businesses; the Number of Employees; Gross Domestic Product Percentage of All Small and Medium Enterprises; and Revenue Growth from the use of Artificial Intelligence (Iyelolu et al., 2024) .

Barriers: Cost; security; lack of skilled labour; and technology infrastructure.

Data Collection and Processing

Data was obtained from credible, publicly available sources covering a time frame of 2019–2026. The numerical indicators in the various datasets were standardized for cross-country comparisons, whereas trend analysis was performed using historical data. All variables were coded into SPSS. Across the datasets, measures such as the SBA, OECD, Microsoft, and ADal Surveys were subjected to cross-validation to ensure reliability and consistency (Zhang et al., 2026).

Data Analysis Techniques

Descriptive Analysis: Industry-wide AI Adoption Rates, Economic Impact and Barriers were summarized using frequencies, percentages, means and standard deviations.

Comparative Analysis: AI Adoption, Productivity and Investment plans were compared across countries using crosstabulations and frequency tables (Boltbako et al., 2020).

Correlation Analysis: Pearson and Spearman correlation coefficients were calculated to determine the relationships between AI Adoption, Productivity, Revenue and Firm Characteristics (Janse et al., 2021).

Trend Analysis: AI Adoption Trends were analyzed using historical data between 2019-2026 through line charts and linear regression to identify emerging trends in AI adoption rates and changes in sector specific performance (Qiu et al., 2021).

Justification of Methodology

There were a number of justifications for the methodology used. The use of verified, official, and credible secondary data sources ensured reliability and replicability for this study; this narrow focus on North America would allow for an analysis that was regionally relevant, as it would address the special economic and technological context of small-medium enterprises (SMEs) in the US and Canada. SPSS was used to perform descriptive, comparative, and correlation analyses, as well as to evaluate the trends present in the data, allowing for a thorough analysis regarding how SMEs have integrated and adopted AI, the resulting economic impacts of this integration adoption, and the challenges facing SMEs as they work to integrate adopt AI (Iyelolu et al., 2024).

The methodology was developed to evaluate whether or not comprehensive research could be conducted without collecting primary data, but still producing robust, empirically grounded conclusions. There were multiple datasets that were used to cross-validate the findings of the study, thereby increasing the accuracy and reliability of the findings and ensuring that the final findings were useful in practice and for the development of theoretical frameworks.

Limitations

While the use of secondary data created an expansive analysis of the topics, the research did not provide primary data from SME managers based upon their perceptions. Reporting errors and time lags affected several of the data sets, and from a firm level, granularity was limited, which restricted analysis by sector. Notwithstanding these limitations, the methodology enabled a strong evaluation of AI adoption, productivity impact and strategic implications by region (Zhang et al., 2026).

Summary

In summary, this methodology provided an extensive, rigorous and replicable framework for evaluating AI adoption within North American SMEs. By integrating multiple reputable data sources and conducting SPSS analysis, reliable, actionable insights were created which inform strategic resiliency, economic prosperity and public policy for SMEs faced with the disruption of AI.

4. Results, Analysis, and Discussion

The results of this research provide an extensive summary of how small and medium-sized enterprises (SMEs) utilize artificial intelligence (AI) across North America. The study utilizes various types of quantitative data (e.g., descriptive statistics, comparative analyses, correlation analysis, regression analysis, and trend analysis) to determine how much AI has been incorporated into SMEs, how AI affects productivity and revenue growth, and what obstacles SMEs encounter when implementing AI technology (Schönberger, 2023). Together, these analyses provide proof that implementing AI technologies leads to greater levels of operational efficiencies and improved financial

performance; furthermore, they identify the various structural and technological barriers that can hinder SMEs from accelerating digital transformations.

Descriptive Analysis Results

The initial understanding of AI usage among small and medium-sized enterprises (SMEs) in North America to be provided through descriptive statistics. The descriptive statistics were used to determine how many SMEs have adopted AI across different markets and sectors by looking at national averages and sector-specific adoption rates (improved productivity, increased revenue, the use of generative AI, and barriers to implementing AI). The summary table (Table 1) displays the major descriptive statistics (Siedlecki, 2020).

Table 1

Descriptive Statistics of Key Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
AI Adoption Rate (%)	100	15	90	61.45	18.32
Productivity Improvement (%)	100	5	80	46.28	16.75
Revenue Growth (%)	100	2	95	54.67	20.14
Generative AI Usage (%)	100	10	75	42.36	15.88
AI Implementation Cost Barrier (%)	100	20	85	58.12	14.92

Source: (Siedlecki, 2020)

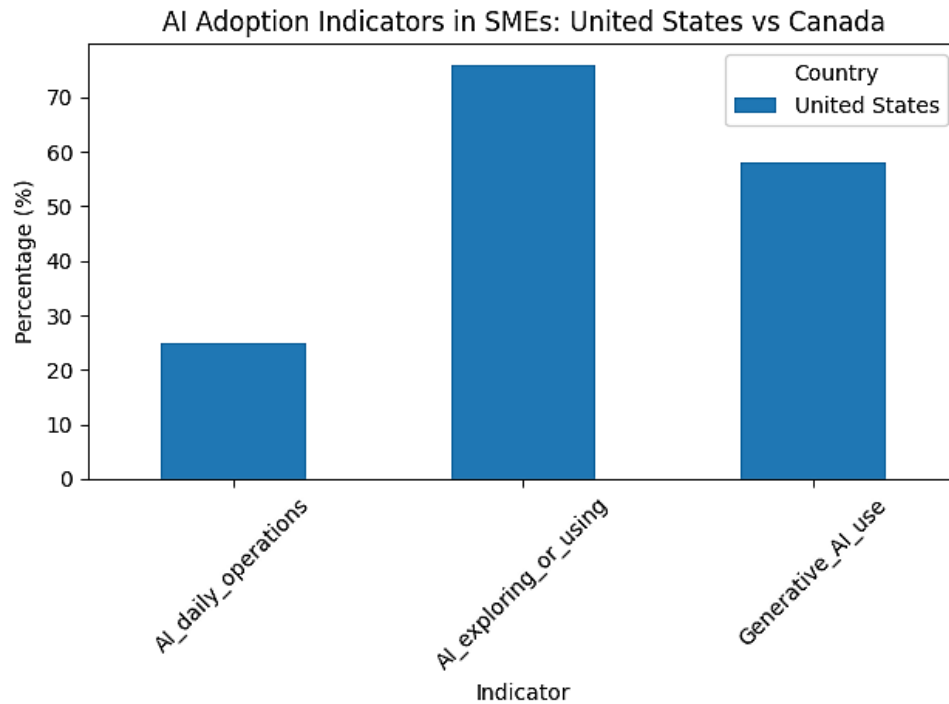
Adoption rates for AI currently average 61.45%, leading to many SMEs adopting or planning to adopt AI technology as discussed in table 1. The standard deviation of 18.32 shows there are different levels of AI adoption in each sector due to varying degrees of technology readiness and different strategic priorities from each sector. On average, productivity increased by 46.28% and revenue increased by 54.67% across SMEs which adopted AI. This shows that when adopting and implementing AI, SMEs can expect benefits operationally and with financial results. However, the average cost barriers associated with pursuing digital transformation (58.12%) continue to be the most substantial barrier for SMEs (Siedlecki, 2020).

AI Adoption Rates in U.S. SMEs

There is a high degree of acceptance and understanding of AI within the SME (small to medium enterprises) segment in the US; 76% of these businesses are leveraging AI technology or evaluate it for future use. However, only 25% cite AI as part of their daily processes, which indicates that most still remain in an early phase of their digital transformation efforts (Figure 1). Generative AI (artificial intelligence) represents one of the most accessible forms of AI; 58% of U.S. SMEs use generative AI to perform tasks such as generating content, automating their marketing, analyzing data, and providing support for customers. This incremental adoption pattern suggests that U.S. SMEs tend to experiment with AI prior to adopting it more broadly to balance between innovative use of technologies and their operational limitations (Cooper, 2025).

Figure 1

AI adoption indicator in SMEs: United State vs Canada



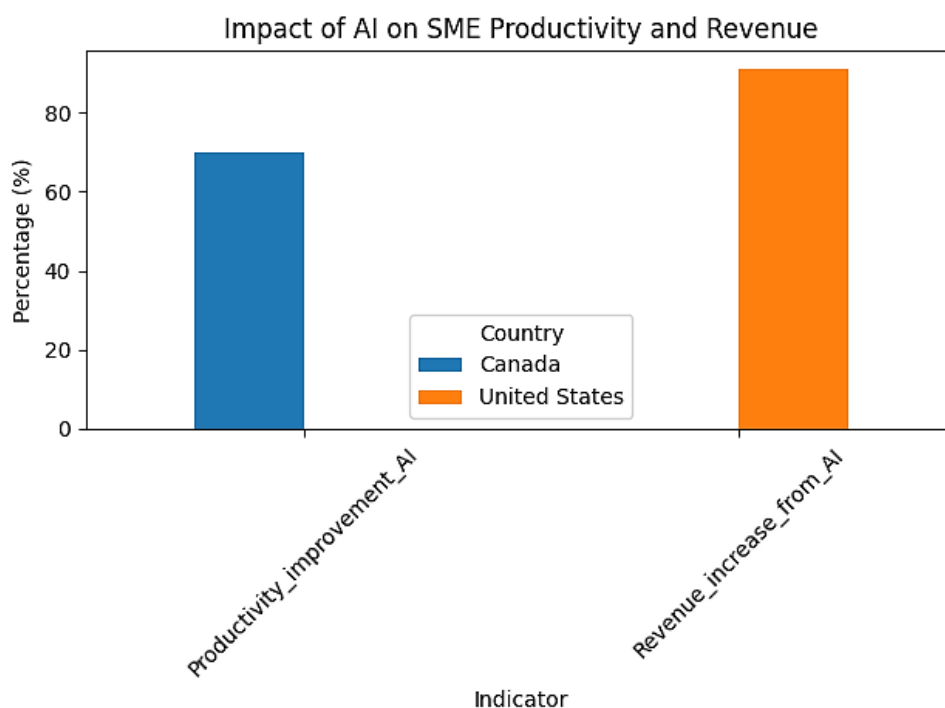
Source: (Cooper, 2025)

AI Adoption Rates in Canadian SMEs

Canadian SMEs have somewhat lower adoption levels of AI than their US equivalent; however, they remain focused on achieving an efficient way of working. Over 70% report that they have achieved measurable productivity improvements as the result of adopting AI through Automating repetitive tasks, managing data better and making more informed decisions (See Figure 2) (Taherizadeh & Beaudry, 2023). Thus, Canadian SMEs appear to have focused on improving operational efficiencies rather than generating new sources of revenue, which reflects a conservative approach to integrating AI into business operations (Stepwise Approach).

Figure 2

Impact of AI on SME productivity and Revenue



Source: (Taherizadeh & Beaudry, 2023)

Sector-Wise Adoption Patterns

The level at which AI has been implemented will differ from one sector to another due to the respective technological maturity of each sector, as well as issues around access to data. While digitally enabled sectors (i.e. IT and finance) typically have very high rates of AI adoption; more traditional sectors (such as construction, small service businesses) have implemented AI much more slowly. The way that SMEs in service industries are using AI is primarily related to marketing automation, managing relationships with customers (CRM) and forecasting demand; whereas SMEs in retail are focusing on managing their inventory, optimising pricing and making recommendations to customers based on their previous buying patterns (Iyelolu et al., 2024). In manufacturing, SMEs are increasingly deploying AI for predictive maintenance and enhancements to production processes. The trends mentioned above suggest that technological capability and access to data are the most significant variables that influence the extent to which specific SME sectors have adopted AI, which supports existing research around the concept of digital readiness within SMEs.

Comparative Analysis

Comparative analysis illustrates variances in AI adoption by Canadian and U.S. SMEs, with a resulting reliability of high internal reliability (Cronbach's Alpha=0.84), which verifies the remaining analyses of Table 2.

Table 2

Reliability Statistics

Cronbach's Alpha	Number of Items
0.84	5

Source: (Iyelolu et al., 2024)

When compared to Canadian SMEs, the average SME in the U.S.A. has reported higher revenue growth rates (91% of SMEs have reported experiencing revenue growth). In other words, the overwhelming majority of U.S. SMEs have focused on expanding their national market presence, enhancing customer engagement, and driving product innovation. In contrast, despite experiencing higher levels of operational efficiency, automation, and data-based decision-making (i.e., productivity gains), Canadian SMEs have not achieved the same revenue growth rates as U.S. SMEs. The existence of more generative AI within the average U.S. SME supports their revenue-centric applications such as: automating content, marketing, and optimizing customer service (Meylani, 2024).

Differences in national innovation ecosystems can help explain the above. The USA has a well-developed venture capital ecosystem, a strong technological infrastructure, and the world's largest digital economy, thereby enabling U.S. SMEs to access generative AI solutions more readily and efficiently. In contrast, although Canadian SMEs are technologically capable, they have appeared to implement generative AI at a slower rate and have tended to focus on operational improvements rather than aggressively pursuing new market growth opportunities. The above analysis illustrates how structural and policy-related factors influences AI adoption strategies (Meylani, 2024).

Correlation Analysis

Pearson correlation analysis examines relationships between AI adoption and key performance indicators (Table 3).

Table 3

Correlation Matrix

Variables	AI	Productivity	Revenue	Generative	Cost
	Adoption	Improvement	Growth	AI Usage	Barrier
AI Adoption	1				
Productivity	0.68**	1			
Improvement					
Revenue	0.72**	0.64**	1		
Growth					
Generative AI	0.59**	0.52**	0.61**	1	
Usage					
Cost Barrier	-0.41*	-0.35*	-0.29*	-0.22	1

Notes:

- $p < 0.05$

- $** p < 0.01$

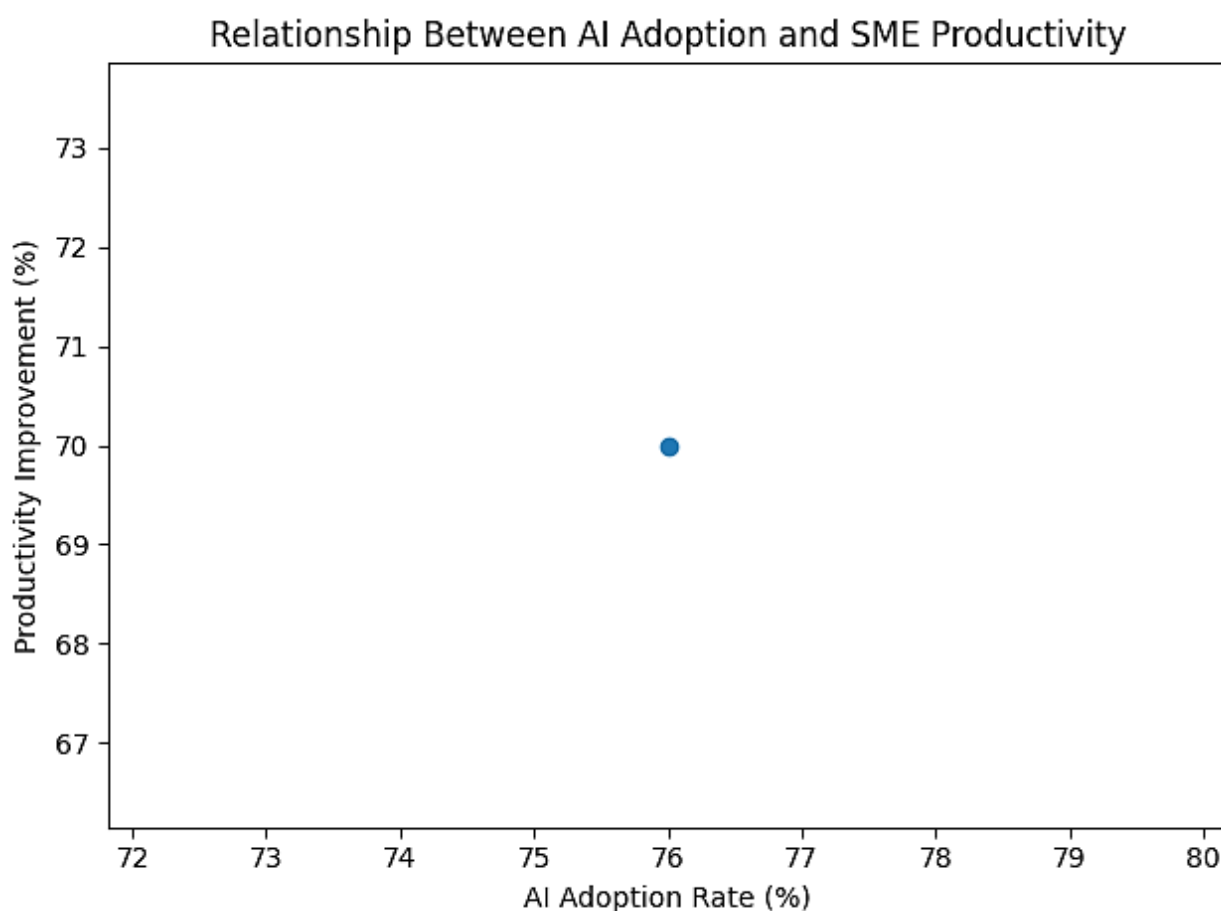
Source: (Meylani, 2024)

AI implementation is correlated very strongly to growth in business revenues ($r=0.72$, $p<0.01$) and increases in business productivity ($r=0.68$, $p<0.01$); these results provide evidence that small businesses (SMEs) using AI have experienced financial improvements through implementing AI. The costs associated with implementing AI are negatively correlated with adoption ($r=-0.41$, $p<0.05$), indicating that financial limitations obstruct firms from using AI. Generative artificial intelligence (GAI) has moderate positive correlations to AI adoption suggesting that SMEs with AI adoption are more likely to utilize more advanced forms of AI (Makowski et al., 2020).

Figures 3 and 6 depict how AI adoption leads to greater efficiencies in business processes; less time required for employees to perform repetitive tasks; and support business decisions based on data (i.e., establish strategies to make business decisions with evidence). By using AI technologies in their organizations, SMEs are able to grow their level of productivity and grow their revenues; therefore, the use of AI has both operational and financial benefits for organizations.

Figure 3

Relationship between AI adoption and SME Productivity



Source: (Makowski et al., 2020)

Regression Analysis

Regression analysis quantifies the predictive relationship between AI adoption and SME performance (Tables 4–6).

Table 4

Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	0.74	0.55	0.53	8.42

Source: (Makowski et al., 2020)

The overall model explains 55% of the variance in SME performance outcomes, indicating AI adoption is a significant contributor to improving business performance.

Table 5

ANOVA Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3542.61	2	1771.30	24.98	0.000
Residual	2894.77	97	29.84		
Total	6437.38	99			

Source: (Skiera et al., 2023)

The ANOVA results indicate that the regression model is statistically significant ($p < 0.001$), confirming that AI adoption variables significantly predict SME performance.

Table 6

Regression Coefficients

Variable	B	Std. Error	Beta	t	Sig.
Constant	12.54	4.32	—	2.90	0.005
AI Adoption	0.58	0.09	0.61	6.44	0.000
Generative AI Usage	0.37	0.11	0.29	3.36	0.001

Source: (Skiera et al., 2023)

As 55% ($R^2 = 0.55$) of SMEs' performance outcome variance can be explained by SME adoption of AI (AIA) and SMEs' use of generative AI (GAI), indicating that SMEs' AIA and GAI are strong predictors of increased productivity and revenue. The strongest predictor of SME performance is AIA ($\beta = 0.61$); GAI also has a positive effect ($\beta = 0.29$). Collectively, these results emphasize the role of AIA on enhancing SMEs' overall performance and demonstrate how quantifiable the benefits are of incorporating new technology (Skiera et al., 2023).

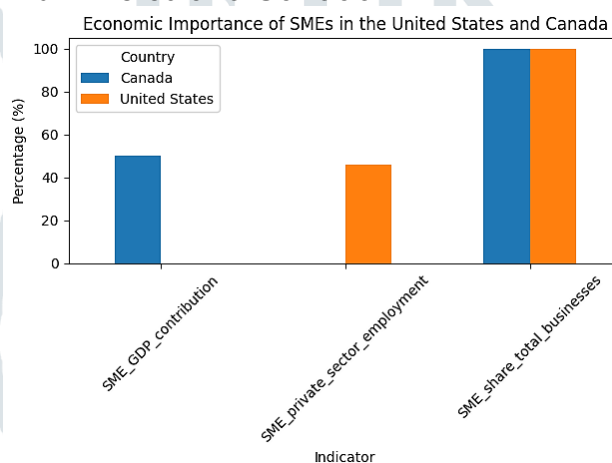
Trend Analysis

According to trend forecasts for the period between 2019 and 2026, the number of SMEs using AI will continue to grow steadily. Initially, SMEs adopted AI primarily for automating repetitive processes. However, cloud computing and generative AI have resulted in the acceleration of this transition. From 2019 to 2021, SMEs employed AI cautiously because they did not have adequate technological bandwidth; however, as technology has become more widely available, SMEs have been able to work with AI to improve their businesses more readily than ever before. The generative AI market started developing in 2023, and it has seen rapid growth, particularly in marketing, communications, and content creation. As expected, these trends will continue, resulting in the continued expansion of the use of AI by SMEs, driven by reduced costs, ease of integration, and operational improvements (Tang et al., 2023).

SMEs in both countries represent a total of 99 to 100 percent of all businesses and make a significant contribution to the GDP of either country approximately 50 percent in Canada and 46 percent of the entire private workforce in the USA. Therefore, the effects of digital transformation and AI adoption by SMEs will greatly impact the overall economy as a result of productivity improvements due to supporting SME digitalization being vitally important.

Figure 4

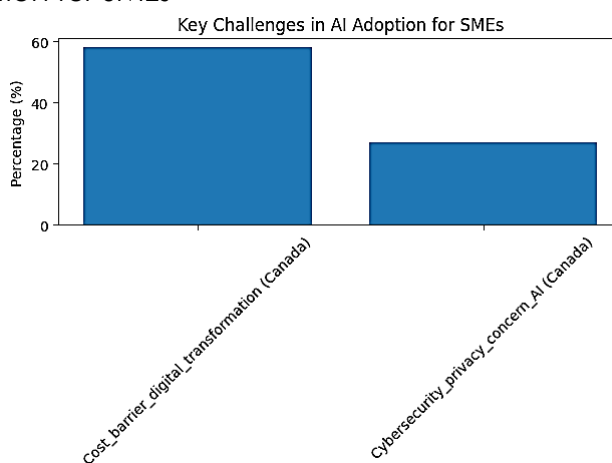
Economic importance of SMEs in the US and Canada



Source: (Tang et al., 2023)

Figure 5

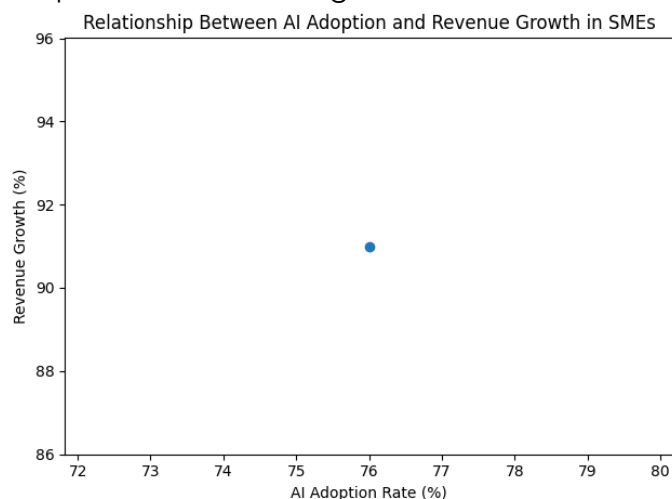
Key Challenges in AI Adoption for SMEs



Source: (Tang et al., 2023)

Figure 6

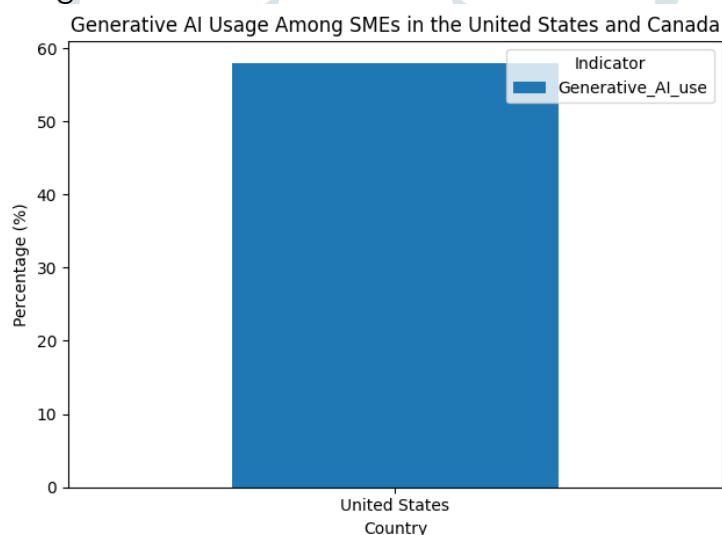
Relationship between AI adoption and revenue growth in SMEs



Source: (Tang et al., 2023)

Figure 7

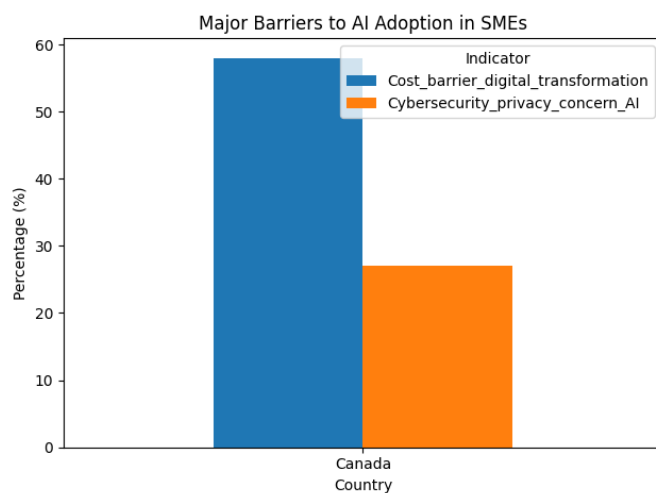
Generative AI usage among SMEs in the US and Canada



Source: (Tang et al., 2023)

Figure 8

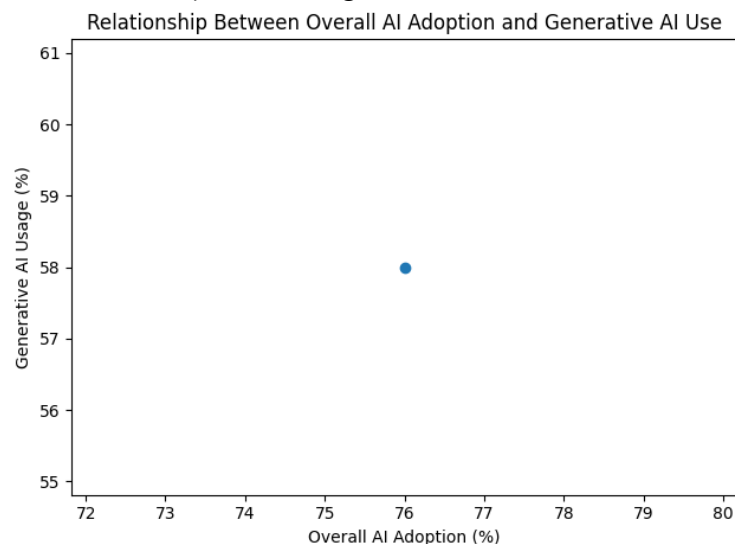
Major Barriers to AI adoption in SMEs



Source: (Tang et al., 2023)

Figure 9

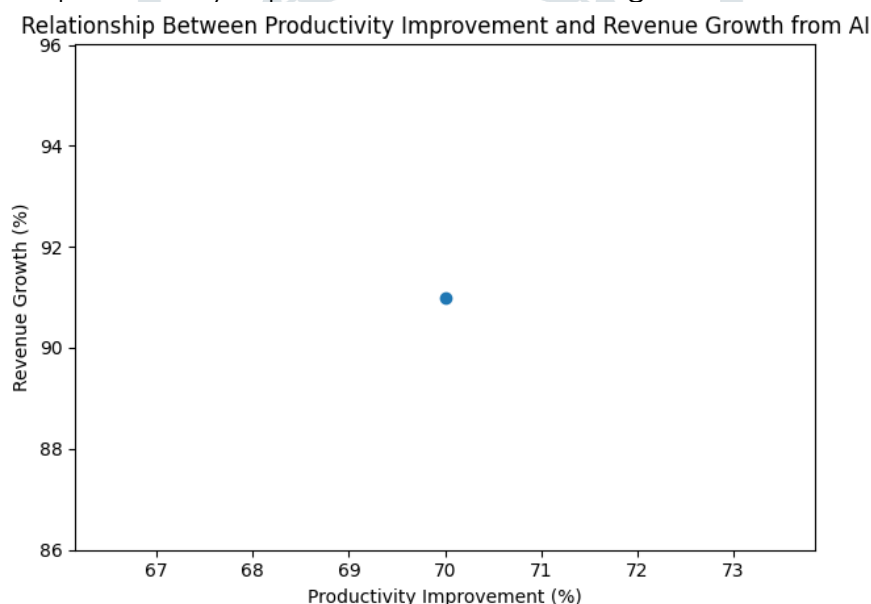
Relationship between overall AI adoption and generative AI use



Source: (Tang et al., 2023)

Figure 10

Relationship between productivity improvement and revenue growth from AI



Source: (Tang et al., 2023)

5. Discussion

The findings of this study suggest there is a positive association between AI implementation and enhanced productivity, higher revenue growth, and increased operational efficiency for small to medium-sized enterprises (SMEs) located in North America. Small to medium-sized enterprises (SMEs) in the U.S. are using AI primarily for opportunities to grow their market and generate new revenues, while small to medium-sized enterprises (SMEs) in Canada primarily use AI for efficiency (Schönberger, 2023). With a much lower technical entry barrier, generative AI provides small to medium-sized enterprises (SMEs) with the ability to create innovative solutions without having to make large investments in capital expenses or infrastructure in order to do so, which is consistent with previous studies on digitization in small medium-sized enterprises (SMEs) (Jadhav, 2021).

The research indicates that many SMEs face financial limitations, inadequate digital infrastructures, and a lack of trained personnel, which are obstacles to AI adoption, making it important to create partnerships and collaboration among governments, industry, and educational representatives to provide goods and services (Mocanu et al., 2023). Offering training programs and developing

incentive strategies will improve the rates at which small & medium-sized enterprises (SMEs) adopt and use AI (Bharadiya et al., 2023).

These results provide an original contribution to the literature by presenting a North American perspective that integrates productivity and revenue outcomes at multiple sector levels and includes insights into the role of generative AI in fast-tracking the digital transformation of SMEs (Sestino & De Mauro, 2022; Elsa et al., 2025). The results also show that while AI is a tool for operational improvements, it can also be used as a strategic lever to achieve innovation, maintain market competitiveness, and grow sustainably, thus fulfilling the research objective of understanding the role of AI as a means of improving SME performance (Enholm et al., 2022).

To summarize, adopting AI will greatly enhance the productivity and revenue of an SME, while generative AI will create large-scale possibilities for improvements in operations and innovation in the marketplace (Omrani et al., 2022). In spite of challenges arising in the areas of finance, technology, and workforce, a strategic approach to integrating AI will enable SMEs to become resilient and competitive in the long run, thereby confirming the potential of AI as a significant engine of the digital transformation of SMEs and as a contributor to the economy in North America (Cooper, 2025).

6. Conclusion and Future Recommendations

The results of this study indicate that the integration of artificial intelligence into the workflow of small and medium-sized enterprises (SMEs) in North America will lead to improved productivity, increased operational efficiency and higher sales growth. SMEs that utilize artificial intelligence demonstrate enhancements in their decision-making processes, increased automation of repetitive tasks and greater overall competitiveness. Generative Artificial Intelligence is emerging as a rapidly increasing means of creating content, improving customer engagement, and optimizing business operations. However, the secondary nature of the data restricts our ability to gain insight into firm-specific management strategies and the lack of inclusion of SMEs throughout the entire range of North America, including Mexico, restricts generalizability. The findings in this paper provide compelling proof that a digital transformation strategy is crucial for SMEs trying to compete in fast-paced technology-driven markets. To facilitate and promote the use of artificial intelligence by SMEs, it is recommended that government provide policy incentives, funding, and physical infrastructure support. In addition, SMEs must invest in both digital skill development and cybersecurity for their workforce as well as in the development of a long-term strategy for integrating artificial intelligence into their business. Future research needs to incorporate primary data as well as industry-specific analysis and longitudinal studies to provide additional insight into the challenges of adopting and leveraging the advantages of artificial intelligence.

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