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A comparative examination of perceptions of artificial intelligence's role in small businesses

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ABSTRACT

BACKGROUND AND OBJECTIVES: As artificial intelligence increasingly transforms business potential, its adoption in small businesses has become a growing interest. This study explores college students' perceptions of artificial intelligence in the context of small businesses, comparing insights from Kuwait and Malaysia. With small businesses playing a pivotal role in the economic growth of both countries, understanding how future employees perceive artificial intelligence can provide valuable guidance for educators, entrepreneurs, and policymakers. The research aims to investigate key factors such as artificial intelligence awareness, perceived benefits and challenges, willingness to adopt artificial intelligence technologies, and the perceived effectiveness of artificial intelligence in improving business operations. In addition, a bibliometric analysis was conducted to compare the research trends and national emphasis on artificial intelligence in business within the two countries.

METHODS: A quantitative research approach was employed using a structured survey distributed to a total of 834 university students from Kuwait and Malaysia. The survey collected data on various dimensions, including artificial intelligence awareness, perceived utility, anticipated challenges, and readiness to engage with artificial intelligence in small business settings. The data were statistically analyzed to determine significant differences and similarities across the two national contexts. Also, a bibliometric analysis was carried out to explore the scholarly output and collaboration trends related to artificial intelligence and business in both countries.

FINDINGS: Statistical analysis of the survey data from 834 students (433 from Malaysia and 401 from Kuwait) revealed high mean scores across all constructs, ranging from 3.90 to 4.08 on a 5-point Likert scale, indicating overall positive perceptions of AI's role in small businesses. Independent-samples t-tests showed no significant differences ($p > 0.05$) between the two countries regarding AI awareness, perceived benefits, anticipated challenges, willingness to adopt AI, and perceived impact on SMEs. Reliability coefficients (Cronbach's α) for the constructs ranged from 0.73 to 0.86, confirming internal consistency. Additionally, bibliometric analysis showed that Malaysia produced 105 relevant publications from 2010–2024, with 1,872 total citations, while Kuwait produced 10 publications from 2018–2024, with 234 citations. Despite fewer publications, Kuwait demonstrated higher average citations per paper (23.4 vs. 17.83), indicating a high-impact research contribution.

CONCLUSION: This study underscores the universal recognition of artificial intelligence's value in small businesses among young professionals in Kuwait and Malaysia. The findings highlight the need for context-sensitive policies, focused artificial intelligence education, and hands-on support mechanisms for small enterprises. Cross-cultural collaboration and targeted research initiatives are recommended to responsibly harness artificial intelligence's potential and drive sustainable innovation in the small business sector.

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INTRODUCTION

Small and Medium-Sized Enterprises (SMEs) play a crucial role in the global economy, contributing to innovation, employment, and economic growth. The significant technical advancements over the past two decades have contributed to the reallocation of resources. Internet resources and the current accessibility of big data and Artificial Intelligence (AI) have profoundly transformed the corporate environment. These developments have been beneficial in that production has been more efficient and faster, while communication has become instantaneous. AI refers to the development of computer systems that can perform tasks that typically require human intelligence, such as speech recognition, decision-making, problem-solving (Petricini et al., 2023), and self-learning (Soni et al., 2020; Al-Hunaiyyan et al., 2021C). AI plays a significant role in transforming small businesses across various aspects, offering opportunities for efficiency, growth, and innovation (Boucher et al., 2022). In addition, AI empowers small businesses by providing tools and capabilities and contributes to the sustainable growth of an increasingly digital and competitive business (Petricini et al., 2023). Furthermore, small businesses can leverage automation and AI to streamline routine tasks and make informed decisions based on customer data (Munyengeterwa et al., 2023; Bhattacharya, 2020), and can transform industries by increasing efficiency, reducing costs, improving product quality, and enhancing customer service (Kumar and Kalse, 2021). Moreover, AI can extract valuable insights from vast amounts of data, leading to more informed decision-making and better business outcomes (Campbell et al., 2020), improved marketing strategies (Francis et al., 2023). However, previous studies have indicated that challenges such as a lack of technical skills, high implementation costs, and resistance to change are common obstacles faced by SMEs (Chalmers et al., 2020). In addition, the adoption of AI among small businesses has been limited due to various barriers, including a lack of knowledge, privacy concerns, bias, and resources (Sharma, 2023; Boucher et al., 2022). Despite the growing relevance of AI in developing economies such as Kuwait, where SMEs are critical to economic growth and job creation, there remains a limited understanding of how future business leaders perceive AI, especially in terms of its practical applications, benefits, and

challenges. Malaysia's national strategy strongly supports entrepreneurs and small business owners through policies and initiatives that foster digital transformation and technology adoption (Malaysian Investment Development Authority (MIDA), 2021; Ministry of International Trade and Industry (MITI), 2018). Central to this strategy is the Malaysia Digital Economy Blueprint (MyDIGITAL), which aims to advance the country's digital economy by promoting the integration of AI and other digital tools among SMEs (Malaysia Digital Economy Corporation (MDEC), 2020). The government provides financial incentives, such as the SME Digitalisation Grant Scheme and Industry4WRD Intervention Fund, which help SMEs adopt digital technologies and enhance operational efficiency (Malaysia Digital Economy Corporation (MDEC), 2020). Additionally, agencies like Malaysia Digital Economy Corporation (MDEC) actively facilitate training and capacity-building programs, equipping entrepreneurs with the necessary skills to leverage AI and other digital solutions effectively. Similarly, Kuwait's national strategy supports entrepreneurs and small business owners by focusing on economic diversification and fostering a knowledge-based economy through digital innovation and entrepreneurship. The Kuwait Vision 2035 initiative (New Kuwait, 2018), known as "New Kuwait," aims to reduce dependency on oil revenue and stimulate the growth of the private sector, particularly by empowering SMEs. The National Fund for SME Development (2021) is a key component, providing financial support, training, and resources to nurture entrepreneurial ventures and enable small business growth. In addition, programs led by the Kuwait Foundation for the Advancement of Sciences (KFAS, 2020) promote digital skills and AI literacy, preparing entrepreneurs to integrate AI and digital tools into their businesses. Encouraging individuals to engage in entrepreneurship is crucial for the vision and mission of countries, particularly in the context of the knowledge economy, which aligns with the vision and mission of the State of Kuwait. The "New Kuwait" development plan, outlined by five strategic directions and seven pillars, aims to position Kuwait as a leading regional hub in finance, culture, and institutions by 2035. This plan emphasizes modern education as a key focus area (Al-Hunaiyyan and Al-Sharhan, 2009), developing a diverse and prosperous economy to reduce the country's dependence on

income from oil exports (Alkharafi *et al.*, 2024). Despite the rapid advancement of AI and its growing relevance in small business transformation, the rate of AI adoption among SMEs remains relatively low, particularly in developing economies. For example, a global survey by IBM in 2023 found that only 35% of small businesses have actively adopted AI technologies, citing challenges such as cost, skills shortage, and lack of awareness. In Kuwait, where SMEs contribute approximately 40% to non-oil GDP (KFAS, 2020), the National Fund for SME Development reported that less than 10% of funded businesses use AI solutions (National Fund for SME Development, 2021). Similarly, in Malaysia, although government support is extensive, a 2022 SME Corp report showed that only 21.8% of SMEs have adopted any form of AI (SME Corporation Malaysia, 2022). This gap between technological potential and practical adoption, combined with limited insights into how future business professionals perceive AI, highlights a significant problem. Understanding these perceptions is essential for designing effective AI education and policy interventions. Despite the increasing global attention on AI, its actual adoption among SMEs remains limited—especially in developing nations. According to IBM’s 2023 Global AI Adoption Index, only 35% of small businesses worldwide have actively adopted AI technologies, citing barriers such as cost, lack of technical skills, and awareness. In Kuwait, SMEs contribute around 40% to the non-oil GDP (KFAS, 2020), yet the National Fund for SME Development notes that fewer than 10% of supported businesses utilize AI-based tools. Similarly, in Malaysia, while government efforts are extensive, only 21.8% of SMEs had adopted any form of AI by 2022 (SME Corp Malaysia). This gap between AI’s transformative potential and its underutilization, particularly by future business leaders, highlights a critical knowledge and readiness gap that this study seeks to address.

Research aim, objectives, and hypothesis

This study seeks to gather quantitative data from business college students in Malaysia and Kuwait to assess their views on these benefits, thereby providing a clearer picture of how future business leaders perceive the value of AI in enhancing competitive advantage within small businesses. Examining these challenges through the lens of student awareness

and perceptions will elucidate the gaps in knowledge and support that may hinder successful AI adoption. Another objective is to explore the comparative insights into the benefits of AI adoption as understood by students from both countries (Chatterjee and Kar, 2020). Realizing these benefits requires future business leaders who understand AI’s capabilities and limitations and help educators to better prepare students and equip them with the skills needed for technology-driven business environments. The study seeks to highlight students’ readiness and willingness to adopt AI, offering critical insights for educators and policymakers to align academic programs with the digital competencies necessary for a modern workforce. By capturing comparative insights, this research provides an understanding of how cultural and economic contexts shape student perceptions of AI. Through a comparative examination of Kuwaiti and Malaysian students, the study illuminates regional differences and similarities in perceptions of AI, contributing to global insights on AI education trends. The specific objectives are:

- 1. Investigate students’ awareness and understanding of AI technologies as relevant to small businesses in Kuwait and Malaysia.*
- 2. Identify and compare students’ perceptions of the benefits of AI across the two countries.*
- 3. Examine the challenges students anticipate regarding AI implementation within small businesses.*
- 4. To compare the thematic focus, research productivity, and impact of AI and business research between Kuwait and Malaysia.*

Given that Malaysia has developed an advanced digital infrastructure through its national digital transformation plan, supported by comprehensive government initiatives and substantial research investments, this study hypothesizes that Malaysian students are likely to perceive AI in SMEs more positively than Kuwaiti students. Furthermore, this hypothesis is reinforced by a bibliometric analysis within the study, which indicates a higher volume of AI-related research and initiatives in Malaysia. Consequently, the hypothesis guiding this study is as follows:

Hypothesis: There is a significant difference in AI perceptions between Malaysian and Kuwaiti students, with Malaysian students demonstrating a stronger understanding and acceptance of AI’s potential in SMEs.

Literature review

This literature review explores key themes in AI awareness and its integration within SMEs and compares insights from previous studies on perceptions of AI's benefits, challenges, and knowledge levels among young adults, particularly students, in different cultural contexts.

Awareness of AI

Awareness of AI technologies in education plays a crucial role in shaping the perceptions and readiness of students for future employment in a landscape increasingly influenced by AI (Boucher *et al.*, 2022; Chalmers *et al.*, 2020). Research indicates that understanding AI's functionalities and potential benefits can enhance students' learning experiences and prepare them for a workforce that increasingly demands proficiency in AI-related skills (Alsharif *et al.*, 2021; Hussain *et al.*, 2022). According to Enholm *et al.*, (2021), AI is a wide-ranging set of technologies that promise several advantages for organizations in terms of added business value. A frequently cited definition of AI literacy was developed by Long *et al.*, (2021), who define it as a set of competencies that enables individuals to critically evaluate AI technologies, communicate and collaborate effectively, and use AI as a tool online, at home, and in the workplace. Awareness and understanding of AI technology are critical for successful adoption in business environments. Studies have shown that students, particularly those pursuing business and technology degrees, tend to have a basic understanding of AI, though their depth of knowledge is often limited (Zawacki-Richter *et al.*, 2019). According to (Senadjki *et al.*, 2023; Singh and Kumar, 2022), awareness, empowerment, and implementation of AI positively impact business competitiveness, with innovations in technology, society, and environment playing a mediating role. Similarly, Studies have shown that awareness of AI technologies influences perceptions of potential benefits and challenges associated with AI adoption in SMEs (Enholm *et al.*, 2021). (Zawacki-Richter *et al.*, 2019) found that while students recognize AI concepts, many lack an in-depth understanding of its applications and underlying mechanisms. This superficial understanding is a barrier to AI adoption in small businesses, as future leaders must possess both a general knowledge of AI's capabilities and a

practical understanding of its implementation in resource-constrained environments (Holmes *et al.*, 2022). Awareness of AI among small business owners is often limited, with many lacking a comprehensive understanding of AI's potential and its practical applications. Studies indicate that, while some SMEs recognize AI's capacity for improving efficiency and competitiveness, awareness is often surface-level and concentrated on well-known applications, such as customer service chatbots or recommendation algorithms (Zawacki-Richter *et al.*, 2019). According to Kumar and Kalse (2021), small business owners may be aware of AI's broad implications but lack knowledge of specific tools and applications that can benefit their operations directly. This knowledge gap is attributed to various factors, including limited resources, restricted access to training, and minimal exposure to AI-driven technologies (Sivarajah *et al.*, 2023). (Kadhim, 2024) indicated that the growing awareness and impact of AI in various sectors, particularly education, healthcare, and Business, and pointed out that AI technologies contribute to spreading awareness and educating users through the availability of programs that detect and combat fake news (Kadhim, 2024).

Perceived benefits of AI in small businesses

Perceptions of AI's role in small businesses have garnered considerable attention in recent years, particularly as educational institutions strive to equip students with relevant knowledge in technology and business (Zawacki-Richter *et al.*, 2019; Crockett *et al.*, 2023). The adoption of AI technologies holds the potential to significantly impact small businesses, enhancing their competitiveness and operational efficiency (Boucher *et al.*, 2022). The literature emphasizes the diverse nature of small enterprises, encompassing a wide range of industries, sizes, and operational models. In addition, research highlights numerous potential benefits of AI adoption for small businesses (Haenlein and Kaplan, 2019). These include improved decision-making, increased efficiency, enhanced customer experience, cost savings, and the ability to leverage data for strategic insights (Wallace, 2023). AI technologies offer small businesses innovative solutions to address operational challenges (Petricini *et al.*, 2023), possess the capacity to significantly enhance small business efficiency through the automation of jobs and the optimization

of operations (Crockett *et al.*, 2023). According to Kumar and Kalse (2021), AI utilizes machine learning algorithms to analyze data and produce valuable insights that can inform decision-making processes. This can also enhance operational efficiency and ultimately boost productivity (Wamba-Taguimdje *et al.*, 2020; Pfau and Rimpp, 2020), offering round-the-clock assistance, addressing common inquiries, and promptly handling problems in real-time (Chalmers *et al.*, 2020). In addition, AI can enhance operational efficiency, boost decision-making capabilities, support customer service, and eventually augment production (Pfau and Rimpp, 2020). Furthermore, utilizing AI-powered chatbots or virtual assistants enables small enterprises to receive assistance in customer service and support (Hale, 2018). AI can enable small businesses to optimize their marketing and advertising strategies, target the right audience with personalized messages, and ultimately drive more sales (Huang and Rust, 2020). In addition, AI can also automate various marketing tasks, such as email marketing, social media management, and content creation (Huang and Rust, 2020). The use of AI in marketing can also enhance customer personalization and engagement, analyzing customer data and preferences, and can help small businesses deliver personalized marketing (Lee *et al.*, 2019). Furthermore, the utilization of Natural Language Processing (NLP), a branch of AI, allows machines to comprehend and analyze human language, leading to a substantial optimization of diverse business operations (Alzayed and Al-Hunaiyyan, 2021). Concerning human resources, the adoption of AI can lead to the development of employment policies that are more strategic, fair, and effective. This can improve employee satisfaction, productivity, and retention (Alainati *et al.*, 2023B), ultimately contributing to the overall success and growth of the business (Lee *et al.*, 2023; Ying *et al.*, 2023). In addition, the potential for AI to contribute to self-learning and innovation within SMEs is another frequently cited benefit. AI-powered tools that facilitate personalized learning experiences and foster innovation in business operations resonate strongly with younger generations (Giuggioli and Pellegrini, 2023). Entrepreneurs can conveniently and easily gain the essential skills to properly utilize AI tools using online self-learning platforms (Al-Doub *et al.*, 2008). These platforms include a diverse range of tools, such as lessons, interactive modules, and

immediate feedback, that can assist entrepreneurs in comprehending and applying AI in their firms (Campbell *et al.*, 2020). Entrepreneurs can keep themselves updated with the latest advancements in AI, customize their learning to suit their specific business needs, and apply their newly acquired knowledge to enhance efficiency and competitiveness (Al-Hunaiyyan *et al.*, 2021; Al-Hunaiyyan *et al.*, 2021D). Moreover, the incorporation of AI in small firms is inherently connected to improving individual leadership skills (Almonawer *et al.*, 2023) and innovative problem-solving (Al-Sharhan *et al.*, 2006). AI-powered solutions can improve mobile learning experiences by offering customized, context-sensitive, and adaptable learning possibilities (Al-Hunaiyyan *et al.*, 2021), which are essential for small business owners who aim to continuously educate themselves. From a Human-Computer Interaction (HCI) perspective, it is crucial to carefully design the usability, accessibility, and user experience of these AI tools for mobile platforms to cater to a wide range of user groups (Al-Hunaiyyan *et al.*, 2021C; Alhajri *et al.*, 2011).

Challenges of AI adoption in small businesses

Despite the potential benefits, several challenges hinder the adoption of AI in small businesses. Cost and resource limitations are often the most significant barriers, as implementing AI technologies can require substantial financial investments that small businesses may not be able to afford (Enholm *et al.*, 2021). Additionally, enterprises may lack the technical expertise to manage and utilize AI tools effectively, leading to an underutilization of the technology's potential. Ethical concerns, including data privacy and security, are also cited as challenges, particularly among students who may be more attuned to the social implications of technology. According to Holmes *et al.*, (2022), young adults express a strong need for transparency in how AI algorithms make decisions, especially regarding customer data handling and employee monitoring. In cultures where privacy is highly valued, such as in Kuwait, these ethical considerations are amplified, with students expressing reservations about the implications of data disclosure (Al-Kandari *et al.*, 2017). This reflects a broader societal concern and highlights the importance of establishing robust ethical frameworks to guide AI use in businesses. Literature identifies factors such

as budget constraints, lack of skilled workforce, data security concerns, and a perceived complexity of AI technologies as obstacles to widespread adoption (Chowdhury et al., 2022). Overcoming these challenges is critical for SMEs to fully harness the benefits of AI. Researchers (Boucher et al., 2022; Wallace, 2023) highlighted the importance of AI solutions being customizable and adaptable to the specific needs of SMEs. Tailoring AI applications to the industry and operational requirements of small enterprises ensures that these technologies align with the unique characteristics and challenges faced by smaller enterprises. Government support and policies, especially in Kuwait and probably Malaysia, are recognized as influential factors in fostering AI adoption among small businesses.

Cross-cultural comparisons of AI perceptions

Cultural context significantly influences students' perceptions of AI and its applicability in small businesses. For example, studies comparing students in Kuwait and Malaysia suggest that cultural attitudes toward innovation and technology adoption vary widely between the two regions (Albanay, 2024; Khalid, 2020). In contrast, Malaysian students tend to exhibit a more favorable view of AI's transformative potential, largely due to government initiatives promoting digital literacy and innovation. Malaysia's strong emphasis on Science, Technology, Engineering, and Mathematics (STEM) education and investment in digital infrastructure has created a generation of students more inclined to embrace AI and perceive its value for economic development (Lada et al., 2023). A study by Baabdullah et al., (2021) provides background on the importance of SMEs and AI in gaining a competitive advantage, leading to an investigation of AI practices in small businesses in Saudi Arabia. The study emphasized the importance of technology readiness, such as awareness and technical infrastructure, in the acceptance of AI practices (Ahmed, 2019). They demonstrated that the acceptance of AI practices significantly influenced customer AI-based interactions. They stress that it is important to extensively familiarize people with AI practices and increase awareness of their benefits and characteristics. They assert that education and training programs can help to raise the current level of awareness and the value generated from AI practices. Moreover, Lada et al., (2023) examine

the relationship between various factors and AI Adoption among small businesses in Sabah, Malaysia, highlighting the significance of Top Management Commitment and Organization Readiness in driving AI outcomes. Findings reveal that competitive pressure, employee adaptability, and external support do not have a significant impact on AI adoption in SMEs. The study emphasizes the importance of focusing on and enhancing top management commitment and organization readiness practices to improve AI outcomes in small enterprises. Several case studies and success stories highlight instances where small businesses have successfully implemented AI technologies. These cases illustrate how AI can be applied across various sectors, showcasing tangible benefits such as increased productivity, streamlined processes, and improved competitiveness. A questionnaire was made and sent to small businesses in South Africa by Boucher, Cullen, and Calitz (2022) to find out how they felt about the use of AI technologies by small businesses. Based on the answers of 295 people who answered, only 17% were positive about the use of AI and related technologies. The results also show that only 25% of those who answered think that new technologies could help small businesses. Their research gave new information about how small and medium-sized businesses think about and use AI and other new technologies. Furthermore, Wallace (2023) examined the impact of AI from the business owner's perspective. The study sheds light on the fear of AI and anxiety about its ubiquity, while realizing how it can be leveraged to stimulate improvement in entrepreneurship. The author discussed the fundamental understanding of the related areas of study that are important for small business entrepreneurs to navigate the uncertainty at the heart of this AI-driven seismic shift in the business landscape. (Mashat, 2020) examined the use of AI in small businesses across Saudi Arabia and assessed how AI knowledge and application impact advanced entrepreneurship. Surveying 204 small businesses—predominantly tech-oriented—in major Saudi cities. The study reveals a significant gap in both AI use and knowledge. This shortfall is shown to hinder entrepreneurial growth and creativity within the local market. The findings underscore a critical need for AI integration to enhance entrepreneurial capabilities among Saudi small businesses, thereby addressing a gap in the literature on technology-

Table 1: Sample distribution according to the demographic variables (834 students)

Variables		Frequency (F)	Percent %
Gender	Male	316	37.9
	Female	518	62.1
Country	Kuwait	401	48.1
	Malaysia	433	51.9

driven entrepreneurship in the Kingdom. According to Khalid (2020), the role of AI learning in enhancing entrepreneurial performance among university students in Malaysia focuses on how entrepreneurial orientation and strategic entrepreneurship facilitate this effect. The research also examines the moderating influence of government funding and students' attitudes towards entrepreneurship. A survey conducted with 500 teaching staff across Malaysian universities revealed that AI learning significantly boosts entrepreneurial outcomes. The study confirmed that entrepreneurial orientation and strategic entrepreneurship are crucial in linking AI learning to improved entrepreneurial performance. Moreover, Albanay (2024) explored the challenges, benefits, and practical steps for successful Kuwaiti SMEs with the country's vision towards digital transformation and knowledge economy. To achieve these objectives, a quantitative research approach was employed using a structured survey distributed to a total of 834 university students from Kuwait and Malaysia.

MATERIALS AND METHODS

Research methodology

This study employed a mixed-method approach, integrating quantitative survey data with bibliometric analysis. The methodology facilitates a comparative investigation of students' perspectives in two distinct national contexts (Kuwait and Malaysia), while situating the findings within the wider academic framework of AI and SME research.

Quantitative method

This research utilized a quantitative methodology to investigate college students' perspectives on AI in small businesses in Kuwait and Malaysia.

Sample

The target population consists of students from

higher education institutions, including business college students from Malaysia and Kuwait. The investigation comprised 834 students, with 401 from Malaysia and 433 from Kuwait. The demographic data and sample distribution of the study population are presented in Table 1.

Instrument

A 5-point Likert scale questionnaire was developed to assess the responses of students regarding various aspects of AI and its impact, especially for promoting small businesses. The survey was administered to a sample of 834 college students in Malaysia and Kuwait via an online platform. In addition to the demographic part, the questionnaire comprised 27 items organized into five categories: "awareness of AI, perceived benefits of AI, perceived impact of AI on small businesses, willingness to use AI, and challenges associated with AI". Each item in these sections was evaluated on a scale from 1 ("Strongly Disagree") to 5 ("Strongly Agree"), facilitating a nuanced comprehension of students' attitudes and preparedness to use AI. This quantitative research yields measurable data that indicates student awareness and perceptions, facilitating statistical comparisons between the two nations.

Analysis and data validation

The questionnaire was distributed electronically to the selected students. The data was subsequently collected electronically. Descriptive statistics, including frequencies, percentages, mean, and standard deviation, are utilized to interpret quantitative survey data. To ascertain any statistically significant difference between the means of two independent groups (namely, students from Kuwait and Malaysia), the independent-sample t-test is employed. Additionally, SPSS was utilized to calculate the correlation coefficients. The relationships between the individual aspects and the overall score

Table 2: Reliability statistics

	Group	N of Items	Cronbach's Alpha
A	AI Awareness	4	0.73
B	Perceived Benefits of AI	6	0.81
C	Perceived Impact of AI on SMEs	8	0.86
D	Willingness and Future Involvement with AI	3	0.74
E	Challenges	6	0.73
	Total	27	0.91

were significantly strong ($p < 0.01$). Similarly, the questionnaire's reliability was assessed by calculating Cronbach's alpha using SPSS. The questionnaire's dimensions demonstrate significant reliability, as indicated by the coefficient values in Table 2, which range from 0.73 to 0.86. The overall Cronbach's Alpha coefficient is 0.91. Consequently, the questionnaire applies to the foundational study sample, and the results can be deemed reliable.

Bibliometric analysis

A bibliometric analysis was conducted to examine research trends and developments in AI and SMEs. This bibliometric approach was designed to identify and analyze relevant academic publications during different periods for Kuwait and Malaysia, thus providing contextual insights into the progression of AI-related research in the SME sector. The methodology for the bibliometric analysis followed three main phases: data collection, data processing, and data analysis.

1. *Data collection:* The Scopus database was queried using a set of keywords related to AI and SMEs to capture a broad scope of publications. The search parameters were limited to articles, conference papers, book chapters, and review papers, initially yielding 112 documents.

2. *Data Processing:* A thorough screening was conducted to remove irrelevant or duplicate entries, resulting in a refined dataset for analysis. The documents were filtered based on relevance to AI applications within SMEs, ensuring that only pertinent publications were included for in-depth analysis.

3. *Data Analysis:* The final dataset underwent a comprehensive bibliometric analysis using MS-

Excel for descriptive statistics, BiblioMagika for mapping key publication metrics, and VOSviewer for constructing and visualizing bibliometric networks. Key variables, such as publication year, source type, author affiliations, citation counts, and keywords, were analyzed to identify significant research trends, frequently cited studies, and collaborative networks within the field.

RESULTS AND DISCUSSION

Results and findings

This section combines qualitative findings to thoroughly understand the students' views on AI technologies in business promotion, along with a bibliometric analysis that describes current research in the field concerning the study objectives.

Quantitative analysis

The subsequent subsections delineate and evaluate the findings of the questionnaire that investigates students' perceptions of AI in small enterprises. Table 3 offers an overview of students' perspectives, whereas Tables 4 to 8 give statistical data across five categories, analyzing the statistical differences between students from Kuwait and Malaysia. This group of factors is: "awareness of AI, perceived benefits of AI, perceived impact of AI on small businesses, willingness to use AI, and challenges associated with AI".

Students' perspectives on AI for small businesses

Table 3 suggests that students from both Kuwait and Malaysia hold similar and largely positive views on AI's role in small businesses. Across all five factors, the mean scores are consistently high (ranging from 3.90 to 4.08 on a 5-point scale), indicating overall

TABLE 3: STUDENTS' PERSPECTIVE OF AI FOR SMALL BUSINESSES: (SIGNIFICANT DIFFERENCES) - T-TEST

	Factor	Country	Students	Mean	SD	Mean	t	Significance
A	AI Awareness	Kuwait	401	3.90	0.539	3.90	0.040	0.97
		Malaysia	433	3.90	0.551			
B	Perceived benefits of AI.	Kuwait	401	4.07	0.514	4.07	0.155	0.88
		Malaysia	433	4.08	0.523			
C	Perceived impact of AI on small businesses.	Kuwait	401	4.05	0.493	4.05	0.204	0.84
		Malaysia	433	4.06	0.507			
D	Willingness to use, or future involvement with AI.	Kuwait	401	4.01	0.589	4.01	-0.333	0.74
		Malaysia	433	4.02	0.601			
E	Challenges of AI.	Kuwait	401	4.02	0.464	4.02	-0.105	0.92
		Malaysia	433	4.03	0.475			

Table 4: Students' awareness of AI (Frequency 834)

	Question	Gender	Students	Mean	SD	t	Significance
1	I am familiar with the concept of AI.	Kuwait	401	4.06	0.664	-0.004	0.99
		Malaysia	433	4.06	0.686		
2	I have experience using AI tools and applications.	Kuwait	401	3.80	0.719	0.071	0.94
		Malaysia	433	3.80	0.730		
3	I have experience using AI tools and applications.	Kuwait	401	3.97	0.746	-0.152	0.88
		Malaysia	433	3.98	0.760		
4	I have taken course/s or participated in activities related to AI during my studies.	Kuwait	401	3.77	0.762	-0.029	0.98
		Malaysia	433	3.77	0.770		

agreement and favorable perceptions regarding AI's awareness, benefits, impact, willingness to use, and challenges. The analysis of Table 3 reveals that students from both Kuwait and Malaysia hold similar and largely positive views on AI's role in small businesses. Across all five factors, the mean scores are consistently high (ranging from 3.90 to 4.08 on a 5-point scale), indicating overall agreement and favorable perceptions regarding AI's awareness, benefits, impact, willingness to use, and challenges. In addition, no statistically significant differences between students from Kuwait and Malaysia regarding their perspectives on AI and small businesses. For AI awareness, both groups reported identical mean scores of 3.90, with a p-value of 0.97, indicating no significant difference. Similarly, perceived benefits of AI showed means of 4.07 for Kuwaiti students and 4.08 for Malaysian students, with a p-value of 0.88, suggesting similar perceptions. The perceived impact of AI on small businesses had nearly identical means (Kuwait: 4.05, Malaysia: 4.06) and a p-value

of 0.84, confirming no statistical difference. In terms of willingness to use AI, the mean scores were 4.01 and 4.02 for Kuwait and Malaysia, respectively, with a p-value of 0.74, while the challenges associated with AI were rated at 4.02 and 4.03 for Kuwait and Malaysia, with a p-value of 0.92, again showing no significant variation. The consistently high p-values (all above the 0.05 threshold) across all factors demonstrate that the perspectives of students from both countries are statistically similar. This consistency in means and standard deviations suggests a shared understanding of AI's benefits, challenges, and potential applications for small businesses across the two groups. Future research could explore additional demographic or cultural factors that may influence these perspectives or focus on specific challenges in adopting AI within different regional contexts.

Awareness of AI

The analysis of Table 4 highlights the similarities in AI awareness between students from Kuwait and

TABLE 5: STUDENTS' PERCEIVED EFFECTIVENESS OF AI (FREQUENCY 834)

	Question	Gender	Students	Mean	SD	t	Significance
1	I believe that AI tools can contribute to the Automation of tasks.	Kuwait	401	4.16	0.699	-0.064	0.95
		Malaysia	433	4.17	0.710		
2	I believe that AI tools can contribute to better decision-making in entrepreneurship.	Kuwait	401	3.91	0.742	-0.157	0.88
		Malaysia	433	3.92	0.759		
3	I believe that AI tools can contribute to increasing Competition.	Kuwait	401	4.10	0.734	0.040	0.97
		Malaysia	433	4.10	0.744		
4	I believe that AI tools can contribute to Improved media design.	Kuwait	401	4.10	0.738	-0.253	0.80
		Malaysia	433	4.11	0.756		
5	I believe that AI tools can contribute to cost savings.	Kuwait	401	4.12	0.703	0.110	0.91
		Malaysia	433	4.11	0.708		
6	I believe that AI tools can contribute to enhancing efficiency.	Kuwait	401	4.02	0.694	-0.338	0.74
		Malaysia	433	4.03	0.710		

Malaysia based on their responses to four questions about their familiarity and experience with AI. The mean scores for all questions show minimal variation between the two groups, indicating comparable levels of awareness and engagement with AI tools and education (Al-Sharhan and Al-Hunaiyyan, 2012). For the question regarding familiarity with the concept of AI, both groups achieved an identical mean score of 4.06, with a t-value of -0.004 and a significance level of 0.99, demonstrating no statistical difference. Similarly, for experience using AI tools and applications, the mean scores for both groups were 3.80, with a t-value of 0.071 and a significance level of 0.94, again reflecting no significant variation. The question assessing further experience with AI tools yielded mean scores of 3.97 for Kuwaiti students and 3.98 for Malaysian students, with a t-value of -0.152 and a significance level of 0.88, confirming statistical similarity. Lastly, the question regarding participation in AI-related courses or activities showed identical mean scores of 3.77 for both groups, with a t-value of -0.029 and a significance level of 0.98, reinforcing the lack of significant difference. These results suggest a uniform level of awareness and exposure to AI among students from Kuwait and Malaysia, reflecting a shared understanding and interest in AI despite potential regional or cultural differences. This alignment underscores the global nature of AI awareness and its increasing integration into education systems across diverse contexts.

Perceived benefits of AI

Table 5 highlights students' perceived effectiveness of AI tools across six items, with data from both Kuwaiti and Malaysian students showing strikingly similar results. For the belief that AI tools can contribute to task automation, the mean scores were 4.16 for Kuwait and 4.17 for Malaysia, with a t-value of -0.064 and a significance level of 0.95, indicating no statistical difference. In terms of AI's role in better decision-making in entrepreneurship, both groups rated this highly, with means of 3.91 for Kuwait and 3.92 for Malaysia, yielding a t-value of -0.157 and a significance level of 0.88. The belief that AI tools enhance competition also showed identical mean scores of 4.10 for both groups, with a t-value of 0.040 and a significance level of 0.97. Regarding improved media design, Kuwaiti students scored 4.10 and Malaysian students 4.11, with a t-value of -0.253 and a significance level of 0.80, further confirming similarity. Cost savings also received high ratings, with means of 4.12 (Kuwait) and 4.11 (Malaysia), a t-value of 0.110, and a significance level of 0.91. Finally, for efficiency enhancement, the scores were 4.02 (Kuwait) and 4.03 (Malaysia), with a t-value of -0.338 and a significance level of 0.74. Across all six dimensions, the consistently high mean scores (ranging from 3.91 to 4.17) demonstrate strong agreement on the effectiveness of AI tools, while the consistently high p-values (all above 0.05) show no statistically significant differences between the two groups.

TABLE 6: STUDENTS' PERCEIVED IMPACT OF AI IN PROMOTING BUSINESSES (FREQUENCY 834)

	Question	Country	Students	Mean	SD	t	Significance
1	AI tools have the potential to enhance the efficiency of small business operations.	Kuwait	401	4.09	0.647	0.053	0.96
		Malaysia	433	4.09	0.659		
2	I believe that AI tools can contribute to better decision-making in entrepreneurship.	Kuwait	401	3.92	0.721	-0.077	0.94
		Malaysia	433	3.93	0.740		
3	I believe that AI tools can positively impact the promotion of small businesses.	Kuwait	401	4.07	0.669	-0.072	0.94
		Malaysia	433	4.08	0.687		
4	I believe that AI tools can make Innovation for SMEs.	Kuwait	401	4.08	0.771	-0.169	0.87
		Malaysia	433	4.09	0.784		
5	I believe that AI helps in cost-saving for SMEs.	Kuwait	401	4.05	0.754	-0.175	0.86
		Malaysia	433	4.06	0.770		
6	The use of AI tools is essential for the growth and success of small businesses.	Kuwait	401	4.02	0.702	-0.084	0.93
		Malaysia	433	4.02	0.724		
7	Artificial Intelligence has value in SMEs – Business.	Kuwait	401	4.12	0.637	-0.278	0.78
		Malaysia	433	4.14	0.655		
8	I trust AI to do the job and tasks for businesses	Kuwait	401	4.02	0.685	-0.346	0.73
		Malaysia	433	4.04	0.701		

These results underscore a shared understanding among students from Kuwait and Malaysia regarding AI's potential to automate tasks, improve decision-making, foster competition, enhance media design, reduce costs, and increase efficiency, reflecting global recognition of AI's transformative potential in diverse fields.

Perceived impact of AI on small businesses

The analysis of Table 6 reveals that students from Kuwait and Malaysia share remarkably similar perceptions of AI's impact on promoting businesses, particularly SMEs. Across all eight questions, the mean scores are consistently high (ranging from 3.92 to 4.14), reflecting strong agreement on the positive contributions of AI to business operations. The data show no statistically significant differences between the two groups for any of the questions, as all p-values exceed 0.05, indicating alignment in their views. For instance, both Kuwaiti and Malaysian students agree that AI tools enhance the efficiency of small business operations, with identical mean scores of 4.09 and a t-value of 0.053. Similarly, they believe AI contributes to better decision-making in entrepreneurship (Kuwait: 3.92, Malaysia: 3.93) and positively impacts business promotion (Kuwait: 4.07, Malaysia: 4.08), with negligible differences and non-significant t-values (-0.077 and -0.072, respectively). Students

also recognize AI's role in fostering innovation and cost savings for SMEs, with near-identical means (e.g., innovation: Kuwait: 4.08, Malaysia: 4.09; cost savings: Kuwait: 4.05, Malaysia: 4.06). Additionally, both groups strongly affirm that AI is essential for SME growth and success, has value in SME operations, and can be trusted for business tasks, as reflected in high means (e.g., value in SMEs: Kuwait: 4.12, Malaysia: 4.14; trust in AI: Kuwait: 4.02, Malaysia: 4.04). The consistent responses across countries suggest a shared recognition of AI's transformative potential in enhancing efficiency, innovation, cost-effectiveness, and overall business success. These findings provide a solid foundation for promoting AI adoption in SMEs through targeted educational and policy initiatives while highlighting the need to address any remaining scepticism or barriers to implementation.

Willingness to utilize AI

Table 7 presents an analysis of students' willingness to utilize AI, comparing the responses of Kuwaiti and Malaysian students across three key questions. The mean scores for both groups are very similar, indicating a shared interest in learning and using AI tools, pursuing careers related to AI, and planning to use AI in the future. For the first question, "I am willing to learn and use AI tools to support small business activities," the mean scores are 4.12

Table 7: Students' willingness to utilize AI (Frequency 834)

	Question	Gender	Students	Mean	SD	t	Significance
1	I am willing to learn and use AI tools to support small business activities.	Kuwait	401	4.12	0.672	-0.252	0.80
		Malaysia	433	4.13	0.691		
2	I see you pursuing a career or projects related to AI in the future.	Kuwait	401	3.95	0.739	-0.257	0.80
		Malaysia	433	3.96	0.747		
3	I plan to use AI or similar tools for my future.	Kuwait	401	3.95	0.767	-0.300	0.76
		Malaysia	433	3.97	0.779		

Table 8: Challenges of using AI for businesses (Frequency 834)

	Question	Gender	Students	Mean	SD	t	Significance
1	I have concerns about the adoption of AI tools that might lead to faulty decisions.	Kuwait	401	4.06	0.660	-0.004	1.00
		Malaysia	433	4.06	0.682		
2	I have Concerns about ethical considerations with the adoption of AI tools in small businesses.	Kuwait	401	3.90	0.675	-0.149	0.88
		Malaysia	433	3.91	0.688		
3	The cost of AI applications is a major challenge for small businesses considering their adoption.	Kuwait	401	3.94	0.746	0.276	0.78
		Malaysia	433	3.93	0.758		
4	I have Concerns about data security and privacy with the adoption of AI tools in small businesses.	Kuwait	401	4.07	0.740	-0.304	0.76
		Malaysia	433	4.09	0.752		
5	The complexity and difficulty of AI technologies are a major challenge for small businesses.	Kuwait	401	4.10	0.718	-0.058	0.95
		Malaysia	433	4.10	0.733		
6	Artificial intelligence could be dangerous for workers can causing Job Displacement.	Kuwait	401	4.05	0.734	-0.177	0.86
		Malaysia	433	4.06	0.743		

for Kuwaiti students and 4.13 for Malaysian students, with a t-value of -0.252 and a significance level of 0.80, showing no statistically significant difference. Similarly, for the question "I see myself pursuing a career or projects related to AI in the future," both groups scored almost identically, with means of 3.95 for Kuwaiti students and 3.96 for Malaysian students, resulting in a t-value of -0.257 and a significance of 0.80. Finally, regarding future use of AI, the scores were also very close, with Kuwaiti students averaging 3.95 and Malaysian students 3.97, a t-value of -0.300, and a significance level of 0.76, again showing no significant difference. These results suggest that students from both Kuwait and Malaysia exhibit a strong and similar willingness to engage with AI, whether for supporting small business activities, pursuing AI-related careers, or utilizing AI tools

in their future endeavors. The lack of significant statistical differences across all questions highlights a broad and shared acceptance of AI's potential and its integration into students' professional aspirations and future use, regardless of the country.

Challenges of using AI

Table 8 explores the challenges associated with using AI for businesses and other disciplines, comparing the responses of students from Kuwait and Malaysia across six key concerns. The results show that both groups share similar concerns regarding the adoption of AI tools, with no statistically significant differences between them, as indicated by high p-values above 0.05 for all questions. For the concern "I have concerns about the adoption of AI tools that might lead to faulty

Table 9: Citation metric table (Comparison of Kuwait and Malaysia)

Kuwait		Malaysia	
Main Information	Data	Main Information	Data
Publication Years	2018 - 2024	Publication Years	2010 - 2024
Total Publications	10	Total Publications	105
Citable Year	7	Citable Year	15
Number of Contributing Authors	36	Number of Contributing Authors	487
Number of Cited Papers	9	Number of Cited Papers	79
Total Citations	234	Total Citations	1,872
Citation per Paper	23.40	Citation per Paper	17.83
Citation per Cited Paper	26.00	Citation per Cited Paper	23.70
Citation per Year	39.00	Citation per Year	133.71
Citation per Author	6.50	Citation per Author	3.84
Author per Paper	3.60	Author per Paper	4.64
Citation sums within h-Core	232	Citation sums within h-Core	1,743
h-index	6	h-index	20
g-index	10	g-index	42
m-index	0.857	m-index	1.333

decisions,” both Kuwaiti and Malaysian students scored equally, with a mean of 4.06, a t-value of -0.004, and a significance of 1.00, suggesting no difference in their views. Similarly, concerns about ethical considerations in AI adoption were rated similarly by both groups (Kuwait: 3.90, Malaysia: 3.91), with a t-value of -0.149 and a significance of 0.88. Both groups also expressed concern over the cost of AI applications, with the mean scores being 3.94 for Kuwait and 3.93 for Malaysia, a t-value of 0.276, and a significance of 0.78, indicating no significant difference. Regarding data security and privacy issues, both groups scored similarly (Kuwait: 4.07, Malaysia: 4.09), with a t-value of -0.304 and a significance of 0.76. The complexity and difficulty of AI technologies were also seen as a challenge by both groups, with equal mean scores of 4.10 (Kuwait and Malaysia), a t-value of -0.058, and a significance of 0.95, further demonstrating a shared concern. Lastly, concerns about AI causing job displacement were also similar, with Kuwaiti students scoring 4.05 and Malaysian students scoring 4.06, a t-value of -0.177, and a significance of 0.86. Overall, these findings suggest that both Kuwaiti and Malaysian students have similar concerns regarding AI adoption in businesses, with the primary challenges being the potential for faulty decisions, ethical issues, costs, data security, complexity, and job displacement. The lack of statistical differences highlights a common

global awareness of the barriers to AI integration in small businesses.

Bibliometric analysis

Based on Table 9, the field of AI and business research has seen unprecedented growth in Kuwait and Malaysia. A bibliometric comparison of Kuwait and Malaysia reveals several differences in publication productivity, author collaboration, and citation impact. Malaysia’s research foray in AI and business had a time frame from 2010 to 2024. This suggests a longer-term research initiative. In contrast, Kuwait’s participation in this field was more recent, with a time frame ranging from 2018 to 2024. Malaysia has produced 105 papers as compared to Kuwait’s 10 publications. This reflects that Malaysia has a more established research presence in the field of AI. This disparity suggests that AI and business are newer areas of focus for Kuwait. Author contributions also differ greatly. Kuwait has 36 contributing authors, whereas Malaysia has 487, highlighting a stronger research network in Malaysia, fostering collaboration and dynamic research. Additionally, Malaysia has 79 cited papers versus Kuwait’s nine, indicating broader recognition and impact. In total citations, Malaysia again leads with 1,872 compared to Kuwait’s 234. Despite a lower citation count, Kuwait’s average citations per paper (23.4) surpass Malaysia’s (17.83),

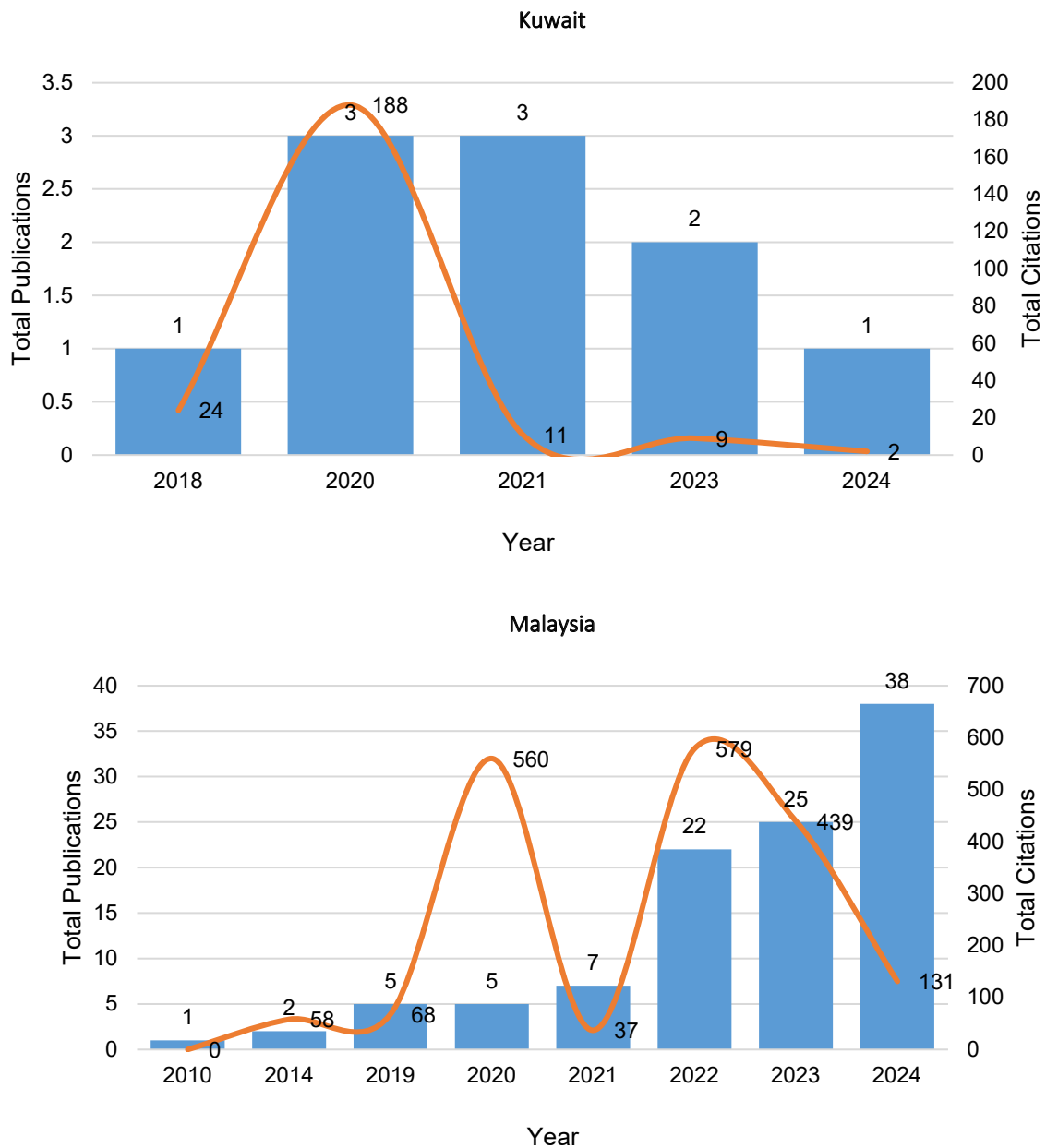


Fig. 1: Total Publications Productivity and Citations (Comparison Kuwait- Malaysia)

suggesting that Kuwait’s studies have a high impact, possibly indicating a focus on quality. Similarly, Kuwait’s citations per cited paper (26) are slightly higher than Malaysia’s (23.7), emphasizing that its limited output still commands attention. These findings reveal that Malaysia demonstrates a more expansive and collaborative research environment,

supported by higher publication and citation counts, establishing it as a key contributor. Although newer to the field, Kuwait shows a promising impact per paper, underscoring its emerging potential in AI and business research.

Referring to Fig. 1, the comparison of AI and business research output and citations between

Kuwait and Malaysia highlights distinct trends in productivity and impact over the years. Kuwait's research activities in this field began in 2018, with an initial publication yielding 24 citations. The country reached its peak in 2020, both in publication count and citation impact, with three publications generating a significant 188 citations. This year marked Kuwait's highest research influence within the field. However, following 2020, Kuwait experienced a notable decline in citation impact, even though it continued to publish two to three papers annually in subsequent years. In 2024, Kuwait's research output had reduced to a single publication. This was followed by only two citations, indicating a drop in both productivity and impact. In contrast, Malaysia has exhibited a longer timeline in AI and business research. Beginning in 2010, Malaysia initially experienced a low research output with fewer than five publications annually until 2019. After this period, Malaysia's research activity improved tremendously in subsequent years, with two peaks in citation impact. The first citation peak took place in 2020, with five publications amassing 560 citations. The second citation impact occurred in 2022, with 22 publications and 579 citations. This trend suggests a growing influence of Malaysian research. In contrast to Kuwait, Malaysia's productivity grew steadily and produced 38 publications by 2024. Despite a citation drop from 579 in 2022 to 181 in 2024, the publication productivity remained on an upward trend. This data reveals that Malaysia has a growing research presence in AI and business. Kuwait, on the other hand, has conducted a more modern, yet smaller-scale, research. This suggests that Kuwait's research productivity and impact are seen in a certain time frame only, differing from Malaysia's productivity in publication and influence, which has been more consistent.

CONCLUSION

This study discusses significant insights into the students' views of AI's function in small businesses in Kuwait and Malaysia, uncovering both universal themes and region-specific dynamics. The results indicate a widely held favorable perspective among students in both countries concerning the advantages of AI for small businesses, including improved efficiency, innovation, and cost reduction.

The results also reveal common apprehensions among students in both nations concerning ethical issues, data privacy, the intricacies of AI technology, and the risk of employment displacement. These problems highlight the necessity for focused educational programs and regulatory structures to alleviate concerns and promote confidence in using AI. The lack of statistically significant differences in opinions indicates that students from these varied cultural and economic backgrounds possess a shared grasp of AI's potential. This alignment highlights the worldwide significance of AI, as technical progress surpasses regional and cultural limitations. Nonetheless, disparities in the historical and strategic contexts of AI adoption and development are apparent through bibliometric analysis. Malaysia's prior and more comprehensive engagement in AI research, bolstered by strong governmental regulations and collaborative initiatives, establishes the nation as a frontrunner in AI innovation. Its holistic approach encompasses various fields, demonstrating a sophisticated and integrated research environment. Kuwait's burgeoning yet impactful research in specific AI applications indicates a focused strategy with considerable potential. Kuwait's research output is very low relative to Malaysia; nonetheless, its superior citations per manuscript underscore the quality and significance of its contributions in specialized fields. This study's findings support and enhance current research about perceptions and adoption of AI in small enterprises, offering detailed insights into cross-cultural dynamics. According to previous research, students from Kuwait and Malaysia exhibited a common positive perspective on AI's capacity to improve operational efficiency, assist in decision-making, and promote innovation in SMEs. These parallels with wider trends in AI acceptance are documented in the literature, indicating that younger, technologically adept people are typically more receptive to the adoption of new technologies ([Senadjki et al., 2023](#)). The absence of statistically significant variations in beliefs between Kuwaiti and Malaysian pupils indicates that factors like global exposure to technology and education, rather than national distinctions, may influence these attitudes. Research such as that conducted by [Khalid \(2020\)](#) indicates that digital globalization has diminished the

perceptual disparity among nations, promoting a more cohesive comprehension of AI's potential. This corresponds with the findings, suggesting that despite Malaysia's more developed AI ecosystem, both student groups exhibit similar awareness and enthusiasm for AI implementation in SMEs. The findings indicate that Kuwait has the potential to enhance its AI research environment through international cooperation, especially with prominent leaders such as Malaysia. Kuwait's specific strategy may be augmented by extensive research and development projects, thereby strengthening its position in the global AI arena. Conversely, Malaysia can enhance its present AI infrastructure by cultivating regional alliances to investigate new applications and reinforce its leadership in AI integration. These conclusions have significant ramifications for academia, legislation, and commercial practices. Customized academic programs can provide students with the skills required to address AI-related difficulties in SMEs and facilitate AI adoption. Policymakers in both nations can leverage these findings to build plans that tackle shared difficulties while utilizing distinct advantages. The collective positive views of AI among business practitioners indicate a promising opportunity for the incorporation of AI into small business operations, provided that adequate support and ethical considerations are established. The bibliometric analysis highlights Malaysia's prominence in AI and business research, marked by a substantial quantity of collaborative and multidisciplinary contributions. Malaysia's strong digital infrastructure and government-driven efforts have fostered an advanced research ecosystem. This aligns with research by [Lada et al., \(2023\)](#), which emphasizes the significance of national strategy in promoting AI development and integration. Kuwait's burgeoning yet significant contributions underscore its strategic emphasis on Vision 2035, which stresses technology-driven economic diversification ([Albanay, 2024](#)). This focused strategy, albeit yielding fewer publications, has significant relevance and impact, evidenced by Kuwait's superior average citations per work. The common issues highlighted in this study, including data security, ethical considerations, and employment displacement, are likewise evident in the literature. ([Holmes et al., 2022](#)) underscore that the ethical dilemmas and

workforce ramifications of AI implementation persist as significant obstacles to its widespread acceptance. Students in both nations express worries regarding the expense and intricacy of AI technology, which corroborates the findings of [Chowdhury et al. \(2022\)](#), who identify resource limitations as a major barrier for SMEs in the adoption of AI tools. The study's findings notably contradict the notion that Malaysian students would demonstrate more favorable attitudes toward AI, attributable to their nation's strong infrastructure and research ecosystem. This indicates that exposure to AI technologies within the school curriculum, as opposed to wider national disparities, may be a more critical factor influencing student attitudes. These findings present multiple ramifications for the academic community and policymakers. For example, broadening access to interdisciplinary AI education, as proposed by scholars like [Davenport and Ronanki \(2018\)](#), could alleviate students' collective apprehensions over AI's intricacy. Moreover, promoting international collaborations between nascent and established AI ecosystems, exemplified by Malaysia and Kuwait, could facilitate knowledge exchange and talent enhancement. The study highlights the necessity for policymakers to establish comprehensive AI adoption frameworks that tackle prevalent issues, including ethical considerations, financial implications, data security, and employment displacement. This corresponds with the worldwide initiative for responsible AI integration, acknowledging the distinct developmental paths of nations such as Kuwait and Malaysia. Malaysia's leadership in collaborative AI research can exemplify Kuwait's focused, high-impact strategy, promoting cross-cultural encounters and the co-development of AI policies. The study underscores the necessity of incorporating AI instruction within university curricula, especially within business and entrepreneurship degrees. The report underscores the necessity for business practitioners to confront practical obstacles to AI adoption, including complexity and expense, while also highlighting its advantages in automation, decision-making, and innovation. This comprehension can inform the creation of AI solutions customized for small enterprises, guaranteeing more efficient execution and enhanced adoption. This study demonstrates the global

significance of AI in small businesses while also emphasizing regional variations in AI research and implementation tactics. Connecting the findings with current literature reveals that a balanced strategy—integrating focused, high-impact research with extensive, collaborative initiatives—can optimize AI's capacity to foster sustainable growth in small enterprises. These observations emphasize the necessity of promoting education, collaboration, and supportive legislation to guarantee responsible and effective AI integration. Based on the findings of this study, the following practical recommendations are proposed to support the integration of AI in SMEs through educational, institutional, and governmental initiatives:

1. *Integrate AI training in business curricula:* Educational institutions should embed AI-related modules into business and entrepreneurship programs to enhance student preparedness and digital literacy.

2. *Establish AI innovation hubs:* Universities and incubators in Kuwait and Malaysia should create AI innovation centers where students and SME owners can co-develop practical solutions.

3. *Subsidize AI adoption for SMEs:* Governments should offer financial support or tax incentives to SMEs that invest in AI tools, especially in sectors with high innovation potential.

4. *Launch public-private AI mentorship programs:* Encourage partnerships between tech firms and SMEs to facilitate skill transfer, tool implementation, and sustainability.

5. *Develop national AI awareness campaigns:* Increase public understanding of AI through targeted campaigns, focusing on real-world success stories, particularly for micro and small businesses.

AUTHOR CONTRIBUTIONS

First Author: Conceived and developed the main research idea; led the conceptual framework and theoretical underpinnings; conducted the comprehensive literature review; designed the methodology; performed the primary data analysis; and took the lead in writing the original manuscript draft. Second Author: Assisted in refining the research design; contributed to data collection and preprocessing; provided critical feedback during the analysis phase; and participated in manuscript review and editing. Third Author: Supported

data interpretation and visualization; ensured methodological rigor through validation checks; contributed to the structuring of the results section; and assisted in manuscript revisions. Fourth Author: Oversaw overall project administration; facilitated access to resources and data; provided guidance on aligning the study with current scholarly debates; and contributed to the final review and editing of the manuscript.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy, have been completely witnessed by the authors.

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ABBREVIATIONS (NOMENCLATURE)

AI	Artificial Intelligence
MDEC	Malaysia Digital Economy Corporation
MyDIGITAL	Malaysia Digital Economy Blueprint
NLP	Natural Language Processing
SMEs	Small and Medium-Sized Enterprises
STEM	Malaysia's strong emphasis on Science, Technology, Engineering, and Mathematics

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