Determinants of Students' Intention to Use AI Chatbots in Entrepreneurship Education: A Technology Acceptance Model Perspective

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ABSTRACTS

Entrepreneurship is central to achieving the United Nations' Sustainable Development Goals (SDGs) and Malaysia's national strategies to create jobs, foster innovation, and encourage youth entrepreneurship. Supporting this vision, Malaysian universities play a vital role in developing entrepreneurial mindsets, with AI chatbots emerging as innovative tools in teaching and learning. This study investigates students' intention to use AI chatbots in entrepreneurship education across the Malaysian Technical University Network (MTUN), using the Technology Acceptance Model (TAM) extended with perceived trust. Survey data from 377 students revealed that perceived ease of use, usefulness, and trust significantly influence intention, explaining 71% of the variance, with ease of use being the strongest predictor. The findings highlight the importance of user-friendly, trustworthy, and effective chatbot systems to support entrepreneurial education and align with national development goals.

INTRODUCTION

Entrepreneurship education has emerged as a critical driver of innovation, economic resilience, and societal progress in the 21st century. The Ministry of Higher Education Malaysia (MOHE, 2023) underscores its rapid evolution, propelled by technological advancements and the growing recognition of entrepreneurship as a catalyst for sustainable growth. Globally, the educational technology market is projected to reach USD 404 billion by 2025, with a Compound Annual Growth Rate (CAGR) of 16.3% (HolonIQ, 2022), reflecting a paradigm shift in how education is delivered and consumed. Among these technologies, artificial intelligence (AI) has been identified as a transformative force, particularly through the integration of AI chatbots that are redefining traditional pedagogical practices.

In Malaysia, the integration of AI in higher education has gained remarkable traction. A survey conducted by the Malaysian Digital Economy Corporation (MDEC, 2023) reported that 75% of universities have begun adopting AI-driven tools, including chatbots, to enrich learning experiences and strengthen student engagement. These developments are aligned with the government's National Artificial Intelligence Roadmap 2021-2025, which positions AI as a strategic enabler across sectors, including education (MDEC, 2021). Such initiatives demonstrate Malaysia's commitment to preparing students for the digital economy while simultaneously advancing its entrepreneurial ecosystem.

Scholarly evidence supports the potential of AI chatbots in education. Studies highlight their ability to provide personalized learning pathways, real-time feedback, and access to vast resources (Ratten & Jones, 2021), with the AI in education market expected to grow at a CAGR of 23.3% between 2021 and 2026 (MarketsandMarkets, 2023). In the Malaysian context, this growth trajectory aligns with national policies such as the Entrepreneur Development Policy 2030, which targets the creation of 100,000 new entrepreneurs, and the National Entrepreneurship Policy 2030, which emphasizes innovation-led learning environments. The integration of AI chatbots into entrepreneurship education is therefore not only a technological enhancement but also a strategic mechanism to foster creativity, self-efficacy, and entrepreneurial intention among students (Shabbir, Batool & Mahmood, 2022).

Despite this promise, the behavioral intention to use AI chatbots in higher education, particularly in entrepreneurship education remains underexplored. Previous studies (e.g., Kim, Park, & Kim, 2021; Tan, Lim & Ng, 2022) indicate that intention to adopt AI technologies is shaped by perceived ease of use, perceived usefulness, perceived trust and institutional support. However, limited empirical research has examined these factors within the Malaysian higher education context, where the entrepreneurial agenda is closely tied to national development goals. Understanding how students, particularly those in technical universities, perceive and are willing to adopt AI chatbots for entrepreneurship education is therefore both timely and crucial.

Building on this concern, artificial intelligence (AI) has increasingly transformed industries and educational landscapes, offering intelligent systems capable of learning, adapting, and supporting decision-making (Russell & Norvig, 2016). Nevertheless, while AI technologies have long enhanced commercial practices, their application in entrepreneurship is still emerging, with scholars noting both opportunities and theoretical challenges for entrepreneurial practice (Townsend et al., 2018; Obschonka & Audretsch, 2020). Despite AI's recognized potential, its integration into entrepreneurship education, especially through AI chatbots, remains underexplored. Existing studies have primarily examined AI in broader educational contexts (Clarizia et al., 2018; Agarwal et al., 2022), thereby leaving a significant gap in understanding how AI chatbots can effectively foster entrepreneurial learning, competencies, and intentions.

This gap is especially pronounced in Malaysia, where AI adoption has become a national priority under the National Artificial Intelligence Roadmap 2021-2025 and the MTUN Advanced TVET 2030 initiative. These policies seek to elevate Technical and Vocational Education and Training (TVET) and entrepreneurship education to parity with mainstream academic pathways, equipping students not only with technical expertise but also entrepreneurial and soft skills (The Star, 2024). Within this agenda, the Malaysian Technical University Network (MTUN) has strategically introduced AI chatbots into its curriculum, positioning them as tools to deliver personalized learning experiences, real-time feedback, and innovation-driven outcomes. However, while such adoption reflects institutional commitment, little is known about how students perceive, accept, and intend to use AI chatbots in entrepreneurship education.

Understanding these factors is critical. According to the Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989), perceptions of usefulness, ease of use, and trust strongly influence technology adoption. Yet, within the context of entrepreneurship education in Malaysia, empirical evidence on these determinants remains scarce. Moreover, Amara's Law (Amara, 1984) cautions against overestimating short-term capabilities of AI while underestimating its long-term impact, underscoring the need for realistic insights into students' expectations and readiness.

Therefore, a pressing problem emerges despite global enthusiasm for AI in education and Malaysia's proactive adoption of AI-driven tools, there is insufficient empirical research on the behavioral intention of students to use AI chatbots in entrepreneurship education. Without such understanding, universities risk misaligning technological investments with learners' needs, thereby limiting the effectiveness of AI in strengthening entrepreneurial competencies. Addressing this problem is essential to inform educational strategies, support national policy goals, and prepare future entrepreneurs for success in the digital economy.

Accordingly, this study investigates the factors influencing the intention to use AI chatbots in entrepreneurship education among students with a focus on Universiti Malaysia Pahang Al-Sultan Abdullah (UMP), Universiti Tun Hussein Onn Malaysia (UTHM), Universiti Teknikal Malaysia Melaka (UTeM) and Universiti Malaysia

Perlis (UniMAP). Drawing on the Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989) and extended constructs of trust and institutional support, the research aims to provide empirical insights into students' readiness to adopt AI-driven tools in their entrepreneurial learning processes. By doing so, it contributes to the growing body of knowledge on AI adoption in education and offers practical implications for policymakers and educators seeking to strengthen Malaysia's entrepreneurial ecosystem in the digital era.

Entrepreneurship Education

Entrepreneurship education is rapidly expanding worldwide due to its ability to connect theory with real-world practice. In fact, over 70% of universities are incorporating it into their curricula, reflecting the government's vision to strengthen the entrepreneurial ecosystem (MOHE, 2022). Typically, it is delivered through three approaches: education "about" entrepreneurship, which provides theoretical foundations; education "for" entrepreneurship, which develops students' entrepreneurial skills; and education "through" entrepreneurship, which emphasizes experiential learning through real-world projects. Moreover, Artificial Intelligence (AI), particularly generative AI, has strong potential to transform entrepreneurship education, especially in the "about" approach by generating and presenting information traditionally delivered by lecturers. This shift, therefore, could redefine the educator's role from knowledge transmission to facilitating deeper understanding and application. Taken together, these approaches ensure students gain not only knowledge but also the skills and experience needed to succeed in an evolving entrepreneurial landscape.

Building on this foundation, universities adopt experiential and problem-based learning, industry partnerships, and entrepreneurship centers to build students' creativity, problem-solving skills, and entrepreneurial self-efficacy (Lee et al., 2023; Vivekananth et al., 2023). At the same time, national policies, including the Entrepreneur Development Policy 2030 and the National Entrepreneurship Policy 2030, aim to nurture 100,000 new entrepreneurs and foster innovation. Consequently, Malaysia's strong ranking in the Global Entrepreneurship Index further highlights these efforts. Looking forward, the integration of innovative technologies such as AI chatbots is expected to enhance students' learning experiences and entrepreneurial competencies.

In parallel, entrepreneurship education in Malaysia has rapidly expanded, with more than 70% of universities embedding entrepreneurship courses, reflecting the government's strategic commitment to strengthening the entrepreneurial ecosystem (MOHE, 2022). Specifically, universities employ experiential, problem-based, and industry-linked pedagogies that enhance students' creativity, problem-solving, and entrepreneurial self-efficacy, significantly increasing their intentions to start businesses (Ismail et al., 2021; Rahim & Isa, 2023). Furthermore, supported by national strategies such as the Entrepreneur Development Policy 2030, which targets 100,000 new entrepreneurs (Entrepreneur Development Policy, 2021), and initiatives like the Malaysian Global Innovation & Creativity Centre (MaGIC, 2021), the country has built a robust entrepreneurship support infrastructure. Additionally, Malaysia's ranking in the Global Entrepreneurship Index (Statista.com, 2022) and the establishment of Entrepreneurship Development Centers across universities (Lee, Tan & Low, 2023) further underscore this progress. Ultimately, integrating innovative technologies such as AI chatbots is expected to enrich entrepreneurial education and strengthen students' competencies.

Intention to use Artificial Intelligence Chatbot

The intention to use AI chatbots is shaped by key factors from the Technology Acceptance Model (TAM), including perceived usefulness, ease of use, trust, enjoyment, and social influence (Smith & Jones, 2023; Chen et al., 2023; Lee & Park, 2023). Positive perceptions of efficiency, convenience, and reliability enhance user attitudes, leading to higher adoption rates. For businesses, fostering trust and creating engaging, user-friendly chatbot experiences is essential to strengthen user intentions, which in turn drive customer satisfaction, loyalty, and overall performance.

The Technology Acceptance Model (TAM), developed by Davis (1989) and expanded from the Theory of Reasoned Action, is widely used to explain users' adoption of new technologies. Its core constructs: perceived usefulness and perceived ease of use have been shown to significantly influence technology adoption, with perceived trust increasingly recognized as an additional determinant (Ayanwale & Molefi, 2024). Studies

further highlight the role of individual, social, and environmental factors in shaping user intentions (Teo et al., 2021). As such, TAM provides a robust framework for examining the relationship between predictors and intention to use AI in educational settings.

Perceived ease of use (PEOU) is a key determinant of AI chatbot adoption in entrepreneurship education. It reflects how simple users find the technology to operate (Davis, 1989) and strongly influences attitudes and intentions toward usage. Studies show that when students view chatbots as intuitive and user-friendly, they are more likely to integrate them into learning (Chang & Wu, 2023; Liu & Zhou, 2022). PEOU also mediates the relationship between attitudes and behavioral intentions (Wang & Li, 2023), highlighting its critical role in shaping acceptance. Ensuring ease of use is therefore essential for successful integration of AI chatbots in Malaysian higher education.

Perceived usefulness (PU) is a central factor influencing students' acceptance of AI chatbots in entrepreneurship education. Defined as the belief that a system enhances performance (Zulfiqar et al., 2021), PU has been consistently shown to predict usage intentions. Studies highlight that accurate, reliable, and beneficial chatbot functionalities increase students' satisfaction and intention to adopt them (Almahri et al., 2020; Malik et al., 2021). When students view chatbots as tools that support academic goals through instant access, personalized support, and interactive learning, they develop positive attitudes toward their use. In line with the Technology Acceptance Model (TAM), PU strongly drives the adoption of AI chatbots in Malaysian higher education.

Perceived trust is a key determinant in the adoption of AI chatbots, reflecting users' confidence in the technology's credibility, reliability, and security (Liden & Nilros, 2020; Winkler & Soellner, 2018). Research shows that students are more likely to use chatbots when they trust their accuracy, dependability, and ability to safeguard personal data (Gallimore et al., 2019; Pillai et al., 2023). In entrepreneurship education, trust enhances students' motivation to engage with chatbots, particularly when sharing personal information for tailored support. Building trust requires reliable performance, clear responses, secure data handling, and advanced conversational capabilities. Overall, trust plays a pivotal role in fostering acceptance and effective use of AI chatbots in educational settings.

METHODOLOGY

This study employed a quantitative research design to investigate the factors influencing university students' intention to use artificial intelligence (AI) chatbots in entrepreneurship education. The Technology Acceptance Model (TAM) served as the theoretical framework, with three independent variables (perceived ease of use, perceived usefulness, and perceived trust) and one dependent variable (intention to use AI chatbots). A cross-sectional survey method was selected to collect data from students at Malaysian Technical University Network (MTUN).

The target population consisted of undergraduate students enrolled at MTUN, as they represent the primary group exposed to entrepreneurship-related courses and emerging digital learning tools. A simple random sampling technique was applied to ensure equal probability of selection and minimize sampling bias. Based on Krejcie and Morgan's (1970) sampling table, a sample size of 377 students was deemed sufficient to represent the population and provide statistical validity. Moreover, random sampling was aimed to look at the three elements of the sample respondents, namely types of MTUN institution, the years of study and engineering students with entrepreneurship education experiences. The selection of these elements was based on the data requirements for this research. Typically, this type of sampling is biased. However, the findings of the research using sampling are not representative or descriptive of the population, but rather provide an initial image of the field of study (Fruth et al., 2019). The result of the sample information obtained in this study are as shown in Table 1 below.

Table 1: Respondents' Sample

No.	MTUN Institution	Location	Number of samples
1	Universiti Tun Hussein Onn Malaysia	Johor	103

	(UTHM)		
2	Universiti Teknikal Malaysia Melaka (UTeM)	Melaka	101
3	Universiti Malaysia Pahang (UMP)	Pahang	98
4	Universiti Malaysia Perlis (UniMAP)	Perlis	75

Instrument Design

Data were collected using a structured questionnaire comprising three main sections:

Section	Variables	Items
A	Demographic Information	5
B	Independent Variable 1: Perceived Ease of Use (PEOU)	4
	Independent Variable 2: Perceived Usefulness (PU)	4
	Independent Variable 3: Perceived Trust (PT)	4
C	Dependent Variable: Intention to Use Artificial Intelligence Chatbot	5

The questionnaire used in this study was adapted from Ayanwale and Molef's (2024) and Yap and Kamaruddin (2023) research. While their original framework provided a foundation, modifications were made to align the questions with the specific context and objectives of this research. This approach ensured that the questionnaire was both relevant to the research topic and suitable for the target audience, enhancing the validity of the data collected. All items were adapted from validated scales (Davis, 1989; Gefen et al., 2003) and measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Data were collected over six weeks (March–April 2024) through online distribution via university learning platforms and official student networks, ensuring voluntary participation and confidentiality.

Pilot Test

A pilot study with 38 respondents (10% of the total sample) confirmed clarity and reliability. Cronbach's alpha values ranged between 0.745 and 0.844, indicating acceptable to very good reliability (see Table 2).

Table 2: Pilot Test's Reliability Statistics

Variables	Cronbach's alpha	Reliability
Independent Variable 1: Perceived Ease of Use (PEOU)	0.775	Good
Independent Variable 2: Perceived Usefulness (PU)	0.830	Very Good
Independent Variable 3: Perceived Trust (PT)	0.745	Good
Dependent Variable: Intention to Use Artificial Intelligence Chatbot	0.844	Very Good

The table presents the results of the reliability test for the pilot study. The highest Cronbach's alpha value, 0.844, was found for the scale measuring the intention to use artificial intelligence chatbots. On the other hand, the lowest Cronbach's alpha value of 0.745 was for the perceived trust (PT) scale. All the scales were deemed reliable, as the Cronbach's alpha values for all variables were greater than 0.6.

RESULTS AND DISCUSSION

In terms of gender, most respondents are female students which totals up to 233 people (61.8%) and the rest are male students which totals up to 144 people (38.2%). In terms of MTUN institutions participation, the

majority of respondents are from Universiti Tun Hussein Onn Malaysia (UTHM) with 103 students (27.3%), followed by Universiti Teknikal Malaysia Melaka (UTeM) with 101 students (26.8%), Universiti Malaysia Pahang (UMP) with 98 students (26%) and Universiti Malaysia Perlis (UniMAP) with 75 students (19.9%). Year 4 students dominate the number of respondents with 113 students (30%), followed by year 2 students with 111 students (29.4%), year 1 students with 93 students (24.7%) and year 3 students with 60 students (15.9%).

Table 3: Model Summary of Multiple Regression Analysis

Model Summary[b]				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.847[a]	0.717	0.715	1.77094

1. Predictors: (Constant), PEOU, PU, PT, ITU
2. Dependent Variable: (DV)

The multiple regression model summary revealed a strong relationship between the variables, as the value is greater than 0.5. The independent variables, Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Perceived Trust (PT) were found to be relevant and closely related to the dependent variable, which is the intention to use artificial intelligence chatbots. The R-squared value of 0.717 suggests that 71% of the variation in the dependent variable can be explained by the three independent variables. The Adjusted R Square of 0.847, which accounts for the number of predictors and the sample size, further confirmed the robustness and good fit of the model. The standard error of the estimate (1.77094) suggested a relatively low average deviation between the observed and predicted intention to use AI Chatbot scores, indicating a reasonably accurate model. Collectively, these results strongly suggested that the chosen independent variables provided a compelling explanation for the variations observed in intention to use AI Chatbot in Entrepreneurial Education among MTUN students.

Table 4: Regression Analysis on ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2965.624	3	988.541	315.201	<0,001[b]
	Residual	1169.813	373	3.136		
	Total	4135.438	376			

1. Dependent Variable: DV
2. Predictors: (Constant), PT, PEOU, PU

The ANOVA analysis further supported the significance of the regression model in explaining the variation in intention to use AI Chatbot (F = 315.201, p < 0.001). With three predictors (Perceived Ease of Use, Perceived Usefulness, and Perceived Trust), the substantially larger regression sum of squares (2965.624) compared to the residual sum of squares (1169.813) clearly demonstrated that the model explained a significant portion of the variance in the dependent variable. The high F-value, derived from the mean square for regression (988.541) and the mean square for residual (3.136), unequivocally confirmed the strong explanatory power of the model. This statistical significance underscored the crucial role of Perceived Ease of Use, Perceived Usefulness, and Perceived Trust in intention to use AI Chatbot in Entrepreneurial Education among MTUN students.

Table 5: Regression Analysis on Coefficients

Coefficients[a]						
Model		Unstandardized		Coefficients	Standardized Coefficients	t	Sig.
		B		Std. Error	Beta		
1	(Constant)	2.382		0 .600		3.967	<0.001
	PEOU	0.539		0.063	0.437	8.550	<0.001
	PU	0.285		0.064	0.234	4.444	<0.001
	PT	0.296		0.039	0.274	7.584	<0.001

1. Dependent Variable: DV

The coefficients for the regression analysis, presented in Table 3, indicated the individual contribution of each predictor variable to intention to use AI Chatbot in Entrepreneurial Education. Perceived Ease of Use exhibited the highest positive beta value ($\beta = 0.437$, $p < 0.001$), signifying that it had the most substantial positive effect on intention to use AI Chatbot compared to the other two variables. Perceived Trust ($\beta = 0.274$, $p < 0.001$) and Perceived Usefulness ($\beta = 0.234$, $p < 0.001$) also demonstrated significant positive beta values, indicating their important contributions to the dependent variable. These results suggested that while all three independent variables were significant predictors of intention to use AI Chatbot.

The p-values for all hypothesized relationships were below the critical threshold of 0.05, confirming their statistical significance and supporting the acceptance of all proposed hypotheses. The results clearly indicate that perceived ease of use, perceived usefulness, and perceived trust each exhibit a significant positive relationship with the intention to use AI chatbots in entrepreneurial education. These findings highlight that the three factors are valid, reliable, and impactful determinants, underscoring their critical role in fostering the adoption of AI chatbot technology.

CONCLUSION

The findings of this study corroborate the growing global recognition of the importance of technology adoption in advancing educational practices, particularly within entrepreneurial education. The coefficients for the regression analysis, presented in Table 3, indicated the individual contribution of each predictor variable to the intention to use AI chatbots in entrepreneurial education. Perceived ease of use exhibited the highest positive beta value ($\beta = 0.437$, $p < 0.001$), signifying that it had the most substantial effect on intention to use AI chatbots compared to the other two variables. Perceived trust ($\beta = 0.274$, $p < 0.001$) and perceived usefulness ($\beta = 0.234$, $p < 0.001$) also demonstrated significant positive beta values, indicating their important contributions to the dependent variable. These results suggest that while all three independent variables are significant predictors of intention to use AI chatbots, perceived ease of use emerges as the most influential factor in driving adoption.

The p-values for all hypothesized relationships were below the critical threshold of 0.05, confirming their statistical significance and supporting the acceptance of all proposed hypotheses. Descriptive analysis further supported these findings, with respondents expressing positive perceptions regarding the simplicity of interacting with AI chatbots, their trust in the reliability of the technology, and the usefulness of chatbots as a learning tool. This alignment between descriptive and inferential results underscores the argument that AI chatbots hold considerable potential to enhance both teaching and learning experiences in entrepreneurial education.

Collectively, this study provides robust empirical evidence of the significant influence of perceived ease of use, perceived usefulness, and perceived trust on the adoption of AI chatbot technology in entrepreneurial education. Perceived ease of use plays a particularly critical role by lowering barriers to adoption and

increasing willingness to integrate technology into learning activities. Perceived usefulness reinforces adoption by demonstrating the practical benefits of AI chatbots in improving learning outcomes, while perceived trust alleviates concerns about reliability, credibility, and privacy, thereby strengthening students' confidence in using the technology.

LIMITATION AND FUTURE RESEARCH

While this study offers valuable empirical insights, several limitations should be acknowledged. First, the findings are limited in generalizability as the sample was drawn exclusively from MTUN institutions, which may not fully represent the diversity of Malaysian higher education contexts. Future studies should extend to public and private universities to strengthen external validity. Second, the cross-sectional design restricts causal interpretations and does not capture temporal shifts in students' attitudes toward AI. Longitudinal or experimental research could track changes in perception and sustained adoption patterns over time. Third, the quantitative-only approach provides breadth but not depth in understanding students' lived experiences. Future studies could adopt mixed-method designs, incorporating interviews or focus groups to capture richer pedagogical and emotional dimensions of AI chatbot use. Finally, exploring moderating factors such as digital literacy, learning culture, and institutional support could yield more comprehensive insights into AI integration success.

Contribution

This study advances theory and practice in three significant ways. Theoretically, **it** validates the Technology Acceptance Model (TAM) within the domain of AI-driven entrepreneurship education, confirming perceived ease of use, usefulness, and trust as strong determinants of behavioral intention. Practically, the results suggest that educators and technopreneurs should collaborate to co-design AI chatbot systems that are user-friendly, context-sensitive, and pedagogically aligned. For example, educators could provide real-world entrepreneurship scenarios, while technopreneurs develop adaptive AI algorithms that personalize guidance and feedback. Such collaboration ensures that chatbot tools not only deliver content but also foster critical thinking, creativity, and entrepreneurial self-efficacy. Managerially, institutions can leverage these findings to design professional development programs that build educator confidence in using AI and to establish policies ensuring ethical, transparent, and privacy-respecting AI deployment.

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