

# Investigating the Relationship between Acceptance of Artificial Intelligence (AI) with Intention to Use: An Evaluation of Technology Acceptance Model (TAM)

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**Abstract:** The purpose of this research was to investigate the relationship between artificial intelligence (AI) acceptance and intention to use and evaluate the technology acceptance model (TAM). The present study utilized a descriptive-correlation methodology, incorporating structural equation modeling. The population for this research comprised all marketing specialists of private companies in Tehran, Iran, in 2023. The sample included 384 marketers, of whom 227 were women, with ages ranging from 25 to 41 years, and an average age of  $33.76 \pm 3.49$  years. Participants were chosen through a convenience sampling technique. Standard questionnaires were used to collect data. Pearson correlation test and the structural equation modeling were used for data analysis. The findings reveal that perceived usefulness significantly affects ease of use, evidenced by a T-value of 6.589. Furthermore, perceived usefulness also has a notable influence on user attitudes, as indicated by a T-value of 6.695. Additionally, ease of use significantly impacts user attitudes, with a T-value of 5.320. It is also important to note that ease of use significantly affects intentions to utilize artificial intelligence, with a T-value of 4.207. User attitudes further demonstrate a significant influence on intentions to use artificial intelligence, also with a T-value of 5.896. Importantly, user attitudes act as a significant mediator in the relationship between perceived usefulness and ease of use concerning intentions to use artificial intelligence, with a p-value of less than 0.001. The model fit results, as presented in [Table 4](#), indicate that the research model shows a good fit. Considering the findings of the study, entrepreneurs engaged in the establishment of AI-driven online enterprises will find significant advantages in utilizing its insights to enhance the effectiveness and efficiency of their business model development.

**Keywords:** Artificial Intelligence, Marketing, Marketer, ATM, Modelling

## Introduction

The evolution of technology and the introduction of innovative solutions compel business owners to adopt agility, flexibility, and enhanced operational efficiency. This is achieved through the utilization of the latest and most effective tools across various management domains, including production, finance, marketing, sales, and communication ([Akpan et al., 2022](#)). Concurrently, consumer preferences, tastes, and requirements are in a state of constant flux, influenced by technological advancements and the competitive landscape of the market

(Bazoukis et al., 2022). Given the pivotal role of the customer in business, it is essential to identify and swiftly address customer needs in a manner that is both effective and profitable. This necessitates approaches that transcend traditional production, sales, and marketing methods (Al-Emran, & Granić, 2021). A key solution lies in the application of information sciences and digital technologies, which enhance business performance by improving sales, facilitating effective communication with customers and suppliers, and bolstering organizational capabilities (Gams & Kolenik, 2021). Among the most sophisticated technologies available today is artificial intelligence. As a hallmark of the fourth industrial revolution, artificial intelligence aims to replicate the cognitive functions of the human brain, positioning itself as a significant technological trend (Khan et al., 2022).

Artificial intelligence represents a robust, adaptable, and multifaceted technology capable of enhancing various sectors and enterprises. This field is not a recent development; rather, many of its theoretical underpinnings and technological advancements have been established by researchers over the last seven decades, finding application across numerous industries and businesses (Davies & Hughes, 2014; Kraus et al., 2022). Nevertheless, in the contemporary landscape, the surge in computational capabilities, the accessibility of extensive data sets, and advancements in machine learning algorithms have transformed artificial intelligence from a purely academic pursuit into a significant and practical technological force within industries, businesses, and society at large (Marjerison et al., 2022). Artificial intelligence encompasses a range of technologies that empower machines to achieve a heightened level of intelligence by emulating human capabilities, such as comprehending and exploring their environment and acquiring knowledge. Intelligent systems can actively interpret their surroundings through machine vision, auditory processing, and various sensor modalities (Piccialli et al., 2021). They analyze and comprehend the gathered data using inference engines, which include image processing, speech recognition, and natural language processing. Furthermore, these systems can determine optimal actions through intelligent planning, ensuring effective engagement in the real world. Additionally, these capabilities are enhanced over time as the systems learn from their experiences (Ravindar et al., 2022).

At present, artificial intelligence is recognized as a pivotal element in the digital transformation across various sectors. According to forecasts from the PWC Institute, the advancement of artificial intelligence applications is projected to boost the global economy by approximately 15.7 trillion dollars by the year 2030 (Liu, 2023; Nikiforova, 2022; Sakaguchi & Aoki, 2022). The contribution of each nation to this economic growth varies based on their developmental status, with leading countries like China and the United States expected to see an increase of between 18 and 21 percent, while nations with weaker economies, such as Pakistan and Zambia, may experience growth rates ranging from 4 to 8 percent. In terms of investment, the United States, China, the United Kingdom, and Canada have made significant financial commitments to artificial intelligence development, with investments totaling 23 billion, 10 billion, and 9.1 billion dollars, respectively (Maddikunta et al., 2020). Additionally, the European Commission has allocated a budget of 1.2 billion euros for artificial intelligence development from 2021 to 2027. These developments underscore the growing significance and expansion of artificial intelligence on a global scale (Cheng et al., 2021).

The World Economic Forum has highlighted that a significant challenge in the advancement and proliferation of artificial intelligence lies in the acceptance of its utilization by both the private and public sectors. In essence, for artificial intelligence to be effectively implemented within a nation or industry, it is crucial to recognize and assess the key factors that influence acceptance (Al-Nuaimi et al., 2023; Kaartemo, & Helkkula, 2018). A review of the national development strategies of various countries further underscores the significance of acceptance in the growth and deployment of artificial intelligence, as many have incorporated this aspect into their strategic frameworks (Paliwal et al., 2022). It is important to emphasize that prior to developing any initiatives aimed at fostering adoption, it is essential to identify and prioritize the factors that affect the acceptance of artificial intelligence in both public and private domains (Lee, 2022; Mishra & Mukherjee, 2019; Schwyzer et al., 2022).

The acceptance of information technology can be understood as a clear and demonstrable satisfaction derived from the utilization of information systems tailored to specific tasks. This acceptance is a complex, multi-faceted phenomenon encompassing a variety of significant variables, including individuals' perceptions, beliefs, attitudes, and characteristics, as well as their engagement with information technology (Gillenson & Sherrell, 2002; Mohamad Hassan & Abd Elrahman, 2022). Essentially, technology acceptance reflects the emotional commitment individuals have towards the intention of using a particular technology. Consequently, the presence or absence of acceptance serves as a critical determinant of the success or failure of an information system (Sestino & De Mauro, 2022). Therefore, it is imperative for research to focus on understanding, identifying, and evaluating the factors that influence this acceptance. This research specifically aims to address this issue. Numerous perspectives have been offered regarding the factors that influence users' decisions to adopt or reject information systems; however, the underlying rationale is that the success or return on investment in information technology is closely linked to the extent of users' willingness to embrace or resist these systems (Har et al., 2022). To assess the usage and the factors influencing the acceptance or rejection of

information technology, various theories and models have been proposed and empirically tested, among which the Davis Technology Acceptance Model (TAM) stands out as particularly significant (Sestino, & De Mauro, 2022; Song et al., 2019).

According to the model illustrated in Figure 1, the acceptance of information technology by users is influenced by two primary categories of factors: internal structures and external structures. Internal structures encompass elements such as ease of use, perceived usefulness, attitudes toward usage, intentions to use, and actual usage (Ahmad et al., 2022). In contrast, external structures include factors such as managerial support, the fit between tasks and technology, individual characteristics, organizational dynamics, social influences, and specific attributes of computer systems, which involve hardware and software types, training approaches, system complexity, user experience, and optional features, among others (Bondy, 2021). This research examines the influence of internal beliefs and predispositions on individuals' behaviors, particularly focusing on how users' perceptions and beliefs affect their acceptance or rejection of information systems. Specifically, it investigates the impact of the internal factors of the Technology Acceptance Model (TAM) including ease of use, perceived usefulness, and user attitudes on marketers' intentions to utilize artificial intelligence.

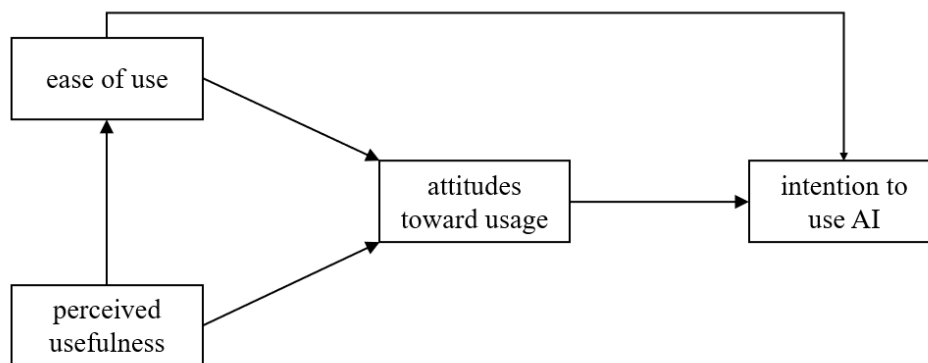


Figure 1. Conceptual Model of the Study.

### Methods

The present study utilized a descriptive-correlation methodology, incorporating structural equation modeling. The population for this research comprised all marketing specialists of private companies in Tehran, Iran, in 2023. The sample included 384 marketers, of whom 227 were women, with ages ranging from 25 to 41 years, and an average age of  $33.76 \pm 3.49$  years. Participants were chosen through a convenience sampling technique.

In accordance with the objectives, theoretical underpinnings, and conceptual framework of the research, the artificial intelligence acceptance questionnaire was developed based on the four internal constructs of the information technology acceptance model, which encompass ease of use, perceived usefulness, attitude towards usage, and intention to use. To achieve this, specific items were created for each construct, and the overall score for each construct was derived from the cumulative scores of these items. Each item was accompanied by a 5-point Likert scale (ranging from completely disagree to completely agree), allowing respondents to indicate their level of agreement by selecting one of the options. The primary method for data collection in this research involved administering a face-to-face questionnaire, while secondary data was gathered through library resources. To ensure the validity of the questionnaire and assess the feasibility of its items, the formal content validity method was employed. Initially, a preliminary questionnaire consisting of 29 questions was developed and subsequently refined based on expert feedback. This revised questionnaire was then presented to several professors, who provided insights regarding the clarity and comprehensibility of the questions. Ultimately, 23 questions were approved for use. Additionally, the reliability of the questionnaires was evaluated using Cronbach's alpha coefficient, which yielded an average value of 0.92 for the factors assessed, surpassing the acceptable threshold of 0.94, thereby confirming the reliability of the questionnaire for its intended purpose. The alpha values for each individual factor ranged from 0.84 to 0.94.

We utilized SPSS-26 and Lisrel software to analyze the data. Descriptive statistics such as means and standard deviations were employed to characterize the variables. Pearson correlation test was conducted to assess the relationships between the variables. The structural equation method was applied to investigate the impact of the internal factors of the Technology Acceptance Model (TAM) including ease of use, perceived usefulness, and user attitudes on marketers' intentions to utilize artificial intelligence. The significance level was set at  $P < 0.05$ .

### Results

The analysis of demographic variables indicated that concerning the "work history" of the participants, the most prevalent category was "under 10 years" at 57 percent, while the least prevalent was "21 years and older" at 18 percent. The distribution of employment across the two sample groups, male and female, was nearly identical, with no significant differences noted. In terms of "education level," the most common qualification among both groups was a "Bachelor's degree" at 50 percent, whereas the least common was a "PhD" at 9 percent. The distribution of educational attainment between the male and female groups was also comparable, showing minimal variation. Regarding the "company of employment," the highest frequency for both groups was found in "service companies" at 59 percent, followed by "manufacturing companies" at 41 percent. The mean scores of the ease of use of the female group were higher compared to the male group, but the perceived usefulness of these two groups was not significantly different from each other. Also, the level of attitude and intention to use artificial intelligence was higher in women.

The results of Kolmogorov-Smirnov tests (Table 1) revealed that all variables were normally distributed (all  $P > 0.05$ ).

**Table 1.** Normality of Data

	Ease of Use	Perceived Usefulness	Attitudes Toward Usage	Intention to Use AI
<b>Statistic</b>	4.28	3.66	3.74	2.89
<b>P-Value</b>	0.200	0.200	0.200	0.200

The bivariate relationships involving ease of use, perceived usefulness, user attitudes, and intentions to use artificial intelligence are illustrated in Table 2. The findings indicate a significant direct correlation between perceived usefulness and ease of use ( $P < 0.001$ ). Additionally, perceived usefulness showed a direct and significant link to user attitudes ( $P < 0.001$ ). Also, ease of use showed a direct and significant link to user attitudes. Moreover, ease of use showed a direct and significant link to intentions to use artificial intelligence. Lastly, user attitude was found to have a direct and significant association with intentions to use artificial intelligence ( $P < 0.001$ ).

**Table 2.** Results of bivariate relationships between variables

	1	2	3	4
<b>1. Ease of Use</b>	-			
<b>2. Perceived Usefulness</b>	$r=0.669$ $P < 0.001$	-		
<b>3. Attitudes Toward Usage</b>	$r=0.528$ $P < 0.001$	$r=0.657$ $P < 0.001$	-	
<b>4. Intention to Use AI</b>	$r=0.419$ $P < 0.001$	$r=0.349$ $P < 0.001$	$r=0.580$ $P < 0.001$	-

1. Table 3 and Figure 1 illustrate the outcomes derived from the structural equation modeling analysis. The findings reveal that perceived usefulness significantly affects ease of use, evidenced by a T-value of 6.589. Furthermore, perceived usefulness also has a notable influence on user attitudes, as indicated by a T-value of 6.695. Additionally, ease of use significantly impacts user attitudes, with a T-value of 5.320. It is also important to note that ease of use significantly affects intentions to utilize artificial intelligence, with a T-value of 4.207. User attitudes further demonstrate a significant influence on intentions to use artificial intelligence, also with a T-value of 5.896. Importantly, user attitudes act as a significant mediator in the relationship between perceived usefulness and ease of use concerning intentions to use artificial intelligence, with a p-value of less than 0.001. The model fit results, as presented in Table 4, indicate that the research model shows a good fit.

**Table 3.** Results of Structural Equation Modelling

Path	$\beta$	T-value
<b>1</b> perceived usefulness => ease of use	0.650	6.589
<b>2</b> perceived usefulness => attitudes toward usage	0.671	6.695
<b>3</b> ease of use => attitudes toward usage	0.524	5.320
<b>4</b> ease of use => intention to use AI	0.421	4.207
<b>5</b> attitudes toward usage => intention to use AI	0.593	5.896
	Z	P-value
<b>5</b> perceived usefulness => attitudes toward usage => intention to use AI	7.205	$P < 0.001$
<b>6</b> ease of use => attitudes toward usage => intention to use AI	6.321	$P < 0.001$

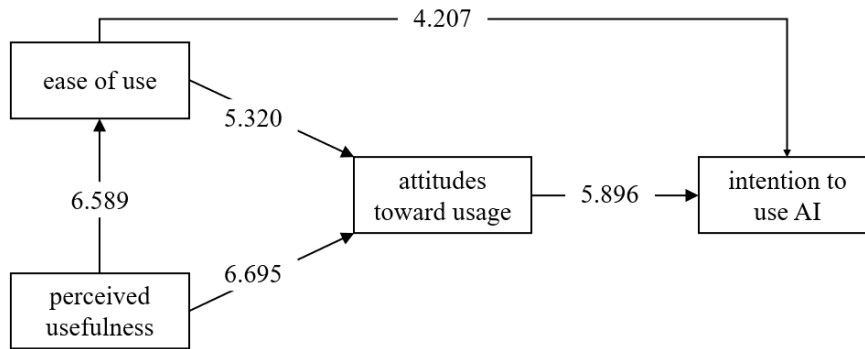


Figure 2. Structural equation modelling in the form of T-values

Table 4. Results of model fit

Index	Optimal Range	Obtained Value	Conclusion
RMSEA	< 0.08	0.06	Good fit
X <sup>2</sup> / df	< 3	2.93	Good fit
RMR	Closer to 0	0.03	Good fit
NFI	> 0.9	0.92	Good fit
CFI	> 0.9	0.92	Good fit

Discussion

This article explores the impact of the internal factors of the Technology Acceptance Model (TAM) including ease of use, perceived usefulness, and user attitudes on marketers’ intentions to utilize artificial intelligence. The findings reveal that perceived usefulness significantly affects ease of use. Furthermore, perceived usefulness also has a notable influence on user attitudes. Additionally, ease of use significantly impacts user attitudes. It is also important to note that ease of use significantly affects intentions to utilize artificial intelligence. User attitudes further demonstrate a significant influence on intentions to use artificial intelligence. Importantly, user attitudes act as a significant mediator in the relationship between perceived usefulness and ease of use concerning intentions to use artificial intelligence.

The research community posits that internal structures serve as significant and effective elements in the acceptance of artificial intelligence among marketers (Pizzo et al., 2022). The information technology acceptance model has proven instrumental in providing a comprehensive analysis of the factors that influence the degree of acceptance of artificial intelligence, thereby assisting marketers in its implementation and promoting its acceptance (Al-Emran et al., 2021). The findings derived from these hypotheses suggest a correlation between the utilization of artificial intelligence and the inclination to engage in its use, which is shaped by two cognitive perceptions. The first is the subjective assessment of the usefulness of artificial intelligence, reflecting users' beliefs regarding its potential to enhance their performance (Ouchchy et al., 2020; Song et al., 2019). The second is the subjective evaluation of ease of use, indicating users' perceptions of the simplicity involved in utilizing the technology. According to the information technology acceptance model, the research outcomes demonstrated that the subjective perception of ease of use directly influences the subjective perception of usefulness, with both perceptions subsequently affecting marketers' attitudes towards artificial intelligence and their intentions to adopt it, ultimately impacting its actual usage (Al Shamsi et al., 2022). It has also been established that the strongest direct effect was observed in the context of perceived ease of use. The findings indicate that a higher level of trust in artificial intelligence during online shopping correlates with an increased likelihood of individuals perceiving AI-driven websites and applications as beneficial. Furthermore, a heightened sense of trust contributes to a more favorable attitude towards utilizing these online platforms for shopping (Jiang et al., 2022; Wang, 2021). The increasing prevalence of artificial intelligence in online shopping is noteworthy, as it enables consumers to secure the best deals and enhances the likelihood that individuals will choose to shop through AI-integrated applications and websites (Grewal et al., 2021). The perceptions of individuals regarding AI-related applications and online stores have a significant, positive, and substantial influence on the business intelligence unit (Akil & Ungan, 2022; Mariani et al., 2022; Zulfiqar & Ahmed, 2022). Furthermore, it indicates that customer attitudes are essential in boosting the traffic of AI-related applications and online stores (Raghupathi et al., 2022). Research has shown that perceived ease of use significantly influences perceived usefulness on online shopping platforms (Wang et al., 2021). Furthermore, consumer acceptance models for online shopping incorporate additional factors not included in the traditional Technology Acceptance Model, such as Trust, enjoyment, and the quality of the online shopping experience, which shape

preferences, behaviors, and attitudes towards electronic commerce (Chalmers et al., 2021; Singh, 2021; Yuan et al., 2021). The application of TAM in the realm of e-commerce presents various advantages and disadvantages, as highlighted by numerous researchers. It has been determined that the indicators of acceptance for electronic transactions primarily focus on enhancing Technology Acceptance Model through the inclusion of two extended constructs: quality and trust (Ahmad et al., 2021).

### Conclusion

Considering the findings of the study, entrepreneurs engaged in the establishment of AI-driven online enterprises will find significant advantages in utilizing its insights to enhance the effectiveness and efficiency of their business model development. This research will act as a compelling motivator for emerging business leaders to pursue AI-centric business frameworks, particularly as the Technology Acceptance Model has traditionally been examined in isolation from both AI and E-commerce perspectives. By integrating these elements within the Technology Acceptance Model framework, this study aims to provide a comprehensive understanding for both scholars and entrepreneurs, thereby highlighting its relevance to their ventures. The implications of this research are applicable across various developed and developing nations. Firstly, the advent of the internet and information technology has transformed the world into a global village, resulting in numerous commonalities in the adoption of AI technologies. Secondly, Pakistan, as a developing nation, boasts a substantial internet user base that is comparable to that of developed countries.

It is advantageous for web shop owners and online marketing managers to evaluate how consumers engage with the emerging technology that incorporates AI in online shopping. Additionally, researchers and academics are urged to implement the Technology Acceptance Model (TAM) within the realm of e-commerce. Those interested in understanding the influence of trust on consumer decisions in the digital marketplace will also gain insights from this research. Furthermore, this study will assist entrepreneurs involved in AI-driven online businesses in refining their business models more effectively and productively based on the findings. Lastly, this research will inspire new entrepreneurs to create their business models centered around AI technologies.

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