The Adoption of Technology Acceptance Model in E-commerce with Artificial Intelligence as a Mediator

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Abstract

The rapid advancement of technology has significantly changed how consumers approach their purchasing habits. The global volume of online commerce has seen a significant surge, largely due to the COVID-19 pandemic, which has accelerated the growth of e-commerce. Increasingly, online merchants are incorporating cutting-edge Artificial Intelligence technology into their platforms to better grasp customer needs and enrich the shopping journey. However, there has been little research conducted on how consumers adapt to and utilize artificial intelligence powered online stores. This study seeks to examine the connection between the elements of the Technology Acceptance Model and E-commerce, with artificial intelligence serving as a mediator in this relationship. A survey was conducted with 352 Iraqi participants who participate in online shopping. Structural equation modelling was applied for data analysis. After establishing the initial theoretical model, a nested model based on TAM was formulated and examined. The finding showed that both ease of use and usefulness as a TAM component positively influences the likelihood of AI adoption and continued usage among online shoppers. Also, artificial intelligence has a positive influence on the customers' adoption of E-commerce. Finally, artificial intelligence plays a mediate role between Technology Acceptance Model and E-commerce. These results offer valuable insights for online retailers looking to improve customer adoption of AI technologies.

Keywords: E-commerce, Artificial Inelegancies, Ease of use, Usefulness, Technology Acceptance Model

Introduction

Over the past thirty years, there has been an unparalleled surge of digitization in the global economy. This transformation has reshaped the management and competitive landscape of businesses, determining their ability to survive and gain market share. The advent of the Internet and information technologies has been instrumental in driving this technological progress in the business world (Xu et al., 2023). Due to the widespread availability of internet-connected mobile devices, consumers now enjoy convenient access to a vast marketplace, enabling them to shop anytime and from any location. This accessibility has expanded their choices, allowing them to browse through numerous varieties, brands, and products spanning a wide price range. Moreover, consumers can swiftly choose diverse products according to their desire, thanks to online platforms. According to Beheshti et al. (2024) recognizing the importance of technology in maintaining a competitive edge, most retail businesses have embraced Electronic Commerce (EC) or online retailing. EC involves using any form of technology to conduct business transaction, facilitating electronic exchange of goods and services irrespective of geographical distances and time constraints (Khando et al., 2022). According to recent studies, EC has witnessed rapid growth in the past few years, emerging as a substantial segment of the cyberspace and its related technologies. This trend is expected to persist, if not accelerate, in the coming years. Consequently, businesses are continuously upgrading their technological infrastructure, transitioning from conventional internet technologies to more sophisticated solutions like AI (Sestino et al., 2023).

The widespread adoption of AI technologies has been steadily increasing across various sectors for many years, significantly impacting the economy. Its applications have been proven effective in fields such as healthcare, marketing, education, finance, and most recently, EC. With the remarkable success of EC businesses, firms recognize it as both a modern business opportunity and a necessity in today's market landscape. The emergence of AI technology has effectively addressed these needs and paved the way for further growth in EC. According to the World Economic Forum projections, AI will substitute for 85 million jobs by 2025. Major players in the EC industry, including Alibaba, Amazon, and Rakuten, utilize AI for tasks such as mining customer feedback for insights and providing personalized product recommendations. The significance and demand for AI technology are underscored by studies by Cherniak (2024) showing that 1.5 billion people are using chatbots, and 47% of customers are open to making purchases using bots. AI applications in EC can be broadly categorized into two main groups: those designed for business owners and those for customers (Song et al., 2019). Business-focused AI applications encompass functionalities such as chatbots for customer queries, automatic generation of product descriptions, data management and analysis, sales forecasting, cybersecurity measures, after-sales support, and identifying fraudulent reviews. On the other hand, customer-centric AI applications include conversational chatbots, recommendation systems, image recognition for tagging products, personalized shopping experiences, and streamlined checkout processes, among others (Gupta et al., 2024).

AI is consistently transforming the EC sector, particularly with the rise in online shopping propelled by the COVID-19 pandemic. As consumers increasingly embrace EC solutions, their behaviors and preferences are evolving, further fueling the demand for AI technology in businesses (Massoudi et al., 2024). Piccialli et al. (2021) suggested a substantial growth trend for the retail AI market, with an annual growth rate of 35% from 2020 to 2027, likely to reach $7 billion in value.

To evaluate the relevance of TAM in this rapidly evolving landscape, a study by Al-Emran & Grani (2021) analyzed 2,400 papers published in the Web of Science between 2010 and 2020. The study concluded that TAM remains a viable model, as evidenced by the continued research being conducted on its applications and modifications. Despite the emergence of new technologies such as augmented reality, EC remains a prominent domain for TAM applications, underscoring its enduring relevance and adaptability.

The importance of AI in EC is undeniable, particularly as customer behaviors continue to evolve in response to the COVID-19 pandemic (Akıl, 2022). EC businesses need to identify the main features that can enhance their operations and better serve their customers (Massoudi & Fatah, 2021). Given that AI is a relatively recent technology, not all of its functionalities may be relevant to every retail establishment. While various studies have investigated the role of AI in EC from the viewpoints of EC and technology experts, there is a call for additional research concentrating on the reactions of EC customers to AI and its effects on efficiency (Cheng et al., 2021).

This study aims to address this gap by examining the features that are crucial for AI technology to deliver optimal results in EC. Specifically, it tests TAM in the context of AI technology in EC. The survey targets online purchasers to gather their insights and perspectives. The objectives of the study are twofold: first, to evaluate the effectiveness of the TAM in explaining the acceptance of AI technology EC, and second, to identify the mediating role of AI between TAM and EC landscape in Iraq using the TAM theory as a framework.

Literature Review

Technology Acceptance Model

Despite the emergence of various new technological acceptance schemes, TAM as depicted in Fig. 1, continues to hold significance among both academic scholars and industry researchers (Rafique et al., 2020). Several reasons underscore the continued adoption of the TAM model. Firstly, unlike the Unified Theory of Acceptance and Use of Technology (UTAUT), which focuses on organizational-level acceptance, the TAM model is specifically intended to assess specific users' propensity to adopt technology (Al-Yaqoobi & Tan, 2021). Thus, for this study focusing on the perceptions of individual customers, the TAM model is considered more suitable.

Secondly, the TAM model is especially recommended for scenarios where the acceptance of technology is in its early stages of adoption. Given that Iraq is a developing country, with numerous areas lacking internet access, and where EC is still in its introductory phase, the TAM model becomes even more relevant. This model can provide valuable insights into the factors influencing technology acceptance among individuals, thereby aiding in the understanding and promotion of EC adoption in such contexts.

Perceived Ease of use (PEOU)

PEOU denotes the degree to which an individual observes that using a particular system entails minimal effort (Kaur, 2020). When assessing the PEOU within the context of the Technology Acceptance Model (TAM), customers consider the user-friendliness, accessibility, and simplicity of the technology (Ahmeti & Bajrami, 2024). A technology that is perceived as easy to use is more likely to be embraced and consistently utilized by users. Various factors influence PEOU, including: User interface is a clean, simple, and intuitive user interface enhances the usability of a technology, reducing the learning curve associated with adopting new technology.

Also, user experience which encompasses the entirety of the end-user's interaction with the company, its services, and its products. A positive user experience, characterized by seamless navigation and efficient functionality, significantly enhances PEOU (Jegundo et al., 2020). Finally, training and demos by providing adequate training sessions or demonstrations enables users to familiarize themselves with the technology, thereby enhancing PEOU (Zubir & Abdul Latip, 2023).

Perceived Usefulness (PU)

PU refers to the degree to which an individual believes that using a particular system would enhance their work performance or task efficiency. (Persson et al., 2021). This notion is pivotal in comprehending user acceptance and wields considerable influence over the decision to embrace novel technologies. Numerous factors can shape a user's perception of a technology's usefulness, including: Efficiency which is the technologies that expedite task completion are prone to being perceived as valuable. Effectiveness: Technologies facilitating superior outcomes or enhancing work quality can heighten PU. Also, productivity: Technologies that augment an individual's output or work quality directly contribute to perceived productivity gains. In addition to cost reduction by curtails costs, whether through time or financial savings, is perceived as highly beneficial. Finally, accessibility and convenience by offering seamless accessibility and convenience, accessible anytime and anywhere, amplify PU (Bagdi & Bulsara, 2023).

Artificial Intelligence

AI, a fairly new technological advancement, possesses immense potential through a numerous field of study. (Ahmad et al., 2022). Its objective is to enhance human intelligence or perform tasks traditionally carried out by humans. At its core, AI seeks to replicate and mimic routine mental processes to emulate human intellect. Grounded in algorithms crafted to imitate human cognitive functions, AI draws inspiration from diverse fields such as biology, medicine, and linguistics. By amalgamating engineering with social sciences, AI aims to foster societal advancement, interpreting human commands and deriving meaning through its algorithms. The progression of AI is closely intertwined with both economic prosperity and societal progress. Key components of AI include machine and interactive learning, which encompass fields such as statistics, probability theory, data mining and pattern recognition (Bazoukis et al., 2022).

Electronic Commerce

EC involves employing modern communication technologies and internet to facilitate business-related information exchanges (Song et al., 2019). Within the EC domain, organizations choose from various business models aligned with their specific goals, all emphasizing the utilization of network technology. Essential business functions such as marketing, supply chain, payment dispensation, and delivery heavily depend on electronic technologies within the EC framework. Furthermore, technology plays a pivotal role in effectively managing customer relationships within EC operations (Nikiforova, 2022).

The technological framework supporting EC includes intranet, Electronic Data Interchange, database systems, extranet, and web development tools (Song et al., 2019). EC is widely acknowledged as a significant economic revolution, catalyzing advancements in science, technology, and culture. Technology has fundamentally reshaped how companies execute diverse business activities within the EC domain, while the widespread adoption of EC practices among individuals plays a considerable part in driving global economic growth (Har et al., 2022).

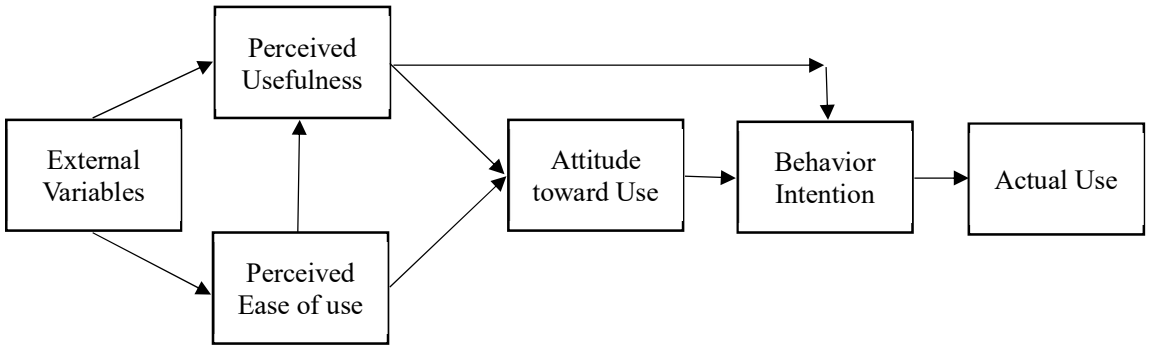


Fig. 1. TAM, Source: Davis (1986).

Hypothesis Development

PEOU and AI

Understanding the relationship between PEOU from the TAM and AI systems perspective is crucial as it sheds light on how users perceive the user-friendliness and accessibility of AI technology (Yamini, 2022). This perception directly impacts the acceptance, adoption, and ongoing usage of AI technologies across diverse domains. Particularly for AI systems featuring user interfaces like chatbots, voice assistants, or complex analytical tools, being perceived as easy to use is essential to encourage initial user engagement (McLean et al., 2021). Difficulties or a steep learning curve during the initial stages may deter users from continuing to use the technology. AI applications that streamline user tasks (e.g., automated customer service, predictive typing) and are perceived as user-friendly are more likely to be embraced. Users expect AI to enhance their tasks without adding complexity to their routines (Li et al., 2024). When users find an AI system easy to interact with, their confidence in utilizing the system grows, leading to sustained usage. An AI system characterized by ease of use fosters a positive user experience, resulting in favorable feedback and heightened user satisfaction. Satisfied users are inclined to recommend the AI to others, potentially expanding its user base (Ghazali et al., 2024).

H1: *The perceived ease as a TAM component positively influences the likelihood of AI acceptance and continued usage among users*

PU and AI

The correlation between PU as a component of TAM and the uptake of AI technologies is fundamental in comprehending how users evaluate the utility of AI systems in enhancing their job performance or streamlining personal tasks (Kelly et al., 2023). PU evaluates how much individuals think that using a particular technology will enhance their efficiency or effectiveness. Within the realm of AI, this perception significantly influences both initial adoption and sustained utilization (Al-Maroof et al., 2024). AI systems that automate mundane tasks can notably enhance efficiency, rendering them highly beneficial to users. For instance, AI-powered data entry tools mitigate the need for manual input, expediting processes and reducing error rates (Lo et al., 2024).

Developers and designers must prioritize crafting AI systems that unequivocally enhance user performance or simplify intricate tasks. The PU of AI systems profoundly shapes their adoption and continued usage. Technologies perceived as directly bolstering job performance, productivity, or decision-making capabilities are more apt to be embraced and seamlessly

integrated into regular workflows (Ismail et al., 2023). This relationship holds paramount importance for developers, business leaders, and marketers alike, guiding them in the design, implementation, and promotion of AI technologies.
H2: *The usefulness as a TAM component positively influences the likelihood of AI acceptance and continued usage among users*

AI and EC Adoption
The integration of AI in EC is both significant and multifaceted, reshaping the landscape by enhancing customer experiences, streamlining operations, and providing data-driven insights that foster business growth (Raji et al., 2024). Adopting AI technologies in EC settings typically results in heightened efficiency, elevated customer satisfaction, and increased sales, prompting further incorporation of AI tools (Josimovski & Dodevski, 2023).

AI algorithms analyze customer data to discern preferences and behavior patterns, empowering EC platforms to offer personalized recommendations, targeted advertisements, and tailored shopping experiences that significantly augment customer engagement and contentment (Babatunde et al., 2024). AI-driven chatbots and virtual assistants deliver round-the-clock customer service, adeptly managing inquiries, complaints, and orders, thereby enhancing the customer experience with instant support and reducing operational costs through task automation (Albeshr, 2023).

Dynamic pricing models, powered by AI, scrutinize various factors including market demand, competitor pricing, and inventory levels to dynamically adjust prices in real-time (Sarkar et al., 2023). This strategic approach enables EC businesses to optimize profits and maintain competitiveness. The implementation of AI-driven personalization and customer service fosters a more gratifying shopping journey, encouraging repeat visits and fostering increased loyalty among shoppers.
H3: *AI has a positive influence on the adoption of E-commerce*

AI as a mediator

The incorporation of AI as a mediator between the components of TAM: PEOU and PU and the adoption of EC among Iraqi retailers presents a dynamic research framework (Low, et al., 2020). This concept proposes that AI can profoundly influence how these foundational TAM components impact the adoption and effective utilization of EC technologies.
Iraqi retailers may perceive AI as useful if it visibly improves their business operations, boosts sales, or enhances customer satisfaction (Wang et al., 2023). AI can assist in analyzing customer data to forecast buying patterns, optimize inventory management, and personalize marketing endeavors, all of which directly contribute to business success. By demonstrating tangible benefits in managing intricate tasks such as demand prediction, personalized marketing, and dynamic pricing, AI can augment the PU of EC technologies (Babayev & Israfilzade, 2023).
Moreover, by simplifying complex data analyses and automating customer interactions and inventory management, AI can render EC technologies more user-friendly and appealing to retailers (Dhoni, 2024). The adoption of EC by Iraqi retailers can be significantly influenced by the extent to which AI tools address their specific needs and challenges, encompassing market dynamics, consumer behavior, and operational efficiencies (Nather et al., 2020).
H4: *AI acts as a mediator in the relationship between TAM components and E-commerce adoption among Iraqi retailers.*

Proposed Conceptual Model:
This study introduces a conceptual model founded on the provided hypotheses. The research encompasses four variables, comprising both dependent and independent factors, along with four interconnected hypotheses. (Figure 2) illustrates the proposed conceptual model alongside its hypotheses.

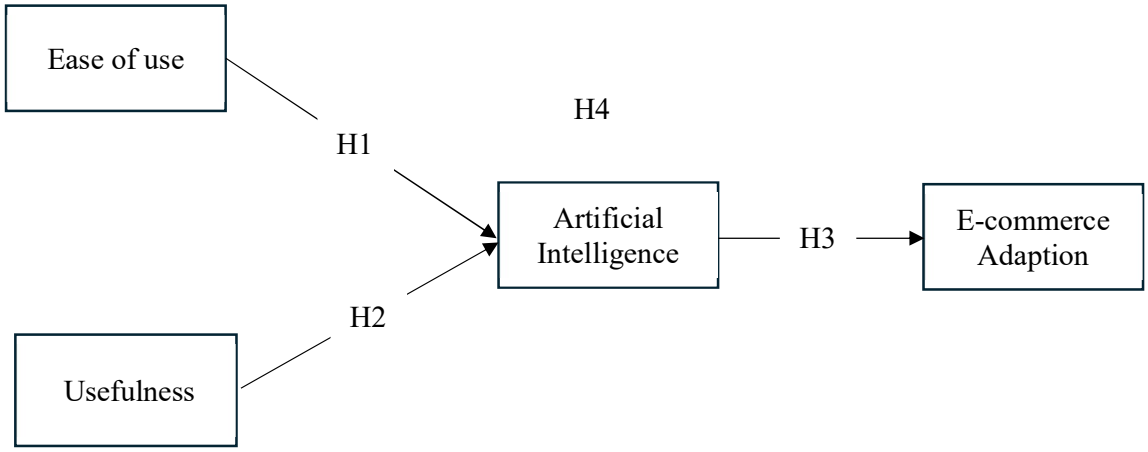


Fig. 2. Proposed Conceptual Model with Hypotheses

Methodology:

This study adopts a descriptive research approach, focusing on people's opinions (Gams & Kolenik, 2021). Researchers initially identify a topic of interest, then gather data to test hypotheses or address research questions. The quantitative approach is employed to produce reliable and generalizable data to a population, offering a significant advantage for this research. Various types of quantitative research methods, such as surveys, experiments, laboratory studies, and numerical methods, can be utilized. This study depended on questionnaire survey.

Measurement scale:
A survey instrument is designed to measure the research variables, including EC, AI, PEOU, and PU. A questionnaire is developed and distributed to employees and workers in Iraq to gather their responses regarding EC.
The questionnaire design encompasses two sections: Part A gathers demographic data, while Part B concentrates on the characteristics influencing electronic commerce users. These variables encompass the dependent variables: PEOU with 3 items, and PU with 3 items both adapted from Wang et al. (2023), and the dependent variable EC with 4 items adapted from Wang et al. (2023). AI as a mediator with 3 items adapted from Sestino & De Mauro (2022).
The questionnaire comprises of 18 items with demographics, utilizing a 5 points Likert-type scale. The scale ranges from 1, denoting "strongly disagree," to 5, denoting "strongly agree." These items specifically pertain to non-demographic factors.

Sample and sampling techniques

In this study, purposive sampling was employed. This technique targets a specific group of participants to partake in the survey, with their feedback representing the entire population. Purposive sampling is recognized as a non-probabilistic sampling method, as the authors select participants based on the study's objectives. The respondents in this study were exclusively individuals who had purchased products from EC firms. Following ethical guidelines, consent was obtained from the participants before they were asked to provide responses through a questionnaire.

This sample size was chosen based on Sekaran and Bougie (2016) stating that sample sizes exceeding 30 are significant for quantitative analysis, and those below 500 are ideal for the study. Initially, the research instrument was distributed to 360 purchasers of EC products, a valid response of 352 participants were used for the analysis, resulting in an 97% response rate. The data collection period spanned approximately two months, from March 1st 2024 to April 30th 2024.

The study focused on online purchasers in Iraq. The Iraqi EC market is experiencing rapid growth, with projected transaction value in the digital commerce market is projected to reach US $10.23bn in 2024. (Statista, 2021). A study by Kapita et al. (2022) revealed that over three-quarters (79.35%) of the Iraqi population, totaling 44.5 million, had shopped online in the past year. Among respondents, 61.22% reported placing 1-3 orders, with the majority spending between $50 and $100 on their purchases. Table 1 illustrates the demographic characteristics of respondents

Table 1. Characteristics of Respondents

Item	Characteristics	Number	%
Gender	Male	217	61%
	Female	135	38%
Age Group	18 to 29 Years	240	68%
	30 to 40 Years	80	22%
	41 to 50	25	7%
	50+ Years	7	2%
Experience shopping online	Less than one year	55	15%
	1-5 years	270	76%
	More than 5 years	27	7%
Education	High School diploma	80	22%
	Undergraduate	190	53%
	Graduate	70	19%
	Post Graduate	12	3%

Table 1 illustrates that 61 of respondents' ware males and 38% are females. The majority of respondents'' ages range from 18-29 years with 68% and the rest are over 30 years of age. Also, 76% of respondents have between 1-5 years of shopping experience. Finally, 53% of respondents have undergraduate degree, 22% with high school diploma and the rest had higher education.

Analysis and Discussion

Measurement model

For assessment of the outer loadings, internal reliability, composite reliability and Cronbach's alpha are commonly utilized methods. the outer loadings of each item should ideally be close to or greater than 0.7. Table 2, which outlines reliability and validity measures, indicates that all items possess loading values exceeding the threshold of 0.7. A value of 0.7 or higher is considered acceptable for both measures if the outer loading values are significant (Ursachi et al., 2015). Table 2 displays reliability and validity metrics, demonstrating that all constructs exhibit composite reliability and Cronbach's alpha values surpassing the threshold. This confirms that the data meets the reliability criteria and is suitable for further analysis.

In term of validity, it encompasses two dimensions: convergent and discriminant validity (O'Brien, 2007). Convergent validity is assessed using Average Variance Extracts (AVE), with a threshold value of 0.5 or higher considered acceptable. Table 2 illustrates reliability and validity metrics, indicating that all constructs have AVE values exceeding 0.5, thereby confirming convergent validity across all constructs.

Table 2. Reliability and validity

Construct	Code	Loading	Cronbach's Alpha	Composite Reliability	AVE
Perceived Ease of Use (PEOU)	PEOU1	0.858	0.918	0.938	0.753
	PEOU2	0.856			
	PEOU2	0.848			
Perceived Usefulness (PU)	PU1	0.850	0.897	0.919	0.693
	PU2	0.851			
	PU3	0.828			
Artificial Intelligence (AI)	AI1	0.918	0.928	0.948	0.820
	AI2	0.903			
	AI3	0.930			
Electronic Commerce (EC)	EC1	0.781	0.902	0.925	0.714
	EC2	0.930			
	EC3	0.907			
	EC4	0.808			

Additional criterion for evaluating discriminant validity is The Heterotrait-Monotrait Ratio. Henseler et al. (2015) indicated that if the value of correlation below 0.90, the HTMT method effectively confirms discriminant validity between each pair of variables. Table 3 illustrates HTMT values for latent constructs and found to be below 0.90. By employing the HTMT method to assess discriminant validity, this study confirms that the constructs under examination are differentiated from one another and do not overlap significantly.

Table 3. HTMT ratios

Construct	AI	EC	EOU	USE
Artificial Intelligence				
Electronic Commerce	0.738			
Ease of Use	0.366	0.488		
Usefulness	0.285	0.518	0.105	

Structure Model

According to Sarstedt et al. (2021), bootstrapping procedure is utilized to examine the significance of several PLS-SEM outcomes including path coefficients and R^2 values. The coefficient of determination (R^2) was examined. R^2 measures the variance of endogenous variables explained by exogenous variables. Hair and Almar (2022) indicated that R^2 values below 0.19 should be rejected, values ranging from 0.19 to 0.33 are deemed weak, those from 0.33 to 0.67 are considered moderate, and those exceeding 0.67 are categorized as high. As indicated in Table 4, the R^2 values for AI and EC are 0.166 and 0.436, respectively. Consequently, the R^2 is considered weak for this model.

Subsequently, the Q^2 criterion is evaluated to evaluate the predictable capability of the projected model. In Smart-PLS, the blindfolding step is used to calculate Q^2. According to the guidelines of Hair and Alamer (2022), it is crucial for this criterion to have a value larger than zero. As shown in Table 4, the Q^2 value is 0.140 and 0.305, which exceeds zero. Henceforth, this measure has been fulfilled without any reservations.

Table 4. Coefficient of determination

	***R* Square**	***R* Square Adjusted**	Q^2
Artificial Intelligence	0.166	0.161	0.140
E-commerce adoption	0.436	0.435	0.305

Hypotheses Testing

In Table 5, the authors examined the proposed model direct and indirect effects to test the hypotheses of this study. The findings in Table 5 reveal that ease of use (PEOU) significantly affects artificial intelligence (AI), where $\beta = 0.321$, the p-value of $0.000 < 0.05$ besides t-values of $6.396 > 1.96$. Hence H_1 is supported. Likewise, usefulness (PU) exerts a significantly positive influence on artificial intelligence (AI), as evidenced by the $\beta = 0.222$, p-value of $0.000 < 0.05$ with a t-values of $4.285 > 1.96$. Consequently, H_2 is supported. Similarly, these outcomes are showing that artificial intelligence (AI) has a significant impact on Electronic Commerce (EC). This conclusion is drawn from the $\beta = 0.661$, p-value < 0.05 and the t-value of $17.895 > 1.96$. Accordingly, H_3 is confirmed. Ultimately, the analysis revealed a significant indirect effect path where artificial intelligence mediates the relationship between TAM components and ecommerce, where the $\beta = 0.147$, p-value of $0.000 < 0.05$ and a t-value of $3.847 > 1.96$ for the first independent variable. Also, $\beta = 0.212$, p-value of $0.000 < 0.05$ and a t-value of $5.790 > 1.96$ for the second independent variable. Therefore, H_4 is supported. Figure 2 illustrates the measurement model output.

Table 4. Path coefficient

Relationships	Original Sample	Mean	STD	*t*	*p* values
Ease of Use - > Artificial Intelligence	0.321	0.321	0.050	6.396	0.000
Usefulness - > Artificial Intelligence	0.222	0.227	0.052	4.285	0.000
Artificial Intelligence - > Electronic Commerce	0.661	0.665	0.037	17.895	0.000
Indirect Effects					
Usefulness -> Artificial Intelligence -> E-commerce	0.147	0.152	0.038	3.847	0.000
Ease Of Use -> Artificial Intelligence ->E-commerce	0.212	0.213	0.037	5.790	0.000

Fig. 3 Outer loading

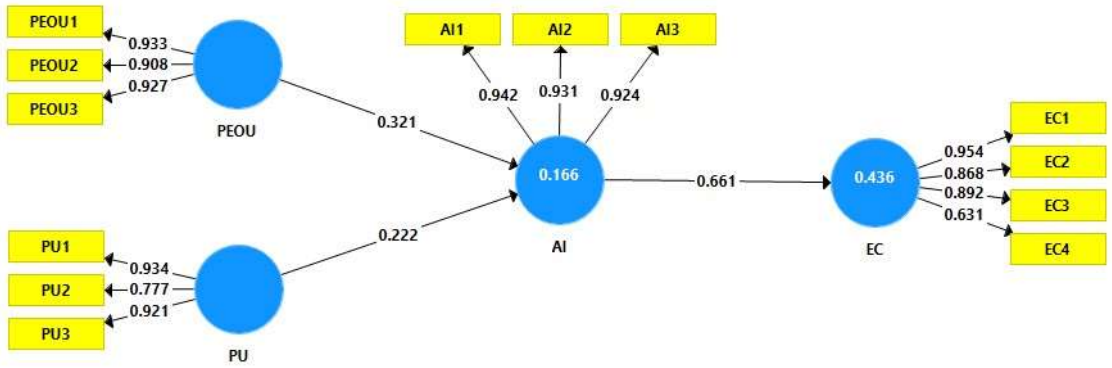
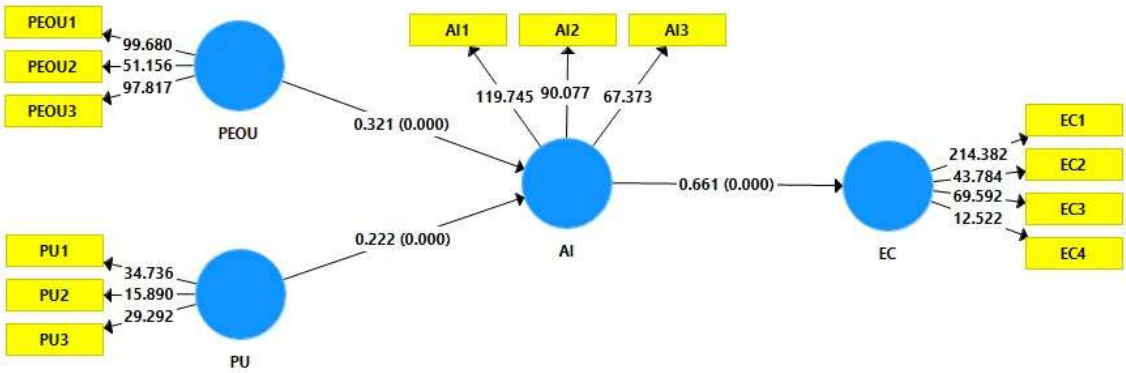


Fig. 4. Measurement Model Output



Discussion

The results of the study suggest that PEOU, a component of TAM, has a positive impact on users' acceptance and ongoing use of AI systems. This conclusion aligns with earlier research conducted by Abu-Taieh et al. (2023) and Sohn & Kwon (2020). When AI systems are perceived as intuitive and uncomplicated, users are more inclined to accept them and continue utilizing them. This simplicity contributes significantly to a positive user experience, which is pivotal for fostering acceptance and sustained usage. Moreover, individuals who find AI systems easy to navigate are inclined to share their positive experiences with others, either through word-of-mouth or on social media channels. Such positive feedback can influence others' perceptions and decisions regarding AI adoption, creating a ripple effect that promotes broader acceptance. Overall, the PEOU plays a critical role in shaping users' attitudes and behaviors toward AI adoption and usage. By prioritizing user-friendly design and intuitive interfaces, developers and organizations can enhance the likelihood of successful AI implementations and maximize the benefits derived from these technologies.

It has been observed that PU, a component of TAM, significantly impacts the acceptance and continuous use of AI in the context of EC transactions. This discovery aligns with the findings of Wang et al. (2023) and Mican et al. (2020). PU acts as a key role in driving the acceptance and ongoing usage of AI in EC transactions by demonstrating the concrete benefits and value proposition of AI-powered functionalities. EC platforms that prioritize user-centric design and provide personalized, efficient, and dependable AI experiences are more likely to cultivate positive perceptions of usefulness and foster sustained user engagement.

Moreover, the research has revealed that AI exerts a positive influence on the adoption of EC. This finding is consistent with the work of Chen et al. (2022). AI empowers EC platforms to deliver tailored shopping experiences customized to each user's preferences, browsing history, and purchasing behavior. Leveraging machine learning algorithms, AI can analyze vast datasets to offer personalized product recommendations, promotions, and content that resonate with individual customers. This increased degree of customization boosts user interaction and contentment, and ultimately drives adoption, as users value platforms that comprehend and cater to their unique needs and preferences.

The research also revealed that AI serves as a mediator in the connection between TAM components and EC adoption among Iraqi retailers. While previous studies, such as the one conducted by Wang et al. (2023), explored attitude as a mediator between TAM and EC, no prior study specifically tested the mediation of AI between TAM components and EC adoption. In this study, linking AI to power EC platforms can enhance user experience by providing personalized recommendations, thereby rendering the system more useful and user-friendly for Iraqi consumers. Furthermore, AI can streamline various tasks, such as customer support, consequently reducing the perceived effort required to make purchases on an EC platform.

Conclusion

The objective of this study is to investigate the implementation of the technology acceptance model within the EC industry in Iraq, with AI acting as an intermediary. The research confirms that both PEOU and PU are pivotal factors influencing users' adoption of AI in EC. When users lack trust in AI-powered online shopping platforms and apps, they view them as less

trustworthy and maintain a negative attitude towards them, consequently online traffic will decrease. AI empowers online shoppers to obtain tailored suggestions for securing optimal deals, like products with the greatest value, thus diminishing the time invested in searching for items and amplifying the efficiency of online shopping. In the current landscape, crafting a customized customer journey holds greater importance than ever to fulfill customer expectations and deliver an exceptional online shopping journey. Drawing from the insights of the study, entrepreneurs initiating AI-driven online endeavors can harness its capabilities to refine and streamline their business models with greater effectiveness and efficiency. This study stands as a notable source of encouragement for young entrepreneurs to devise business models grounded in AI technology, as previous studies primarily examined the TAM model separately from the perspectives of AI or EC. By integrating both aspects into the TAM model simultaneously, the study provides valuable insights for academics and entrepreneurs to assess its relevance within their respective businesses.

Practical and theoretical implications

It's beneficial for proprietors of web shop and online marketing administrators to evaluate how consumers embrace new technology employing AI in online shopping. Likewise, scholars and researchers are urged to employ TAM in EC. People interested in exploring the significance of trust in consumers' online decisions will also find value in this study. Additionally, Entrepreneurs engaged in AI-driven online enterprises can optimize their business models more efficiently and productively, drawing from the insights gleaned from the study. Furthermore, this study acts as a source of motivation for aspiring entrepreneurs to formulate their business models centered around AI.

Despite TAM's status as an older model, having been introduced by Davis in 1986, concerns about its reliability and validity have surfaced alongside the emergence of new technological trends. However, numerous researches have shown that the model remains valid and is utilized by researchers in various digital industries. Although TAM has undergone testing across various technology-driven sectors, its application in AI, particularly within the realm of EC, required improvement. This study scrutinizes the TAM model through the lens of customers patronizing AI-based EC companies, offering a fresh framework and incentive for research on integrating AI in EC.

Limitations and future direction

Several limitations constrain the scope of this study. Firstly, it solely relies on quantitative data analysis based on existing theoretical models, thus excluding potential insights from qualitative research. Qualitative studies could uncover additional factors influencing the technology acceptance model. Secondly, the study's respondents are limited to Iraq, limiting the generalizability of the findings. Future research could gather data from various countries to improve generalizability. Thirdly, the study utilizes cross-sectional data, which may limit its ability to establish cause-and-effect relationships. Longitudinal data would be more appropriate for verifying such relationships.

Caution should be taken when extending the discussion and findings to other groups and technologies due to these limitations. However, these constraints also offer opportunities for additional exploration. In future research, employing diverse methodologies such as interviews, longitudinal studies, and focus groups could delve into the correlation between

barriers, trends, and customer purchasing behavior in online applications. Additionally, future studies could delve into the evolution of online application systems and the ongoing expansion of the internet. Finally, replicating similar studies focused on EC to assess purchase behaviors rather than intentions could provide valuable insights for future research endeavors.

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