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Customer satisfaction towards the application of artificial intelligence in e-commerce

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Abstract: The growth of e-commerce is one of the fastest growing distribution methods for business and has significantly changed the operations of retailers all over the world. Innovative solutions and improved consumer experiences are greatly helped by artificial intelligence (AI) in the e-commerce market. Hence, the concept of algorithms and learning technology, which provides a framework for automation are important to AI when it comes to the eCommerce sector. E-commerce use AI and data gathered from customers and company to predict new developments and make informed decisions effectively. This research studies the relationship between AI Shopping Cart, Recommendations System, Chatbots, and Image Search and how they contribute to customer satisfaction. Questionnaire survey was collected from 208 consumers in Malaysia aged between 18 years old and above. SPSS software was used as the data analysis tool and results from descriptive analysis, reliability test, Pearson correlation coefficient analysis, inferential statistics, multiple linear regression as well as hypotheses testing were considered. The findings revealed that recommender systems and image searches are important elements that contribute to customers satisfaction and customers who are satisfied with the AI functions will continue to use these AI applications. This research provides insights for e-commerce retailers, consumers, and researchers.

Keywords: e-commerce; artificial intelligence; descriptive analysis; reliability test; Pearson correlation coefficient analysis; inferential statistics; multiple linear regression

1. Introduction

E-commerce refers to the activities or services that encompass purchasing goods and services through online platforms [1,2]. The utilization of artificial intelligence (AI) methodologies, systems, tools, and processes to facilitate online transactions for the procurement of goods and services is termed as AI in e-commerce [1]. AI has the capacity to enhance the customer

experience on e-commerce websites through improved strategic decision-making [3,4]. Its application holds significant potential for assisting customers in effectively accessing relevant information during the e-commerce purchasing process.

Artificial intelligence is frequently described as creations of human intellect that can engage in information processing, planning, perception, and even understanding human speech [3]. The relationship between AI, machine learning, and deep learning is illustrated in Figure 1. AI systems play a role in nearly all facets of the technology industry, driven by advancements in machine learning and deep learning. Machine learning (ML) is a facet of artificial intelligence wherein software programs can autonomously learn from new data and adapt without human intervention [3]. Deep learning techniques facilitate automated learning through the assimilation of vast quantities of data sources, such as text, images, and videos. The application of AI has extended to various domains, including the expansive realm of e-commerce.

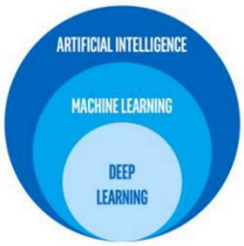

Figure 1. Relationship between artificial intelligence and machine learning note [3].

Artificial Intelligence (AI) constitutes an expansive domain within computer science that is focused on designing technologies with the capacity to execute tasks traditionally associated with human intelligence [5]. This has led to a swift proliferation in the application of AI over recent decades [6]. Particularly within the realm of electronic commerce, AI technology has undergone significant evolution, emerging as a formidable tool capable of augmenting revenue growth and streamlining the intricate operations of e-commerce ventures [7]. The swift transformation driven by AI is evident in predictions from market research firm Gartner, which anticipate AI's replacement of humans in over 80% of customer support roles by 2020 [6,7].

In the contemporary landscape, the e-commerce sector stands as a driving force in the advancement of artificial intelligence. This industry constructs a substantial customer base, grasps customer preferences, conducts research, and furnishes effective solutions. This symbiotic relationship has propelled e-commerce to expand exponentially. Furthermore, AI can play a pivotal role in marketing operations, orchestrating tasks that monitor and influence consumer behavior across the entire consumer journey, from recognizing needs to post-purchase actions [8]. E-commerce platforms continually explore innovative methodologies to meet diverse customer demands, leading to enhanced operational efficiency and elevated service quality [7].

AI lends essential support to e-commerce platforms for customer management and follow-up, leveraging tools like chatbots to nurture relationships between businesses and

their clientele [9]. By employing AI, e-commerce websites offer personalized services to online customers, including product recommendations and chatbot interactions, while rapidly analyzing customer feedback. Automated systems, in comparison to human counterparts, swiftly gather, process, and evaluate data, leading to heightened convenience for customers and achieving equilibrium in supply and demand [9]. As such, these perspectives are instrumental in identifying AI-related resources and elucidating how they synergize to form advanced tools in AI applications.

One of the key domains influenced by AI is customer relationship management (CRM), aiming to bolster sales and customer satisfaction through strategies encompassing sales, advertising, and communication [10]. However, it's important to note that roughly 50% of customer relationship management programs fail to meet upper management expectations, with only 16% significantly impacting business performance; the majority, approximately 59%, falter due to technical developmental challenges [11,12]. In light of this, AI technology emerges as an application capable of assisting e-commerce enterprises in enhancing their CRM practices, potentially mitigating the shortcomings encountered by traditional approaches. E-commerce needs to provide customers access to advantages like continuous outcomes, quick delivery, and more flexibility that they could get via purchasing online [13]. Every month, e-commerce gains more success which enhances this sector's revenues and increases competitiveness [14]. AI includes human intellect to be used by computers and computer systems, merchants use AI with e-commerce together to improve revenue. The current generation prefers time-saving electronic transactions, and AI helps to provide consumers enhances conveniences [15]. The organizations must increasingly think about the implications of satisfaction related to a customer's intent to continue using and being loyal due to the possible impact to profitability [16]. Therefore, e-commerce retailers need to use the application of AI to know the preferences of the customer base which improves the CRM and satisfaction of customer.

As e-commerce is becoming more famous, consumers' shopping habits have changed in a big way [17]. Artificial intelligence gives computers the ability to think and do things better than people, such as being able to recognise images, hear voices, make decisions, and translate between different languages [18]. Due to the wide range of tasks that AI systems can do, such as video, image, and speech recognition, voice recognition, and autonomous images, AI systems have made e-commerce better [9], so using AI applications to learn more about customers' buying habits in e-commerce can directly target a better customer base. Even though trust is an important part of the relationship part of marketing, which is related to the growth of B2C e-commerce [19], e-commerce retailers must create ways to build trustworthiness in this situation of risk and uncertainty, and tools should be created to help customers decide how much confidence to put in an e-commerce purchase [20]. Hence, it is important to find out what makes people change the way they buy things and what problems they face when they buy things online [17].

The central objective of this research is to examine how customers perceive and experience satisfaction with the integration of Artificial Intelligence in the realm of e-commerce. The outcomes of this study hold substantial implications for retailers, customers,

and researchers alike. By offering valuable insights into the deployment of AI in e-commerce and its subsequent effects on customer satisfaction, business strategies, consumer experiences, and intentions for future use, the findings of this research have the potential to shape perspectives across these domains.

2. Literature review

2.1 Review of relevant theories

2.1.1 Technology Acceptance Model (TAM)

The research delves into assessing customer satisfaction regarding the incorporation of Artificial Intelligence (AI) within the context of e-commerce, as well as gauging consumers' intentions for sustained AI utilization within e-commerce using the TAM. In the realm of e-commerce, customers seek to save time, money, and effort while also capitalizing on the diverse array of available products and services [21]. The primary objective of employing the technology acceptance model in this study is to ascertain whether the application of AI within e-commerce effectively meets customers' satisfaction when put into practice. Recent research has explored customer satisfaction's implications in the e-commerce landscape by expanding upon the TAM and integrating it with other theoretical models, further enriching our understanding of this complex interaction.

Customer satisfaction is the result of customers' perceptions, opinions, and emotional responses to a product or service [22]. TAM has become a well-developed, efficient, accurate, reliable, and generally used model for predicting and analyzing users' behavior and IT usage [2]. This approach for measuring user adoption of the technology may offer useful data determine the likely that the suggested technologies will be successful. The expanded Technology Acceptance Model served as the source for the conceptual model. Based on the discussion, TAM may be used to describe the independent variables of AI Shopping Cart, Recommendations System, Chatbots, and Image Search and the dependent variable of customer satisfaction on e-commerce.

2.1.2 Expectation Confirmation Theory (ECT)

Customer behavior research often relies on the ECT to investigate consumer satisfaction and post-purchase behavior [23]. Consumer behavior after acceptance, which is satisfaction it situated in ECT as a combination of expectations and confirmation [24]. In an ECT framework, customers acquire at their repurchase intentions through the following process. The customers build an initial expectation of the application of AI on ecommerce. After that, they will continuously be using when the customer satisfaction towards the application of AI on ecommerce. The expectation confirmation model (ECM) analyses the desire to continue using a technology by integrating the expectation confirmation theory with a feature called perceived usability [25]. The definition of expectation is the extent to which a customer is satisfied with an emotion based on usage of technology [26].

Satisfaction, as explained by [26], is a desirable emotional state that leads to customer retention, while continuous intention refers to customers' plans to continue using a particular technology. ECM suggests the two key factors of performance confirmation and perceived usability which are both connected to customer satisfaction and continuous intention to use [25]. ECT was developed by investigating customer satisfaction and keep up to continuous in use the application of AI on ecommerce. Moreover, customer satisfaction in use the application of AI on ecommerce after their initial experience are referred to as continuation intentions [23]. ECT indicated the relationship between people's decisions to continue usage and consumers' decisions to make purchase decisions and recommended the ETCT in the literature to describe the conception of customers' continuous intention [26]. Therefore, Expectation-Confirmation Theory (ECT) can be adopted to explain when the customer satisfaction towards application of AI on ecommerce, the customers will continuous usage on ecommerce based on this model.

2.2 Review of variables

2.2.1 AI shopping cart

Drawing from [27], the notion of AI-powered shopping carts presents an intriguing and valuable perspective for investigating online purchasing behavior. This is particularly relevant since a majority of online stores have integrated virtual shopping cart software solutions, which aid customers in aggregating items of interest during their shopping journey. A shopping cart is a software application that makes it easier to buy good or service on e-commerce. It is a fully-featured website that provides customers with the flexibility they need to use an online store [28]. The functions in the AI shopping cart include add, delete, and review purchases. With the aid of Artificial Intelligence, merchants are able to better comprehend a customer's needs and recommend relevant products at the appropriate time [29]. The customers can also continually refresh their shopping cart in anytime. Online customers may use AI shopping cart as a wish list to convenient and see products they are interested are thinking of buying in the future [26]. After that, customers may complete their purchase by selecting the checkout button. Customers can immediately purchase products or services using ecommerce AI shopping cart software. The usage of shopping carts online may significantly improve the probability that a customer will make a purchase [29].

According to [23], many goods are added by customers to their online shopping carts on different e-commerce systems, but not all those things are bought. Furthermore, unlike traditional on-ground shopping carts, data on the usage patterns of electronic carts offered with online purchases may be easily acquired for surveys [22]. A satisfying customer in using the system is significant since it enables customers to decide what they really want to purchase before choosing their things [20]. The AI shopping cart ought to include functions like the ability to add things and check those items out using the available payment options [22]. The benefits of AI Shopping Cart can enhance the shopping experience for all e-commerce customers. Overall, AI shopping cart will make sure that customers desire purchase on e-

commerce and return more frequently [23]. These results lead to the conclusion that there is a relationship between customer satisfaction with e-commerce and AI shopping cart.

H1: There is a significant relationship between AI shopping cart and customer satisfaction towards ecommerce.

2.2.2 Recommendations system

A Recommendations System is a mechanism that utilizes machine learning algorithms to dissect historical consumer data pertinent to decision-making and behavioral patterns [3]. By harnessing AI algorithms, a diverse array of techniques such as deep learning, mathematical programming, modeling, and interpretation of consumer behavior can be applied. This enables the analysis of extensive datasets and predictions regarding the products that are most likely to captivate customers [24]. The use of feature learning algorithms allows the recommendation system to be transformed by artificial intelligence [7]. Based on the customers' requirements, AI will suggest suitable items. By developing a list for a given customer, they use data analysis techniques to help customers determine which things they would want to buy at e-commerce sites [25]. They can easily predict customer preferences and can offer or suggest the best goods to customers [3]. Recommender systems are increasingly employed in various practical applications and have achieved notable commercial success, aiming to improve the efficiency of product suggestions by incorporating detailed product prices [26].

Recommendations system, according to [3], can benefit financial and e-commerce businesses in boosting revenue and customer satisfaction. To expedite the process of product discovery for customers, the recommendation engine generates relevant suggestions for the user's browser and presents them on a personalized webpage [7]. A recommendation system that uses artificial intelligence can be transformed using a dimensionality reduction algorithm [24]. According to [7], recommendation systems are a popular tool used by many e-commerce businesses, including Amazon, AliExpress, and Taobao had add the time dimension, the dynamic aspect of the system and the user may be achieved. [27] states that, recommendation system may also be personalized based on inferred or stated preferences from prior terms of customer, it also shows the amount of product suggestions and the complexity of a single product that related products to the customers when they are searching on ecommerce.

H2: There is a significant relationship between recommender system and customer satisfaction towards ecommerce.

2.2.3 Chatbots

According to [7], An artificial intelligence assistant (chatbot) which main function is to use a natural language processing technology to automatically answer to customer enquiries, perform out basic voice instructions, and recommend products. Artificial intelligence markup language (AIML)-based intelligent chatbot system that could function as an e-commerce assistant [28]. A chatbot is a technology used in this type of communication that can understand the context and offer the right answer [29]. Chat conversations on e-commerce

sites are built to use machine learning algorithms to communicate with customers in a flexible way [24]. Regardless of absence of a person to handle customer inquiries, AI is helping ecommerce provide continuous customer support across different platforms [24]. Chatbots contribute to the customization of customer service through direct chats. The application of chatbots automates customer contacts and reduces the need to assign a human to answer user questions [20].

The Chatbots Artificial Intelligence able to provide 24 hours customers service to customers on ecommerce [29]. To increase customer satisfaction and achieve good services to customers, the significant proportion of e-commerce websites use chatbots [3]. According to [29], a chatbot is presently being developed to respond more intelligently, quickly, and consistently to customers. According to [24] chatbots is convenience in the customer experience helps save consumers' time and energy, whether they are doing so cognitively, emotionally, or physically when ecommerce purchase. With the time and advancements in AI, chatbots can help customers with responses and support customized to their wants and expectations [22]. Jiang *et al*. (2021) claims that offering their clients 24-7 customer service is a nice benefit of shopping on e-commerce websites [28]. Thus, it can conclude that the relationship between Chatbots and customer satisfaction towards ecommerce from these findings in this research.

H3: There is a significant relationship between chatbots and customer satisfaction towards ecommerce.

2.2.4 Image search

Image search is a sort of search that has emerged as a result of the growth of image processing techniques and the rising use of applications with cameras, reports [21]. AI-enabled image search, according to [24], is the process of using an image to locate related or comparable visual artefacts. Artificial intelligence is employed to establish image search functionality on e-commerce websites by utilizing algorithms designed for image processing [3]. A more efficient search and translation tool is made using image recognition and database technology, which will help the customer save a lot of time [23]. The e-commerce platforms include "search by image" feature and are investigating various search engines to enable effective and fast visual search [21]. When customers cannot accurately describe a product, customers can use this method for image search and easily submit the product image to the ecommerce website [24].

[24] asserts that when shoppers encounter challenges moving from "seeking" to "viewing" a product, they can have a straightforward search experience while making an online purchase. Customers are not obligated to search for things using keywords; they are free to look for items using photographs [3]. Image uploading is a simple process that allows for rapid and easy searches, allowing for the expression of visual preferences that may not be properly expressed through language [21]. These findings suggest a correlation between image search functionality and customer satisfaction within the e-commerce context. According to [25], customers use e-commerce search engines so they can compare prices,

items, and stores fast, minimize the risks, identify stores, find the most popular products, limit their options, and assess store reputations.

H4: There is a significant relationship between image search and customer satisfaction towards ecommerce.

2.2.5 Customers satisfaction towards e-commerce

Due to the importance of customer satisfaction for e-commerce, the research has investigated at the variables affecting customer satisfaction on ecommerce [26]. Customer satisfaction is measured as the perceived difference between expected values and the tool's actual performance as experienced after usage [27]. It was discovered that the beliefs and perceived values have an impact on customer loyalty and satisfaction when they use an e-commerce website [28]. The customer attitude and key characteristics of present businesses' continuous improvement make measuring customer satisfaction one of the most significant procedures affecting product or service offered [29]. Customer satisfaction in the service sector of ecommerce leads to the conclusion that satisfaction and service quality are two different ideas [27]. When customers use a product or service on e-commerce that conclude their requirements and expectations have been met, customers are satisfied [20].

H5: There is a significant relationship between customer satisfaction towards ecommerce and continuous usage.

2.2.6 Continuous usage

As per [22], the extent to which customers express contentment with the ordering and fulfillment procedures, as well as the usability of the website, holds notable sway over their decision to persist in using e-commerce platforms. Furthermore, the trustworthiness associated with the identification of e-commerce consumers is closely tied to their ongoing intention to utilize such platforms [2]. The evolution of multiple features and capabilities geared towards enhancing customer engagement has paved the way for a fresh surge in e-commerce growth [22]. Hence, AI has been applied in e-commerce to enhance customer experience during ecommerce purchases. The variables that motivate people to use e-commerce services must be identified to support and help customers in this process [21].

According to [2], behaviours are used is how much effort is needed and how long the behaviours face of challenges and experiences depend on expectations of knowledge and personal efficacy. Customer’s expectations of the physical and mental work to use a technology how little effort would be required to use a given system are represented by perceived ease of use [23]. The research assumes that customers' continuous e-commerce uses the application of AI is influenced by the satisfaction they experience when their fundamental requirements are met. The importance of ensuring ease of use in the implementation of AI holds a direct influence on the adoption of information technology (IT), with particular relevance to e-commerce [4]. Drawing from these findings, it can be deduced that a connection exists between sustained usage and customer satisfaction within the realm of e-commerce.

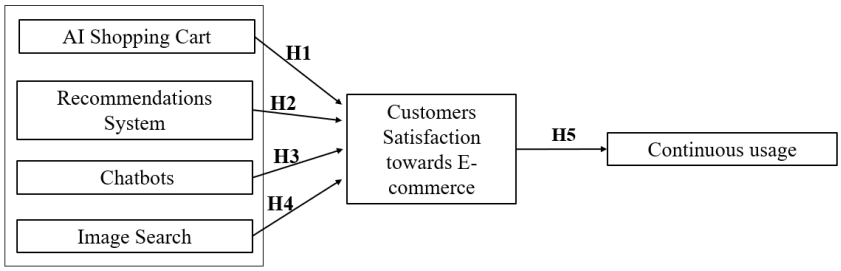

Figure 2. Proposed conceptual framework.

The primary objective of this research is to ascertain the level of customer satisfaction regarding the implementation of artificial intelligence (AI) within the context of e-commerce (Figure 2). The theoretical underpinning of this study has been constructed by integrating the technology acceptance model and the expectation confirmation theory. The definition of satisfaction includes an emotional evaluation and the satisfying feelings that result from the application of AI. It should be emphasized that customer satisfaction might have an impact on a customer's decision to continue using an e-commerce platform. The independent variables are the application of AI, and the dependent variable is customer satisfaction toward e-commerce.

3. Research methodology

This study adopted quantitative method, non-probability sampling technique using open-ended questionnaire survey to collect data from 208 respondents who are e-commerce users. The questionnaires were distributed through WhatsApp, Facebook, Instagram, and Xiaohongshu by using Google form. Within this research, the questionnaire is designed to encompass four distinct independent variables. These variables serve the purpose of discerning customer satisfaction in relation to the utilization of Artificial Intelligence within the e-commerce domain. This endeavor involves engaging a substantial population of target respondents for the purpose of comprehensive assessment. A total of four independent variables (IV) are proposed; AI Shopping Cart, Recommendations System, Chatbots, and Image Search. Customer satisfaction with online shopping is the research's dependent variable. The final research question asked is whether customers intend to keep using the AI e-commerce service. Descriptive Analysis, Pearson Correlation Coefficient, and Multiple Linear Regressions are used to analyze the data using SPSS software.

4. Results and discussion

Discussions on findings

A sum of 200 questionnaire sets were disseminated, resulting in the collection of 208 completed questionnaires. The entirety of the collected data underwent analysis through the utilization of SPSS software. The initial segment of the questionnaire was dedicated to

gathering general information about the respondents. This section encompassed inquiries regarding their gender, age, educational attainment, preferred e-commerce platform, frequency of e-commerce transactions, and their engagement with artificial intelligence in the realm of e-commerce.

Table 1. Respondent's profile.

Respondent's profile	Valid	Frequency	Percentage (%)
Gender	Male	117	56.3
	Female	91	43.8
	Total	**208**	**100**
Age	18-23	89	42.8
	24-30	76	35.5
	31-40	32	15.4
	41-50	8	3.8
	50 and above	3	1.4
	Total	**208**	**100**
Education	Secondary or below	39	18.8
	Diploma	51	24.5
	Undergraduate	98	47.1
	Postgraduate	20	9.6
	Total	**208**	**100**
Platform	Lazada	38	18..3
	Shopee	132	63.5
	Taobao	37	17.8
	Tmall	1	0.5
	Total	**208**	**100**
Purchase frequency	1 time	62	29.8
	2-3 times	114	54.8
	4-5 times	19	9.1
	5 times above	13	6.3
	Total	**208**	**100**

Table 1 displays the demographic characteristics of the respondents. Out of the total survey participants, 117 identified as female, while 91 identified as male, completing the survey. Most of the respondents, or 42.8% of the total sample size, are between the ages of 18 and 23, which includes 89 respondents. The respondents between the ages of 24 and 30 were followed by 76 respondents (36.5%) and 32 respondents (15.4%) who were between the ages of 31 and 40. Lastly, there are 3 respondents (1.4%) who are 51 years of age or older and 8 respondents (3.8%) who are between the ages of 41 and 50. A total of 39 respondents (18.8%) had an educational level of secondary or below. Diploma holders accounted for 51 respondents (24.5%), while 98 respondents (47.1%) had completed their undergraduate

studies. Additionally, 20 respondents (9.6%) held a postgraduate certificate. Among all respondents, 132 (or 63.5% of the total) claimed to have made purchases through Shopee. In addition, 38 respondents (18.3%) reported using the Lazada platform, and 37 respondents (17.6%) reported using the Taobao platform. Lastly, one respondent stated that they made purchases on the Tmall platform. 62 respondents (29.8%) reported purchasing items on e-commerce platforms once a month while 114 respondents (54.8%) stated that they make purchases 2-3 times per month on e-commerce. Additionally, 19 respondents (9.1%) mentioned making 4-5 monthly purchases on e-commerce, while 13 respondents (6.3%) reported making more than 5 monthly purchases on e-commerce platforms.

Table 2. Reliability test.

No	Construct	Cronbach's Alpha	No of items
1	AI Shopping Cart [ASC]	.909	4
2	Recommender System [RS]	.950	5
3	Chatbot [C]	.947	5
4	Image Search [IS]	.941	4
5	Customer Satisfaction [CSTE]	.938	3
6	Continuous Usage [CU]	.931	3

Table 3. Pearson correlation analysis.

		ASC	RS	C	IS	CSTE	CU
ASC	Pearson Correlation	1	.744**	.648**	.673**	.667**	.664**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	208	208	208	208	208	208
RS	Pearson Correlation	.774**	1	.771**	.771**	.763**	.737**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	208	208	208	208	208	208
C	Pearson Correlation	.648**	.771**	1	.806**	.760**	.740**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	208	208	208	208	208	208
IS	Pearson Correlation	.637**	771*	.806**	1	.865**	.791**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	208	208	208	208	208	208
CSTE	Pearson Correlation	.667**	.763**	.760**	.865**	1	.877**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	208	208	208	208	208	208
CU	Pearson Correlation	.664**	.737**	.740**	.791**	.877**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	208	208	208	208	208	208

**. Correlation is significant at the 0.01 level (2 tailed).

Table 2 displays the Cronbach's Alpha coefficient results, which ranges from 0.909 to 0.931. The highest Cronbach's Alpha values are 0.950 for the recommender system (RS) and

0.947 for the chatbot (C). Following that were the Cronbach's Alpha coefficients for image search (IS) and customer satisfaction with e-commerce (CSTE), which were respectively 0.941 and 0.938. In contrast, the AI Shopping Cart (ASC) has the lowest Cronbach's Alpha (0.909). Lastly, 0.932 is the continuous usage (CU). All constructs demonstrate a high level of correlation, and the alpha coefficient values have excellent internal consistency accuracy which is ≥ 0.9. All of these variables exhibit a high degree of reliability.

As shown in Table 3, the Pearson correlation between the independent variables AI Shopping Cart (ASC), Recommender System (RS), Chatbot (C), and Image Search (IS) and the dependent variables Customer Satisfaction Towards E-commerce (CSTE) and Continuous Usage (CU) is positive, with respective correlation coefficients of 0.664, 0.737, 0.740, 0.791, and 0.877. As the p-values are below the designated significance level of 0.001 for the two-tailed correlation, the correlation is statistically significant (Table 4). This provides substantial evidence to assert that the correlation indeed exists within the broader population.

Table 4. Summary of hypothesis testing.

Hypotheses	Value scored	Decision
H1	β=0.068 p-value = 0.168 (P > 0.05)	Not Supported
H2	β= 0.159 p-value = 0.01 (P < 0.05)	Supported
H3	β= 0.084 p-value = 0.148 (P > 0.05)	Not Supported
H4	β= 0.598 p-value = 0.00 (P < 0.05)	Supported
H5	β= 0.890 p-value = 0.00 (P < 0.05)	Supported

The findings of this research revealed that recommender system, image search and continuous usage meaningful constructs that customer satisfaction towards the application of Artificial Intelligence in ecommerce. Recommender systems and image search have a significant impact towards customer satisfaction, while customer satisfaction significantly impacts continuous usage. The finding is consistent where we can conclude that consumers have a strong intent to use recommender systems, while also ensuring that reliable image search is crucial. Customer satisfaction also plays an important role in determining whether customers will continue to use AI applications. The finding indicates a strong positive association between customer satisfaction and continuous usage. Studies demonstrated that customers who are satisfied with a product or service will continue using it. The usability of AI, especially in e-commerce, has a direct effect on the adoption of technology.

While AI shopping carts and chatbots indicated an insignificant relationship towards customer satisfaction, there may be several factors contributing to this. This may be attributed to the service quality and system quality. The respondents may have had a bad experience

using AI shopping cart in the past. As indicated by [28], a chatbot's ease of use is insufficient. It is crucial as a need for a technology, but not as a predictor of behaviour to use, according to [29]. As a result of the research, it may be found that customer satisfaction may decrease due to their feeling dissatisfied or disagreeable when using chatbots during e-commerce purchases [20]. Another piece of research provides that chatbots make it relatively difficult for customers to develop trust, and there are requirements on how quickly services can respond to all user needs, which causes problems in determining user satisfaction [22].

5. Conclusion

This study is set to investigate customer satisfaction towards the application of Artificial Intelligence in e-commerce. The results revealed that the recommender system and image search are important factors that lead to customer satisfaction in online shopping. The result also revealed that customer satisfaction leads to continuous usage. This suggests that higher customer satisfaction is associated with increased continuous usage of the product or service. The findings provide significant impacts to e-commerce retailers, customers, and researchers.

Given that global consumer demand for e-commerce purchases is rising and that e-commerce is expanding globally, the findings can help them understand that the application of AI is crucial to the effectiveness of e-commerce processes for consumers, particularly given the industry's rapid technological advancement. In addition, the findings help the business develop more effective and profitable business strategies, giving better understanding on how to satisfy the customers. Advancements in the application of AI aid users in enhancing their ecommerce customer relationship management experience. In addition, consumers can understand the function of AI and the advantages of AI in e-commerce. Thus, it can facilitate the use of the e-commerce platform by more customers.

This study aims to understand customer satisfaction towards the application of Artificial Intelligence in ecommerce using the expanded Technology Acceptance Model served as the source for the conceptual model. It enables the investigation of independent variables such as AI Shopping Cart, Recommendations System, Chatbots, and Image Search in relation to the dependent variable of customer satisfaction in e-commerce. The research focuses on examining the influence of these variables on e-commerce by utilizing the expanded Technology Acceptance Model (TAM) and integrating it with other theoretical models. This study also employs the Expectation Confirmation Theory (ECT) to examine consumer satisfaction and their intent to continue utilising AI applications in e-commerce. The ECT provides insight into the relationship between individuals' decisions to continue usage, and its incorporation in this study is recommended in order to comprehend customers' future intention to continue using the service. The research investigates customers who are pleased with the implementation of AI, enabling their continued use on e-commerce platforms.

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Conflicts of interests

The authors declare no conflict of interests.

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