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Revisiting the Technology Acceptance Model: A Trust-Centric Approach to E-Commerce Adoption

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ABSTRACT: With the rise in online shopping activities, there is now a greater necessity to understand how technology-related perceptions and usage of platforms affect consumer trust. Using the modified Technology Acceptance Model, this research investigates the linkages between perceived ease of use, perceived usefulness, attitude towards online shopping, behavioral intentions, actual system use, and user trust. A data sample for this investigation has been gathered using an online survey from consumers in Delhi NCR in the period from April to July 2024. Out of 1,000 respondents approached, 880 have provided their input, and 700 valid responses have been considered for the analysis. The proposed framework has been validated using partial least squares structural equation modeling in SmartPLS. The results reveal that perceived ease of use is positively related to perceived usefulness and attitude towards online shopping. Attitude is found to be positively linked to behavioral intentions and actual system use. Behavioral intentions positively correlate with actual system use, and actual system use positively relates to user trust. This research adds to the literature related to Technology Acceptance Model by identifying trust as a dependent variable which can develop as a result of interactions with the online shopping platform. However, the results should be generalized with caution due to the cross-sectional design and convenience sampling used in the study in Delhi NCR.

1. INTRODUCTION

Online shopping has grown rapidly all around the world, with digital platforms being the most used platforms for purchase products or services [1], [2], [3]. Some researchers have shown that online shopping offers many advantages over traditional purchasing like convenience, time, variety of products and choices of price [1], [2]. This shift in shopping is because of technological advancement, globalization and the changing consumption patterns of the consumer, and in this change, the pandemic coronavirus has also played a significant role in, changing the way one may avail or purchase a service or products, and with that changed the minds of the consumer by shifting them to purchase online [3], [4], [5].

The Industrial Revolution 4.0 has led to the construction of information technology infrastructure, which has made business-to-customer (B2C) e-commerce a success in recent years. B2C e-commerce and mobile commerce developed quickly due to

the increase in internet and smartphone (and tablet) users [6]. Websites and mobile applications enable e-commerce enterprises to expand their company through e-commerce exchanges, also known as e-commerce trading floors [7]. Using mobile phones appears to be a more flexible method for conducting business-to-consumer e-commerce. As a result, mobile commerce, or m-commerce, develops quickly. A few benefits of shopping online include lower costs, time savings, and the removal of various physical challenges associated with traditional retail [8]. Customers using an e-commerce exchange can browse the site, evaluate features and costs of goods from various vendors (manufacturers, shops, etc.), and choose the ones that best suit their needs. With multiple suppliers taking part in e-commerce exchanges, the range of products selling on these platforms is expanding rapidly. This improves consumers' capacity to locate the ideal products and draws more users to e-commerce exchanges, both of which contribute to the future expansion of the e-commerce market [9]. With the widespread use of technology, the world of online shopping has experienced a significant upheaval that has completely changed. One significant development in technology is the emergence of mobile commerce, or m-commerce, which allows customers to easily shop using their smartphones and tablets at any time and from any location. For users who are constantly on the go, mobile apps and responsive websites provide easy-to-use interfaces and faster checkout procedures, improving accessibility and convenience. For online shopping, trust is very important. If there is no trust online shopping is not possible. It is important for all businesses. Trust is one of the main key factors for online shopping [10]. There are several reasons and factors behind the adoption of new technology by the consumer, which include the availability, usability and security of these technologies [11], [12] [13], [14]. The Technology Acceptance Model (TAM), which was developed by Davis in (1989), is said to be a remarkable achievement as it can illustrate the degree of interest a user takes in adopting new technology. To understand the acceptance and adoption of online shopping platforms, researchers have frequently applied the Technology Acceptance Model (TAM). Originally proposed by [15] TAM highlights two critical determinants of technology adoption—perceived usefulness and perceived ease of use. People embrace or avoid a technology based on a mix of personal beliefs and outside influences. The way one feels about a system, their purpose to use it, and their behavior are all formed by the beliefs, which develop in response to external stimuli [19]. [17] stated that if a system feels useful and is convenient to use, these characters are crucial in shaping consumer choices. In the realm of online shopping, digital platforms offer shoppers convenience and access to wide available products. Trust affects not just whether someone decides to make a purchase, but also their overall satisfaction and experience when shopping online. Focusing on these challenges, this study introduces a conceptual framework that brings together the Technology Acceptance Model (TAM) and the idea of trust. The aim of the study is to better understand what motivates people to use online ecommerce services and how their opinions toward these systems are formed.

2. CONCEPTUAL FOUNDATIONS OF TAM IN ONLINE SHOPPING

The shift from traditional shopping to Online shopping has changed dramatically as e-commerce continues to expand, therefore it is crucial to understand what drives individuals to trust and accept technology when buying online. The Technology Acceptance Model (TAM) has suggested that two main factors—how helpful a system feels and how easy it is to use—determine whether someone will use new technology. If users believe an online platform had made their purchasing more efficient, and hassle-free, they're more likely to try. However, online shopping involves more than convenience and simplicity. Trust, play an important role in purchase decision along with the overall impression people get from using a website. Previous Studies has shown that when people feel secure and find a website easy to use, they're more likely to make purchases. By combining trust, with clear website design, and thoughtful consideration of user intentions with the TAM framework, will give the framework of what motivates shoppers in digital marketplaces. This approach not only reveals what matters to consumers but also points to ways retailers can improve the online shopping journey and make it more enjoyable and reliable for everyone. Figure 1 Illustrates the Technology acceptance model.

2.1 Technology Acceptance Model: Foundations and Relevance in E-Commerce

TAM conceptualizes technology adoption through PU and PEOU, each of which significantly shapes user attitude and behavioral intentions [18]. In e-commerce, PU encapsulates beliefs about how online platforms improve shopping effectiveness by offering convenience, product diversity, and cost advantages. Conversely, PEOU relates to the simplicity of site navigation, transaction processing, and overall usability [19]. Numerous empirical studies validate that PU and PEOU substantially predict consumers' willingness to engage with e-commerce services [20], [21]. Particularly in developing economies, where digital literacy varies widely, ease of use becomes critical for reducing barriers to adoption alongside the intrinsic value perceived in using the platform [22].

TAM has been widely extended to incorporate additional factors to accommodate the unique challenges observed in e-commerce settings as shown in Figure 2. Extensions frequently integrate perceived trust and risk, addressing the lack of physical interaction and heightened uncertainty in online environments. These integrations have enhanced the explanatory power of TAM in capturing the consumer decision-making process in online contexts [23]

2.2 Trust as a Pillar of Online Shopping Behavior

Trust emerges as a fundamental determinant that mediates the relationship between TAM constructs and purchase behavior. Given the intangible nature of online transactions, perceived trust in the platform's security, payment systems, and seller credibility is essential for consumers to overcome apprehensions about fraud, privacy breaches, and product authenticity [24], [25] Research shows that trust not only amplifies the positive impact of perceived usefulness and ease of use but also independently drives intention to purchase [26]

third-party certifications, and positive user-generated content such as reviews act as vital components in establishing trust [27]

Without addressing trust, even technically superior platforms may struggle to convert user interest into transactions Figure 3 shows the factors that affect User trust.

2.3 User Experience: Beyond Functionality

While TAM originally focused on functional attributes of technology, contemporary discourse extends the model to encompass experiential and emotional dimensions of user interaction. Perceived enjoyment, aesthetic appeal, responsiveness, and personalization constitute critical components of user experience that shape attitudes towards online shopping platforms [18], [27]. Platforms that integrate augmented reality or artificial intelligence technologies exemplify how immersive, interactive experiences enrich perceived usefulness and foster emotional connection, thereby accelerating the transition from click to purchase. These factors reduce cognitive effort and create positive associations that motivate repeat engagement, beyond mere task completion.

2.4 Social Influence and Behavioral Intentions

Social influence, including recommendations from peers and online communities, modulates consumers' adoption of e-commerce platforms through normative pressure and informational cues [28]. In collectivist societies, recommendations from trusted social circles play a crucial role in boosting the credibility of platforms and products, thereby strengthening users' intentions to make purchases online. Numerous studies highlight how social proof amplifies the relationships between the constructs of the Technology Acceptance Model (TAM) and consumers' purchase intentions [29].

2.5 Risk Perception and Mitigation

Perceived risk has long been identified as a significant obstacle to adopting e-commerce platforms. Common worries include the possibility of data breaches, financial loss, and dissatisfaction with purchased items [23] These concerns often diminish the impact of perceived usefulness (PU) and perceived ease of use (PEOU) on consumers' behavioral intentions, as uncertainty tends to cause hesitation during decision-making. This issue underscores the need for clear and visible safety measures on online platforms. Features such as secure payment options, transparent return policies, and compensation or reward programs can greatly alleviate user anxieties. When such protections are in place, consumers are more inclined to trust the platform, allowing perceptions of usefulness and ease of use to more effectively translate into actual buying behavior [30].

3. RESEARCH GAPS, OBJECTIVES, CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

The Technology Acceptance Model has been frequently used to describe the consumers' acceptance of e-commerce platforms via perceived utility, perceived simplicity of use, attitude and behavioral intention . Previous academics have extended TAM by adding trust and perceived risk due to the uncertainty in online transactions about the trustworthiness of seller, security of payment, privacy, product quality and transaction completion. However, most integrated TAM–trust studies treat trust as an antecedent of attitude, transaction intention, purchase intention or online-shopping behavior rather than a possible outcome of consumers' platform experience [23], [31], [32]. Moreover, reviews and meta-analyses reveal that trust has been conceptualized inconsistently across e-commerce studies, with some studies assessing trust in the technology and others examining confidence in the platform, supplier, or seller [33], [34], [35] There has been little attention paid to whether the consumers' experience in utilizing an e-commerce platform is related to the creation or revision of platform trust . Real

engagement gives consumers the chance to assess platform navigation, payment processing, information security, order fulfilment, shipping reliability, return processes and complaint resolution. Past study has shown that trust can be built or re-evaluated based on familiarity and post-use experience [36], [37]. However, the entire sequence from perceived simplicity of use to perceived usefulness, attitude, behavioral intention, self-reported platform use and then to subsequent security-oriented platform trust has not been sufficiently investigated, especially in the context of metropolitan Indian online shoppers. The present study seeks to fill this conceptual, empirical and contextual vacuum by exploring if more self-reported use of e-commerce platforms is positively associated with higher security-oriented platform trust among customers in Delhi NCR. Because the study is based on a cross-sectional survey, it tests statistical associations and does not argue that use of the platform causes trust.

3.1 Objectives of the Research:

The main aim of this study is to investigate the relationship between consumers' security-oriented trust for e-commerce platforms and their technology-accepting views, attitudes, behavioral intentions, and self-reported platform use.

The precise objectives are as follows:

- To investigate the effect of perceived ease of use on perceived usefulness in online buying.
- To examine the influence of perceived usefulness and perceived simplicity of use on consumer's attitude towards online buying.
- To find out the effect of perceived utility and attitude towards online purchasing on behavioural intention to use e-commerce platforms.
- Test the effect of attitude and behavioral intention on the self-reported use of e-commerce platforms by customers.
- To examine the relationship between reported platform use and security-oriented platform trust of online shoppers in Delhi NCR.
- To assess the explanatory power of an extended Technology Acceptance Model for e-commerce adoption and trust.

3.2 Conceptual Framework

This conceptual framework expands the Technology Acceptance Model and takes into account the sequential links between perceived ease of use, perceived usefulness, attitude toward online purchasing, behavioral intention, self-reported platform use and security-oriented platform trust. Consistent with TAM, perceived ease of use is assumed to affect perceived usefulness and attitude and perceived usefulness is assumed to affect attitude and behavioral intention. It is posited that attitude affects behavioral intention and self-reported platform use and behavioral intention affects platform use [15], [18], [28]. The main extension of the framework is the positioning of the security-oriented platform trust as a downstream construct related to the platform use. In traditional e-commerce acceptance models trust is often treated as an antecedent of transaction intention or online-shopping behavior [23], [31]. The current paradigm suggests that consumers' experiences in utilizing an e-commerce platform may also give information on payment security, protection of personal information, reliability of transactions and platform performance. Such an event could help to the establishment or reconsideration of trust following the use [23], [36]. Hence, the suggested model studies eight direct correlations (insert Figure 5 and 6).

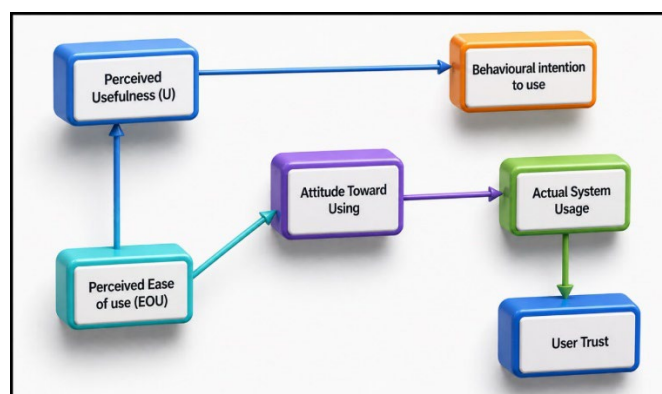
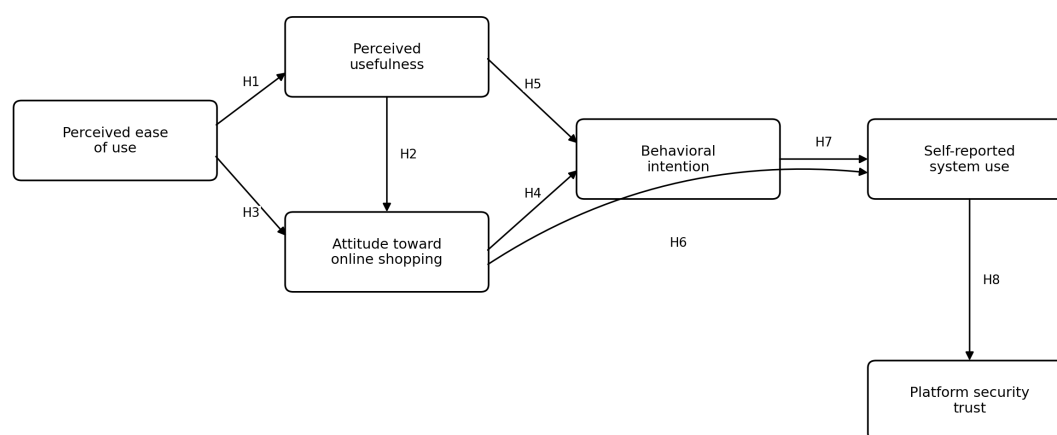


Figure 1: Conceptual Framework



Extended Technology Acceptance Model with trust positioned as a downstream post-use construct

Figure 2: Extended Technology Acceptance Model

3.3 Hypothesis Development

Perceived Ease of Use and Perceived Usefulness

Perceived ease of use is the degree to which an individual believes that using a certain technical system will be free of effort. Perceived usefulness is the extent to which an individual believes that using a given system will increase the efficiency or performance of a specific activity [18]. In online buying, a platform that provides easy to comprehend navigation, efficient product-search functions, simple payment procedures, and an uncomplicated checkout process enables consumers to accomplish purchasing activities more efficiently. Based on the Technology Acceptance Model, perceived ease of use is positively related to perceived usefulness as the effort saved from an easy-to-use system allows users to better realize its functional benefits [15], [18]. In previous e-commerce studies, [38] also found that the convenience of online transaction is one of the factors that influences consumers' opinions of usefulness of electronic purchasing systems. The following theory is then proposed:

H1: Perceived ease of use has a positive effect on perceived usefulness in online shopping.

Perceived Usefulness and Attitude Toward Online Shopping

Attitude towards online buying is a consumer's positive or negative assessment of the use of an e-commerce platform. Consumers are more prone to develop positive attitudes when they perceive that a platform enhances their buying efficiency by saving time, permitting price comparison, providing access to a larger variety of products, and allowing them to shop without visiting a real store [15], [18]

The perceived utility is a core factor of attitude in the original Technology Acceptance Model. Consumers who believe that an e-commerce platform provides real functional benefits are more likely to have a positive evaluation of its use in the context of online buying [38]. Thus, the following hypothesis is developed:

H2: Perceived usefulness has a positive effect on consumers' attitudes toward online shopping.

Perceived Ease of Use and Attitude Toward Online Shopping

Ease of use may also directly affect consumers' perception toward a platform. Confusing navigation, lack of product information, long registration procedures and complicated payment processes may frustrate and discourage use of the platform. On the other hand, a simple, comprehensible, and convenient platform might give a better user experience. In TAM [15], [18], perceived ease of use is theorized to affect attitude directly and indirectly through perceived usefulness.

Similarly, empirical study on e-commerce has indicated that simplicity of use contributes to positive sentiments toward electronic shopping [38]. Hence the developed hypothesis would be-

H3: Perceived ease of use has a positive effect on consumers' attitudes toward online shopping.

Attitude Toward Online Shopping and Behavioral Intention

Behavioral intention is an individual's conscious plan or willingness to undertake a given behavior. According to the Technology Acceptance Model, the consumers who have a positive attitude toward a technology system are more likely to use the system [18]. Thus, a positive attitude towards online buying may enhance consumers' willingness to buy in the future, spend a bigger part of their purchase on online channels and utilize e-commerce platforms consistently.

Prior research on technology adoption has shown that attitude is a strong predictor of behavioral intention and, ultimately, technology use [39]. Hence the developed hypothesis would be-

H4: A favorable attitude toward online shopping has a positive effect on behavioral intention to use e-commerce platforms.

Perceived Usefulness and Behavioral Intention

Perceived usefulness could also influence behavioral intention directly, since customers choose to adopt a technology based on its practical benefits. Even with the consideration of attitude in an acceptance model, the users may want to utilize a system because it promotes efficiency or it gives them the ability to get a desired objective.

TAM2 posits that perceived utility directly influences usage intention [28]. Consumers in e-commerce may have an intention to utilize an online platform when it enables them to save time, compare prices, give product diversity, and finish the purchasing operations efficiently. So, the following hypothesis is proposed-

H5: Perceived usefulness has a positive effect on behavioral intention to use e-commerce platforms.

Attitude Toward Online Shopping and Self-Reported Platform Use

Consumers' good attitude might motivate them to turn positive evaluations into tangible involvement with an online shopping platform. Consumers who see internet buying as beneficial, convenient and attractive may be more likely to include it into their usual shopping routines.

Research on technology adoption has shown that attitude and behavioral intention are important predictors of information system utilization [39]. E-commerce research has also found a positive association between attitude and consumer approval of online purchasing systems [38]. The current approach consequently explores whether attitude relates additionally and directly to self-reported platform utilization. Hence the developed hypothesis would be-

H6: A favorable attitude toward online shopping has a positive effect on self-reported platform use.

Behavioral Intention and Self-Reported Platform Use

Behavioral intention is the most proximal psychological predictor of technology-use behavior. Consumers who plan to buy online in the future and utilize e-commerce platforms on a regular basis are more likely to indicate higher involvement in online purchasing.

The link between behavioral intention and use is a key element in technological adoption models [18], [39]. Later versions of TAM also retain intention to use as a key predictor of technology uptake and use [28] So, the following hypothesis is proposed.

H7: Behavioral intention to use e-commerce platforms has a positive effect on self-reported platform use.

Self-Reported Platform Use and Security-Oriented Platform Trust

Trust is often studied as a factor influencing online-shopping intention and behavior, as consumers need to trust a platform before they disclose personal information or make an online purchase [23], [31]. Trust can also be updated once users interact with a platform, however. Using the platform you get direct information on how payments are made, how your personal data is protected, the dependability of transactions, order fulfillment, delivery performance, and processes for return and complaint resolution.

Repeated engagement can increase familiarity and contribute to the development of trust [37]. In addition, post-use studies of trust have shown that the experience a user has with a technology might influence their later trust judgments [36]. Thus, consumers who experience secure and dependable transactions may acquire deeper confidence in the platform's security and information-protection systems. Therefore, the following hypothesis is proposed.

H8: Self-reported platform use has a positive effect on security-oriented platform trust.

4 METHODOLOGY

4.1 Research Design

The study utilized a quantitative, explanatory, and cross-sectional research methodology to evaluate the associations between perceived ease of use, perceived usefulness, attitude toward online purchasing, behavioral intention, self-reported platform use and security-oriented platform trust. A quantitative design was acceptable because the study involved testing theoretically generated correlations among numerous latent components using survey data. The study was cross-sectional since data were obtained from respondents at one time point, April to July 2024. Thus, the findings reveal statistical connections between constructs, but do not provide evidence of temporal or causal linkages.

4.2 Study Population and Sampling Procedure

The target population was the consumers having experience of online purchasing platform in Delhi NCR, India. Delhi NCR was picked because it is a huge metropolitan region with considerable access to internet services, cellphones, digital payments, and e-commerce delivery networks. The area also serves clients from a wide range of demographic and socioeconomic backgrounds.

The respondents were recruited via internet communication channels, and a non-probability convenience-sampling method was employed. The link of the questionnaire was distributed by email and social-networking platforms such as Facebook, Instagram and WhatsApp. The preliminary sample size requirement was obtained using Cochran's sample size approach [40]. The first computation resulted in a minimal number of responders in the order of 380. However, we contacted 1,000 potential participants in order to get a larger useable sample and to compensate for missing or incorrect responses. A total of 880 questionnaires were returned, of which 700 were considered complete enough to be used in the analysis. The final sample of 700 exceeded the first calculated minimum sample size. Nevertheless, because convenience sampling was utilized, the huge sample size does not eliminate the possibility of selection bias or guarantee that the sample is statistically representative of all online buyers in Delhi NCR.

4.3 Data-Collection Procedure

Data were obtained by a standardized self-administered online questionnaire during the period of April-July 2024. Respondents were informed about the aim of the research and were assured that their participation in the survey was voluntary, anonymous and confidential before completing the questionnaire.

Only responses that were complete enough to be analyzed were saved. Among the 880 questionnaires received, 180 were excluded because they were incomplete, invalid or did not meet the data-screening standards of the study and 700 were included in the analysis.

4.4 Research Instrument and Measures and Measurement variables

Data were acquired by use of a standardized questionnaire that had two sections. The first portion was used to collect the demographic information like gender, age, education, monthly income, and frequency of internet buying. The second phase measured the six constructs in the proposed conceptual model: perceived utility, perceived ease of use, attitude towards online buying, behavioral intention, self-reported platform use, and security-oriented platform trust. Each construct was measured with three items. The responses were rated on a five-point Likert scale, ranging from 1, "strongly disagree," to 5, "strongly agree" The measures measuring perceived usefulness, perceived simplicity of use, attitude and behavioral intention were adopted from the Technology Acceptance Model published by [18] and adjusted to fit the online-shopping context.

Perceived utility was defined as the amount to which respondents considered that online shopping platforms increased the convenience and effectiveness of their shopping activities. Perceived ease of use evaluated the degree to which respondents felt that online-shopping platforms were easy to use and run. The attitude towards online purchasing reflected the opinion of the respondents as positive or negative towards the use of e-commerce platforms. Behavioral intention assessed respondents' willingness and plans to use online buying platforms in the future.

The platform-use construct examined respondents' reported usage of online purchasing platforms. The construct is presented as self-reported platform usage rather than real system use since platform use was quantified by questionnaire responses, not transaction records, application logs, or objectively observed behavior.

The trust measure was developed to gauge how confident respondents felt that online-shopping sites would protect their personal and payment information, have proper security mechanisms, and treat sensitive information responsibly. Because these items focus on information protection and security primarily, the architecture is regarded as security-oriented platform trust, as opposed to generic consumer trust. All measurement items and their sources are tabulated in Table 1

Table 1: Measurement and questionnaire items and level of measurement.

Construct	Item code	Measurement item	Source
Perceived Usefulness	PU1	I find online shopping platforms valuable for conveniently accessing a wide range of products and services.	Adapted from Davis (1989)
	PU2	Using online shopping platforms improves my ability to compare prices and find the best deals.	
	PU3	Online shopping websites and applications make it easier for me to find the specific products I need.	
Perceived Ease of Use	PEOU1	Online shopping platforms are simple and easy to navigate.	Adapted from Davis (1989)
	PEOU2	Finding products and services on online shopping platforms is easy.	
	PEOU3	Online shopping platforms provide an easy-to-use checkout process.	
Attitude Toward Online Shopping	ATT1	I am enthusiastic about using online shopping platforms.	Adapted from Davis et al. (1989)
	ATT2	I have a positive attitude toward online shopping.	
	ATT3 (R)	I have a negative attitude toward online shopping.	
Behavioral Intention	BI1	I intend to use online shopping platforms regularly for my future purchasing needs.	Adapted from Davis et al. (1989) and Venkatesh and Davis (2000)
	BI2	I am motivated to engage in online shopping because I expect it to provide convenience and a positive purchasing experience.	

Construct	Item code	Measurement item	Source
	BI3	Because of the convenience and benefits of e-commerce platforms, I intend to allocate a substantial proportion of my purchasing budget to online purchases.	
Self-Reported Platform Use	USE1	I regularly use online shopping platforms for different types of purchases.	Adapted from Davis et al. (1989)
	USE2 (R)	I occasionally purchase online, but I do not use online shopping as my primary method of purchasing products.	
	USE3 (R)	I rarely purchase products online and generally prefer conventional shopping channels, such as local vendors or physical stores.	
Security-Oriented Platform Trust	TRUST1	I trust online shopping platforms to protect my personal information and payment details.	Source of the exact items must be verified
	TRUST2	I believe that online shopping platforms regularly update their security features to address emerging threats and vulnerabilities.	
	TRUST3	I feel confident using online shopping platforms that require access to sensitive information because I believe that they maintain appropriate security measures.	

Note: All items were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Items marked **(R)** were negatively worded and must be reverse-coded before data analysis. For the five-point scale, reverse coding was performed using the formula: revised score = 6 – original score.

5. RESULT AND DISCUSSION

5.1 Descriptive Statistics

In the final analysis, 700 valid responses were included. There were 355 female respondents, accounting for 50.7% of the sample, and 345 male respondents, accounting for 49.3%. Hence the gender distribution was rather even. The largest group was represented by respondents aged 26–35 years (266 participants or 38.0% of the sample). This was followed by respondents below 25 years of age which included 252 respondents or 36.0%. 19.0% of the sample were respondents aged 36–50 years and 7.0% of the sample were respondents aged beyond 50 years. Regarding education, 56.0% of respondents (392) were graduates, 31.0% of respondents (217) were undergraduates and 13.0% of respondents (91) were postgraduates.

The highest category in terms of monthly income was ₹66,000–₹85,000, which had 295 respondents (42.1% of the sample). The second category included respondents with earnings more than ₹86,000 per month and it consisted of 173 respondents or 24.7%. Further, 170 respondents or 24.3% had an income between Rs. 46,000 and Rs. 65,000 and 62 respondents or 8.9% had an income between Rs. 25,000 and Rs. 45,000. Table 2 presents the demographic profile of the respondents.

Table 2. Demographic Characteristics of Respondents

Demographic variable	Category	Frequency	Percentage
Gender	Male	345	49.3
	Female	355	50.7
Age	Below 25 years	252	36.0
	26–35 years	266	38.0
	36–50 years	133	19.0
	Above 50 years	49	7.0
Education	Undergraduate	217	31.0
	Graduate	392	56.0
	Postgraduate	91	13.0
Monthly income	₹25,000–₹45,000	62	8.9
	₹46,000–₹65,000	170	24.3
	₹66,000–₹85,000	295	42.1
	Above ₹86,000	173	24.7
Total		700	100.0

Source: Authors' survey data.

5.2 Interpretation of Questionnaire result

For this study structural equation modeling (SEM) with SmartPLS 3.0 is used to investigate the links between the proposed construct and the widely accepted and used tool in various disciplines, given the complexity of the association between the two [41]. SmartPLS 3.0 has had a significant influence. It is a more complete software package for performing partial least square SEM analysis with an easy-to-use graphical user interface. Furthermore, instead of forcing distributional assumptions on the data, partial least squares SEM with SmartPLS allows researchers to forecast more complicated models with many variables, indicator constructs, and structural routes [42]. This makes the method more appealing to several academics. As a result, this study used SmartPLS 3.0 and the partial least squares SEM method. The descriptive statistics of each questionnaire item are included in Table 3.

Table 3: Descriptive statistics

Construct	Measurement Items	CA	CR	AVE
Perceived Usefulness	PU1	0.753	0.76	0.67
	PU2			
	PU3			
	PEOU1	0.803	0.803	0.717

Perceived Ease of Use	PEOU2			
	PEOU3			
Attitude toward using	AU1	0.822	0.826	0.736
	AU2			
	AU3			
Behavioural intention to use	BIU1	0.836	0.838	0.754
	BIU2			
	BIU3			
Actual system usage	ASU1	0.774	0.774	0.689
	ASU2			
	ASU3			
User Trust	UT1	0.776	0.728	0.685
	UT2			
	UT3			

5.3 Common Method Bias (CMB) Test

The KMO test result was 0.907, which is deemed appropriate for explanatory factor analysis because it is higher above the acceptable threshold of 0.50 [43], [44]. [45], who emphasized the significance of CMB and noted that some diversity in the research may be attributable to the methodologies used, are linked to the term CMB. It happens when a single questionnaire survey is used to measure every scale in the study simultaneously [46]; as a result, estimations of the association between the variables may be skewed by the effects of CMB. To make sure the data was free of CMB, a comprehensive collinearity technique and Harman's single factor test were used. According to Harman's single factor test, only 39.8% of the variance could be explained by a single component, well below the acceptable 50.0% level. Furthermore, the variance inflation factor (VIF), a measure of the degree of multicollinearity in a group of multiple regression constructs, was also employed and was taken into consideration as a means of identifying CMB [41]. [47] proposed that a 3.0 VIF threshold is appropriate; given that the study's computed VIFs ranged from 1.000 to 1.635 (table 4), CMB is not a major worry.

Table 4: Common method bias (full collinearity VIF)

Construct	Inner VIF
Perceived Usefulness	1.635
Perceived Ease of usefulness	1.635
Attitude towards using	1.620
Behavioural intention to use	1.502
Actual system usage	1.000

5.4 Assessment of Measurement Model

The measurement model was evaluated to look at convergent and discriminant validity, internal consistency, and individual item reliability prior to performing the SEM analysis. **Table 5** shows the outer loading values that are used to gauge the dependability of a single item [48]. According to [47], each outer loading should have a value of ≥ 0.7 . Cronbach's alpha levels ought to be higher than 0.7. The study's constructs had threshold values ranging from 0.713 to 0.885. [49] proposed that composite reliability (CR) for internal consistency should be ≥ 0.7 . In this study, the coefficient value for CR ranged from 0.728 to 0.838. The average variance extracted (AVE) should be less than 0.5 in order to ensure convergent validity. In this investigation, the average variance extracted values ranged from 0.67 to 0.754. Lastly, in terms of discriminant validity, each construct's square root of the AVE should be greater than the construct's inter-correlations with other model constructs, [50]. Table 5 tells the Composite reliability and table 6 illustrates the discriminant analysis.

Table 5: Cronbach's Alpha, CR, and AVE

	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Perceived Usefulness (PU)	0.753	0.76	0.67
Perceived Ease of Use (PEOU)	0.803	0.803	0.717
Attitude toward using (ATT)	0.822	0.826	0.736
Behavioural intention use (BI)	0.836	0.838	0.754
Actual System usage (USE)	0.774	0.774	0.689
User Trust (UT)	0.776	0.728	0.685

Table 6: Discriminant Validity

	Perceived usefulness	Perceived ease of usefulness	Attitude toward using	Behavioural intention to use	Actual system usage	User Trust
Perceived usefulness	0.818					
Perceived ease of usefulness	0.623	0.846				
Attitude toward using	0.619	0.565	0.857			
Behavioural intention to use	0.619	0.61	0.578	0.868		
Actual system usage	0.689	0.627	0.584	0.753	0.83	
User Trust	0.648	0.661	0.596	0.793	0.667	0.827

5.5 Assessment of the TAM-PLS-SEM Model

The TAM-PLS-SEM algorithm and a 5,000 bootstrap bootstrapping technique, as suggested by [41], were employed in this investigation to provide the route coefficient values and their significant level. The analysis shows that every study hypothesis was approved using the criterion (p -value < 0.05).

H01 ($\beta = 0.632$, $t = 21.246$, $p = 0.000$) was confirmed, with the positive association between Perceived ease of use and perceived usefulness in online shopping, therefore H01 was accepted. Regarding Perceived usefulness and attitude toward using, the present study found a positive association ($\beta = 0.467$, $t = 12.602$, $p = 0.000$); therefore, H02 was accepted. The study also evidenced a positive association between perceived ease of use and attitude toward using ($\beta = 0.276$, $t = 6.968$, $p = 0.000$); thus, H03 was accepted. The present study evidenced a significant association between attitude toward using and behavioural intention to use ($\beta = 0.332$, $t = 9.737$, $p = 0.000$); thus, H04 was accepted. In addition, this study accepted H05 ($\beta = -0.41$, $t = 9.533$, $p = 0.000$). Furthermore, this study evidenced a positive and significant association of attitude toward using and actual system usage ($\beta = 0.243$, $t = 7.992$, $p = 0.000$); therefore, H06 was accepted. Furthermore, the present study found that behavioural intention to use and actual system usage has a significant association ($\beta = 0.608$, $t = 19.227$, $p = 0.000$); therefore, H07 was accepted. Regarding the relationship actual system usage and user trust ($\beta = 0.667$, $t = 20.269$, $p = 0.000$); it is found there is a significant effect between the relationships, therefore, H08 was accepted. figure 7 shows the proposed Technology Acceptance Model developing using PLS-SEM and figure 8 presents the results of the PLS-SEM structural model analysis.

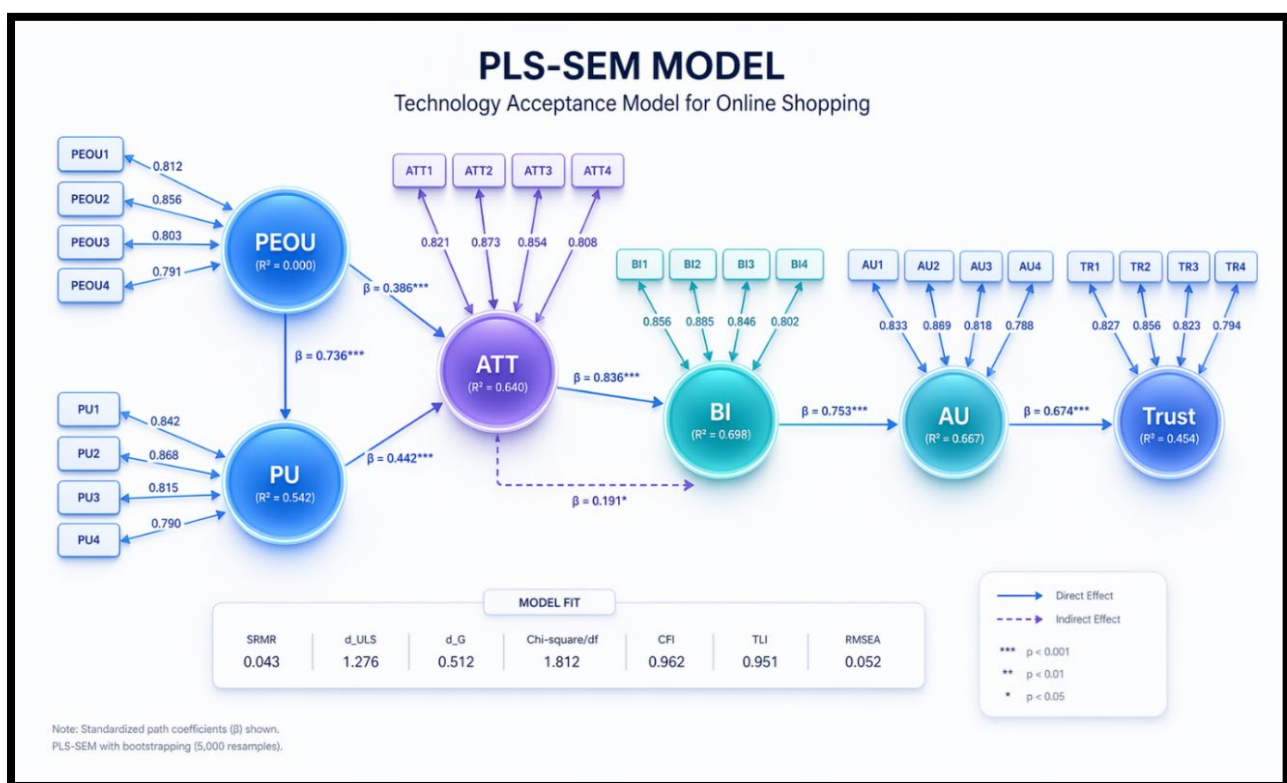


Figure 3: TAM-PLS-SEM

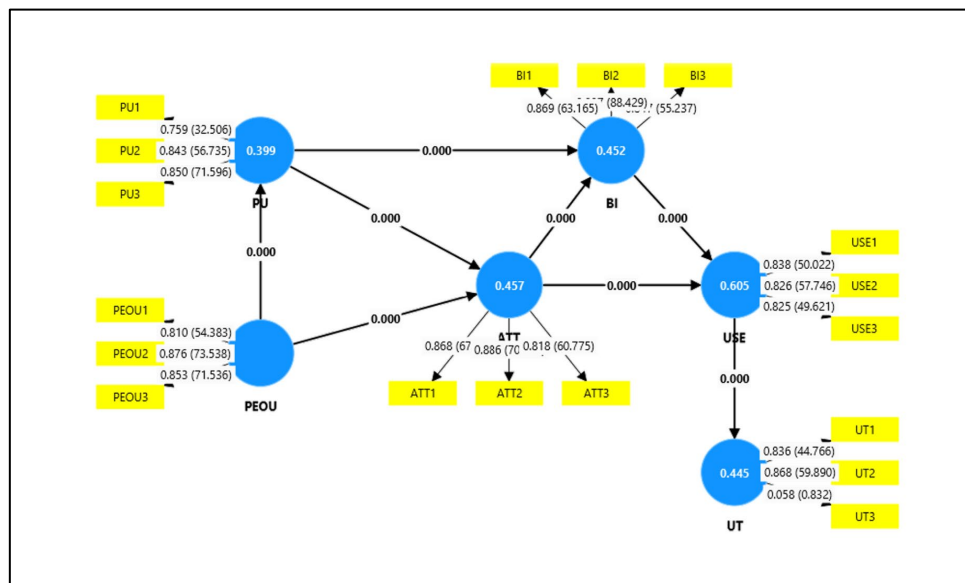


Figure 4: SEM Model

SRMR values less than 0.10, or of 0.08, are regarded as good fits when it comes to the goodness-of-fit indexes. Since the SRMR value of 0.075 is less than 0.08, the model is deemed appropriate for the investigation.

6. DISCUSSION

6.1 Degree of answering the research objectives and the support of the initial assumptions

The results of this study, which was carried out using a bootstrapping technique and partial least squares structural equation modeling (PLS-SEM) within the Technology Acceptance Model (TAM) framework, offer important insights into the variables impacting customer trust in online purchasing. The primary objective of the analysis was to validate or disprove hypotheses using the criterion of a p-value < 0.05.

H1 showed a clear positive link between perceived ease of use and perceived usefulness, which means that when online shopping system is easy to navigate, users are more likely to see it as beneficial. The result of H2 showed that when users recognize a system as useful, they tend to have a more positive attitude towards using it. Similarly, H3 confirmed that perceived ease of use not only increases the perceived usefulness of the system but also directly improves users attitude towards online shopping. H4, showed that users with a favorable attitude toward the online shopping are more likely to intend to use e-commerce platforms, demonstrating the psychological progression from a positive evaluation of the system to an intention to engage with it.

H5, despite the negative beta coefficient, was statistically significant, suggesting a complex interaction that might reflect another underlying factor affecting the model pathways and worth deeper exploration. H6 validated that a positive attitude results into actual use, showing that intentions very well aligned with behavior. H7 reveals that users' intentions are a strong predictor of their real usage behavior.

Finally, H8 showed that as users engage more with the system, their trust increases, underscoring the importance of continuous interaction for building user confidence. Overall, these findings emphasize the interconnected roles of ease of use, usefulness, attitudes, intentions, and actual usage in cultivating trust and ensuring technology acceptance in online shopping contexts. In conclusion, the results of this investigation offer significant perspectives for augmenting user confidence in e-commerce systems. Through highlighting the significance of attitudes, behavioral intentions, perceived usefulness, perceived simplicity of use, and actual system usage, this research provides a thorough framework for building trust and improving the online shopping experience.

The negative beta coefficient for H5 was statistically significant. If this negative coefficient is right, the hypothesis in positive form cannot be maintained. Thus, the sign of the coefficient and item coding should be checked when understanding this

relationship. H6 was supported: A positive attitude about online purchasing was positively related to self-reported platform utilization. Behavioral intention was a substantial predictor of self-reported platform-use behavior in H7. Finally, H8 suggested a positive relationship between a higher level of self-reported platform use and a higher level of security-oriented platform trust, which stresses the role of consumers' platform experiences in developing trust. In sum, the present results show the interconnectedness of perceived ease of use, perceived usefulness, attitude, behavioral intention, and self-reported platform use in explaining security-oriented platform trust and technological adoption in online purchasing. The findings offer valuable insights into consumer confidence in e-commerce systems. The study provides a holistic framework to understand trust and improve the online purchasing experience by underlining the importance of perceived ease of use, perceived utility, attitude, behavioral intention, and platform use.

6.2 Relating the findings to earlier work

Previous research have shown that perceived ease of use has a beneficial impact on perceived usefulness. The more a technological system involves less effort, the more likely users will perceive its functional benefits [18], [28]. The current results reinforce this link within the online-shopping context, suggesting that customers regard e-commerce systems as more beneficial when they are easy to navigate and utilize. The results also indicate that perceived utility has a positive influence on attitude toward internet purchasing. This finding is consistent with previous studies in e-shopping showing consumers generate more positive views when they perceive an online platform enables their purchase activities to be more convenient and successful [38]. The findings also reveal that perceived ease of use has favorable impact on attitude towards online shopping. This finding is consistent with the Technology Acceptance Model, which suggests that ease of use can influence attitude directly and indirectly through perceived usefulness [15]. This is also similar with who discovered that the simplicity of doing online transactions contributes to a positive attitude towards e-shopping [38] Furthermore, the positive association between attitude and behavioral intention confirms earlier research on technology acceptance that has shown that users with a good evaluation of a system are more likely to form an intention to utilize it [18], [28].

The finding on the association between perceived usefulness and behavioral intention need to be carefully confirmed. The current results give a statistically significant, albeit negative coefficient. If the negative coefficient is correct, the positive version of the hypothesis is not supported. Therefore, before giving a theoretical explanation, the coefficient sign, reverse coding of the questionnaire items, structural-model collinearity and SmartPLS output should be rechecked. The negative finding should not be immediately attributed to perceived danger, social influence, or other moderating variables, because these factors were not quantified or tested in the present study.

The positive association between behavioral intention and self-reported platform use is consistent with the main tenet of TAM that intention is a significant determinant of technology-use behavior [18], [28]. The result shows that consumers with higher intention to utilize the e-commerce platforms show higher level of online buying. The positive association of self-reported platform use and security-oriented platform trust also aligns with work suggesting familiarity and experience provide users with information that may assist forming or reassessing trust [36], [37]. Recent studies of online retailing have also indicated that simplicity of use, security, privacy, delivery performance, and online purchasing experience are significant to consumers' trust evaluations. Findings The findings together support the primary linkages indicated by the Technology Acceptance Model and extend the model by investigating security-oriented platform trust as a downstream construct related to self-reported platform use. The results show that perceived ease of use, perceived utility, attitude, behavioral intention and platform use are interrelated in explaining consumers acceptance of and confidence in online purchasing platforms. However, given the study is based on cross-sectional data, the positive relationship between platform use and trust should be viewed as an association, not as evidence that platform use causally enhances trust.

6.3 Theoretical Implications

This study's findings provide meaningful theoretical implications that contribute to and extend existing knowledge in technology acceptance, particularly within the online shopping domain. The results affirm the foundational principles of the Technology Acceptance Model (TAM), underscoring the pivotal roles of perceived ease of use and perceived usefulness in shaping user acceptance of digital platforms. Users are more likely to adopt an online shopping system if they find it easy to navigate and believe it offers tangible benefits. This reinforces the core TAM concept that cognitive evaluations of a system's usability and functionality strongly influence behavioral intentions, a relationship supported by [18], [28].

Beyond this foundational support, the findings reveal that ease of use impacts attitudes directly, not just through usefulness perceptions. This underscores the importance of emotional and experiential aspects in technology acceptance. Users' affective responses—how comfortable and satisfied they feel during interaction—significantly shape their attitudes toward the system. This insight suggests that future theoretical models would benefit from incorporating these experiential dimensions more explicitly, especially in contexts like e-commerce where pleasant user experiences are essential [51].

The progression found—from attitude, to behavioral intention, to actual system use—validates the sequential nature of acceptance frameworks such as TAM and the Theory of Reasoned Action [28], [52]. This shows that fostering a positive user mindset is vital to convert intentions into actual technology use. Hence, system designers and businesses should prioritize features and communications that promote favorable attitudes to enhance real engagement, consistent with [39] emphasis on attitude as a mediator.

A notable theoretical extension emerges from the finding that actual system usage contributes to increased user trust. This highlights trust as a dynamic outcome developing through continued interaction and positive experiences with the platform, rather than just a precursor influencing adoption [24], [33]. Models of technology acceptance should, therefore, integrate trust as both cause and consequence of usage, reflecting its evolving nature in sustaining long-term engagement, especially in trust-sensitive fields like e-commerce [31].

The negative beta coefficient found in one hypothesis suggests there are more complex underlying factors at play. This aligns with advancements in acceptance modeling, which include moderators or mediators such as perceived risk, social influence, and individual differences, as seen in TAM2 and UTAUT frameworks [53]. This complexity highlights the importance of considering broader psychological and contextual variables in acceptance theories, particularly in real-world digital commerce where multiple factors shape user decisions.

Importantly, this research confirms the adaptability and validity of TAM in contemporary online shopping environments characterized by rapid technological change and heightened concerns about trust and security. By emphasizing trust as a result of sustained system use, it bridges an important gap in the literature and suggests that future theoretical models for e-commerce must explicitly account for trust-building processes to better explain user loyalty and retention [31], [37].

In conclusion, this study not only reinforces TAM's basic constructs of ease of use and usefulness but also advocates expanding acceptance models to fully capture emotional engagement, trust dynamics, and interaction effects. These theoretical insights deepen understanding of consumer technology behavior in online shopping and provide a valuable foundation for future research aimed at refining and enriching acceptance frameworks for increasingly complex digital markets.

7. IMPLICATIONS

7.1 Practical Implication

The findings also carry wide-ranging practical implications for business strategy, user-experience design, and digital commerce policy. First, the strong impact of perceived ease of use on perceived usefulness points to the need for businesses to invest in intuitive and accessible platform designs. Simplified navigation, uncluttered interface structures, and responsive systems not only minimize cognitive load but also expand accessibility for less tech-savvy users, thereby broadening the consumer base [23].

At the same time, platform operators must showcase the tangible benefits of their systems, given that perceived usefulness strongly shapes user attitudes. Highlighting functionalities such as convenience, speed, personalization, and diverse product availability can help position platforms as indispensable shopping tools [18], [51]. Complementary marketing approaches—tutorials, demonstrations, and customer support—can reinforce these utility perceptions.

Given the critical role of attitude in driving intention, businesses should also emphasize emotional engagement. Enhancements such as enjoyable navigation flows, pleasing design aesthetics, and real-time assistance can yield more positive attitudes, translating into stronger use and purchasing intent [23].

Trust-building emerges as another cornerstone of practical strategy. Secure payment mechanisms, transparent privacy policies, proactive customer support, and social proof mechanisms (e.g., reviews, certifications, endorsements) all mitigate risk concerns and build confidence, in line with [31], [33].

Our findings also highlight that actual use itself nurtures trust, suggesting that sustainable engagement strategies—such as loyalty schemes, personalized offers, and consistent service quality—are key to fostering long-term consumer confidence [24]. Conversely, operational inefficiencies—slow deliveries, unreliable support, or complex return processes—can break the critical link between intention and sustained usage. Businesses must ensure end-to-end consistency in service delivery to retain user trust and loyalty.

The negative path result uncovered in this study calls for firms to remain vigilant regarding moderating influences like perceived risks or peer effects. Attending to evolving drivers of behavior through ongoing consumer research enables firms to refine design and engagement strategies accordingly [54].

Beyond firm-level actions, these results also carry regulatory implications. Policymakers can promote consumer confidence by introducing stricter standards on privacy protection, secure payment certification, and consumer rights enforcement. These ecosystem-wide measures are crucial in advancing digital economies equitably [31].

8. FUTURE SCOPE & LIMITATION OF THE STUDY

This research not only reinforces the predictive strength of TAM but also opens important avenues for future exploration. One direction involves widening the model to incorporate additional constructs—such as social influence, privacy concerns, or cultural differences—that better capture the diversity of online shopping contexts. Incorporating frameworks like UTAUT offers opportunities to study how social norms and enabling conditions interact with consumer adoption [53].

Further, emotional dimensions deserve closer attention. While this study focused on attitudes as an affective measure, deeper exploration of variables such as enjoyment, anxiety, and satisfaction may uncover psychological layers not fully explained by TAM [51].

Longitudinal research also holds promise, as most TAM studies, including this one, adopt cross-sectional designs. Examining how user perceptions, trust, and behaviors evolve over extended periods would offer insights into how initial acceptance translates to long-term loyalty [24].

As mobile commerce becomes increasingly dominant, future research should also compare acceptance factors across devices. Distinctions in usability between mobile and desktop shopping environments likely shape both ease of use and behavioral intentions in unique ways.

Global applicability remains another area worthy of study. Cross-country or cross-sector comparative research would help contextualize TAM findings in different economic conditions, particularly in emerging markets where infrastructure constraints or payment systems diverge significantly [55].

Despite its contributions, the study carries limitations. TAM, while parsimonious, excludes several potentially influential factors, thereby limiting explanatory scope [56]. Reliance on self-reported data introduces biases related to desirability and recall. Moreover, a cross-sectional design cannot fully capture causality or time-based dynamics [28]. Differences among product categories—fashion versus groceries, for instance—may also restrict generalization, since consumer decision paths can vary widely across sectors.

Finally, the anomalous negative relationship found in one hypothesis signals the necessity for more sophisticated integrations of constructs like risk perception and cultural context to explain complex adoption behaviors.

In conclusion, future scholarship should embrace hybrid and longitudinal approaches, extend TAM with contextual and affective dimensions, and pursue comparative studies across markets and platforms. Such refinements will deepen theoretical understanding and yield richer insights into the evolving domain of digital consumer behavior.

AUTHOR CONTRIBUTIONS

Rohit Dhyani: Conceptualization, Investigation.

Monika Bangari: Methodology.

Anjali Dimri: Data Curation, Analysis.

Aishwarya Pratap: Writing—Review & Editing.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICS STATEMENT

Rohit Dhyani, Monika Bangari, Aishwarya Pratap, Anjali Dimri, Ethical approval was not required for this study.

DATA AVAILABILITY STATEMENT

Rohit Dhyani, Monika Bangari, Aishwarya Pratap, Anjali Dimri. Data supporting the findings of this study are available from the corresponding author upon reasonable request.

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