

Structural Assurance versus Privacy Concerns: A Trust-Extended TAM Model of Online Purchase Intention in an Emerging Market

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Abstract: The rapid expansion of e-commerce continues to be constrained by consumers' privacy concerns and uncertainty about online sellers, frequently resulting in shopping cart abandonment. This study examines the psychological and institutional mechanisms underlying online purchase intention by proposing and testing an extended Technology Acceptance Model (TAM). Specifically, Privacy Concerns (PC) and Structural Assurance (SA) are positioned as key institutional antecedents that influence Trust (TR), which in turn affects Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Purchase Intention. The model further explores whether PEOU exerts only an indirect effect on Purchase Intention when trust and usefulness perceptions are present. Data was collected online through a structured and reliable questionnaire, yielding 162 valid responses from university students in South Africa. Some of the preliminary tests and analysis on the data were conducted using IBM SPSS Statistics 23. The hypothesized relationships were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4, employing 5,000 bootstrap subsamples to assess path significance and mediation effects. The results confirm that privacy concerns negatively impact trust while structural assurance significantly strengthens it. Trust positively predicts PEOU, PU, and Purchase Intention, whereas PEOU strongly drives PU but exhibits no significant direct effect on Purchase Intention, indicating full mediation through PU and Trust. The model explains 43.2% of the variance in Perceived Usefulness and 32.4% in Purchase Intention. Findings highlight the central mediating role of consumer trust in the online seller and the critical importance of structural assurance mechanisms in overcoming privacy barriers, thereby contributing to TAM-based e-commerce literature and offering actionable implications for online retailers aiming to enhance consumer confidence and purchase conversion rates.

Keywords: E-commerce; Purchase Intention; Trust; Privacy Concerns; Structural Assurance; TAM; PLS-SEM.

1. Introduction

South Africa's online retail sector has moved firmly into its next phase of growth and maturity. A decade ago, e-commerce accounted for less than one percent of national retail. By 2023, it had risen to 6% of turnover, with total sales of R71 billion. In 2024, online retail expanded by 35% to an estimated R96 billion, representing 8% of total retail sales. Current trajectories indicate that by the end of 2025, online sales will surpass R130 billion and approach 10% of the national market. Against the backdrop of sluggish offline growth, this shift represents a structural rebalancing in South African commerce [1]. Yet conversion rates remain stubbornly low, with cart-abandonment rates regularly exceeding 70% [2]. Market research confirms that South African shoppers hesitate primarily because of privacy fears, distrust of unfamiliar retailers and doubts about the overall safety of online transactions [3]. At the same time, studies indicate that visible structural assurance cues such as (payment guarantees, seals of approval, and clear transaction protection) can significantly encourage both initial and repeat purchases in the South African context [4].

Three core constructs help explain this hesitation. Privacy concerns reflect consumers' worries about how personal and financial information is collected, stored, and used during online transactions. These concerns intensify when websites lack clear privacy policies, visible security features, or trusted payment methods, and they remain a major barrier in emerging markets [5]. Structural Assurance, by contrast,

refers to the belief that protective institutional mechanisms such as legal regulations, secure payment gateways, escrow services, and third-party certifications are in place to safeguard buyers even when dealing with unfamiliar retailers. In contexts where formal institutions may be perceived as weak, these structural cues often prove more powerful than individual privacy fears in building confidence [6]. Mayer et al. [7] stated trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party". Trust represents consumers' generalized confidence that web retailers as a group are honest, competent, and will act in good faith. It reduces perceived risks of fraud, counterfeit goods, or data misuse and directly encourages purchase and repeat-buying behaviour [8, 9].

The Technology Acceptance Model (TAM) has long explained online purchase intention through Perceived Usefulness and Perceived Ease of Use [10]. However, TAM's predictive power weakens when trust is low [8, 11], leading researchers to integrate trust into the model. Three important gaps remain: (1) most studies measure trust toward a specific website, whereas consumers first develop generalized trust in web retailers [12], (2) although both Privacy Concerns and Structural Assurance are known antecedents of trust, very few studies directly compare their relative strength, especially in African emerging markets; and (3) the full sequential chain Trust → Perceived Ease of Use → Perceived Usefulness → Purchase Intention is rarely tested in such contexts.

The present study addresses these gaps using survey data from South African university students, a digitally native cohort that represents the future of the country's online market. We examine three research questions: RQ1: What are the direct effects of structural assurance and privacy concerns on trust in online sellers in e-commerce? RQ2: Does trust play a mediating role in the relationships between (a) privacy concerns and (b) structural assurance, and online purchase intention? RQ3: What role does trust and the core beliefs of Technology acceptance model (Perceived Usefulness and Perceived ease of use) play in online purchase intention RQ4: What are the indirect effects of structural assurance and privacy concerns on online purchase intention through perceived usefulness and perceived ease of use, mediated by trust?

The remainder of this paper is structured as follows. Section 2 reviews Privacy Concerns, Structural Assurance and the Technology Acceptance Model (TAM), presents the proposed research model, and outlines the hypotheses. Section 3 describes the research design, data and methodology. Section 4 reports the data analysis and empirical results, while Section 5 provides the conclusion of the study and discusses the findings. Finally, Section 6 discusses implications both theoretical and practical as well as limitations and future scope.

2. Theory and Research Model

2.1. Privacy Concern

Online information privacy concerns in e-commerce, defined as consumers' apprehensions about the collection, use, and dissemination of personal data such as financial details and browsing history [13], originated with Westin's [14] conceptualization of privacy as individual control over data acquisition and use. This evolved into the multidimensional Concern for Information Privacy (CFIP) scale, which identifies collection, unauthorized secondary use (internal/external), improper access, and errors as core dimensions [15]. Internet-specific frameworks refined these into the Internet Users' Information Privacy Concerns (IUIPC) model—comprising collection, control, and awareness [16].

Privacy concerns have been considered a major barrier while customers share their information during online transactions or during the adoption of novel technologies. Gutierrez et al. [17] defined privacy as “the ability to control and limit physical, psychological, and informational interaction, and access to the self or one's group”. The usage of new media technologies has led to an increase in recent years in privacy concerns. Online customers put their faith in the intellect, honesty, and sympathy of the exchange party in addition to their integrity. Belanger et al. [18] argued that one important aspect influencing online consumers' purchasing intentions is a privacy concern. Consumers' worries about the possibility that a merchant may attempt to utilize their private information without their consent are referred to as privacy concerns. Bao and Ni [19] revealed that customers' privacy concerns frequently arise from the prevalent practice of companies collecting customer data, particularly regarding security breaches including the sharing of customer data with third-party without their authorization

In e-commerce settings, elevated privacy concerns act as a major psychological obstacle that directly erodes consumer trust by amplifying feelings of vulnerability, the very element that trust requires consumers to accept based on positive

expectations of a vendor's competence and benevolent intentions [7]. When privacy risks are perceived as high, individuals become reluctant to rely on online platforms, leading to diminished trust [9]. A wealth of empirical research supports this inverse relationship, showing that greater privacy concerns consistently reduce trust in digital environments, impacting both cognitive dimensions (reliability and competence) and affective dimensions (goodwill and care) [20, 21].

Privacy concerns can be seen as a personal characteristic that will ultimately influence how the individual perceives a situation where personal information is requested to accomplish an online transaction [16]. Thus, a consumer with a high degree of privacy concerns is more likely to feel a low level of trust [22]. Given that consumers with high privacy concerns tend to perceive the Internet environment as riskier, we expect Privacy Concerns to reduce trust in web retailers and thus the following hypotheses is proposed:

H1: Privacy Concerns has a negative impact trust.

2.2. Structural Assurance

Structural assurance is perceived as objective structural conditions based on institutions. Zucker [23] conceptualizes structural assurance as institutionalized structural constructs, encompassing mandatory legal contracts, commitments, and regulatory systems, which instill consumers with the belief in successful consumption. structural assurance generally refers to the mechanisms or features in place that enhance the trustworthiness and reliability of a system or environment, particularly in digital or transactional contexts [24]. By fostering a secure and reliable environment, it engenders trust among participants in online transactional behaviour. Structural assurance means one believes that structures like guarantees, regulations, promises, legal recourse, or other procedures are in place to promote success. For example, one with high Web-related structural assurance would believe that legal and technological Internet protections like data encryption safeguard one from loss of privacy, identity, or money. Lin, Lu and Zhang [25] defined structural assurance from the standpoint of online investment as secure measures that enhance investors' success rates, including legal resources, guarantees, rules, policies, commitments, or formal agreements. [26], from the perspective of protecting the security of online transactions, posited that structural assurances encompass legal provisions (laws, guarantees, and regulations) provided by the institutional environment to safeguard transaction security.

Structural assurance plays an important role in establishing users' trust in Automated vehicles [27]. Structural assurance also contributes to heightened perceived reliability and security perceptions. In mobile commerce contexts, for example, consumers such as expatriates, who perceive stronger structural safeguards (e.g., secure handling of personal information, reliable transaction processes, and robust privacy protections) are more likely to develop more trust and overall positive attitudes toward mobile purchases [28]. This enhanced sense of security not only reduces perceived risks but also elevates overall willingness to participate in mobile commerce activities.

Structural assurance serves as the foundation of trust, facilitating the establishment of trust effectively. The public tends to trust others or entities more readily in a secure and reliable environment. Therefore, formal contracts, legal regulations, and online monitoring are crucial structural

assurance measures for enhancing trust in online transactions, particularly in the initial stages of transactions [29]. Sporleder and Goldsmith [30] suggested that when buyers are uncertain about the legitimacy of online stores and the quality of goods, sellers can rely on authoritative third-party assurances such as government standards and quality control. Shao et al. [31] affirmed that structural assurance is a significant antecedent facilitating trusting beliefs and willingness to transact online. [32] concluded that trust in online sellers will enhance due to the structural assurance connected to the internet and thus we hypothesize as follows:

H2: Structural Assurance has a positive effect on trust.

2.3. TAM model and Trust

The Technology Acceptance Model (TAM) was originally developed by Davis 1989 based on TRA Ajzen 1980 to explain and predict users' acceptance of new technologies. Since its inception, TAM has become the most widely adopted theoretical framework in e-commerce research and has been successfully applied to understand consumer adoption of online shopping platforms, mobile payment systems, social commerce, and various digital marketplaces [8, 11, 33]. It has also been successfully extended to diverse domains, including digital technologies in education [34], Health [35], automated vehicles [36] and recently facial recognition [37]. According to Davis [10] the TAM gives relief to two specific beliefs in the adoption of information technologies: perceived usefulness (PU), defined as the individual's belief that the use of certain technology will improve its performance, and perceived ease of use (PEOU), which refers to the individual's belief that the use of a particular technology will be free of effort. Through continuous refinement over the years, the model has evolved considerably, with notable extensions proposed by Venkatesh et. al [38]. The present study adopts this extended TAM framework as its foundation to examine users' acceptance of E Commerce specifically online purchasing intention/behavior.

Several studies have integrated trust into the Technology Acceptance Model (TAM) in the e-commerce context, yielding contrasting views on the role of trust. Pavlou [11], in a seminal online shopping study, treated trust as a distal antecedent that indirectly influences behavioral intention to purchase through the mediating roles of perceived usefulness and perceived ease of use. In addition, [39] treated trust as hypothesized that trust as a distant factor that indirectly affects online shopping intentions through PEOU, PU and attitude. Gefen et al. [8], using actual Amazon.com customers, demonstrated that trust in the online vendor functions as a proximal antecedent with a strong direct effect on purchase intention, while also partially mediating the effects of PEOU and PU.

Trust is "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" [7]. Pavlou [11] defines trust the context of business-to-consumer EC as the belief that allows consumers to willingly become vulnerable to online sellers, after taking into consideration their characteristics and environment in which transactions are observed. In this study, trust is defined as the belief that the online seller will act in the best interests of the buyer and will not take advantage of the buyer's vulnerability

in the online transaction. Following the distal perspective, this study conceptualizes trust as a distant antecedent, with privacy concern and structural assurance serving as front-end factors. Besides, this work investigates the impact of trust on the intention to purchase online and perceived user usability and usefulness as mediating factor (Fig. 1)

H3: Trust has a positive impact on perceived usefulness.

H4: Trust has a positive impact on perceived ease of use.

H5: Perceived ease of use has a positive impact on perceived usefulness.

H6: Trust has a positive impact on behavioral intention.

H7: Perceived Usefulness has a positive impact on purchase intention.

H8: Perceived ease of use has a positive impact on purchase.

2.4. Mediating Effect of Trust (TR)

Trust plays a central mediating role in the relationship between privacy concerns (PC), structural assurance (SA), and consumers' purchase intention in e-commerce. High privacy concerns erode trust by amplifying perceived vulnerability and risk, which in turn reduces consumers' willingness to engage in online transactions [9, 40]. Conversely, strong structural assurance through visible safeguards such as encryption seals, trusted payment gateways, and regulatory protections, bolsters trust by signaling a secure transactional environment, thereby increasing purchase intention [6, 11]. Empirical studies consistently demonstrate that trust fully or partially mediates these paths: the negative effect of privacy concerns on intention is transmitted through lowered trust, while the positive effect of structural assurance on intention operates primarily by enhancing trust [41, 42]. Thus, trust acts as the pivotal mechanism that translates perceptions of risk and institutional support into actual behavioral intentions

H9: Trust mediates the relationship between Privacy Concerns and Purchase Intention.

H10: Trust mediates the relationship between Structural Assurance and Purchase Intention.

2.5. Purchase Intention (INT)

Consumer purchase intention refers to their intention to acquire a product in the future and their inclination to remain loyal to it, serving as a dependable gauge of consumer behavior for marketers [36]. Purchase intentions represent a critical metric for evaluating the potential success of a new distribution channel, enabling managers to decide whether the concept merits further investment and to identify the most promising geographic markets and consumer segments [37]. Their predictive power stems from the well-established finding that behavioral intentions are the strongest and most proximal antecedent of actual behavior [38]. Consequently, understanding purchase intentions is essential for the success of any online retailer. This research positions online purchase intention as the central dependent variable, measured at the pre-purchase stage, where it captures the motivational factors that drive consumer behavior [38]. [39] Stated that customers displaying an intention to purchase while shopping typically exhibit a higher rate of actual purchases compared to those who do not express such intentions. In this study online purchase intention is defined as the extent to which a consumer is willing and plans to buy a product from online in the near future.

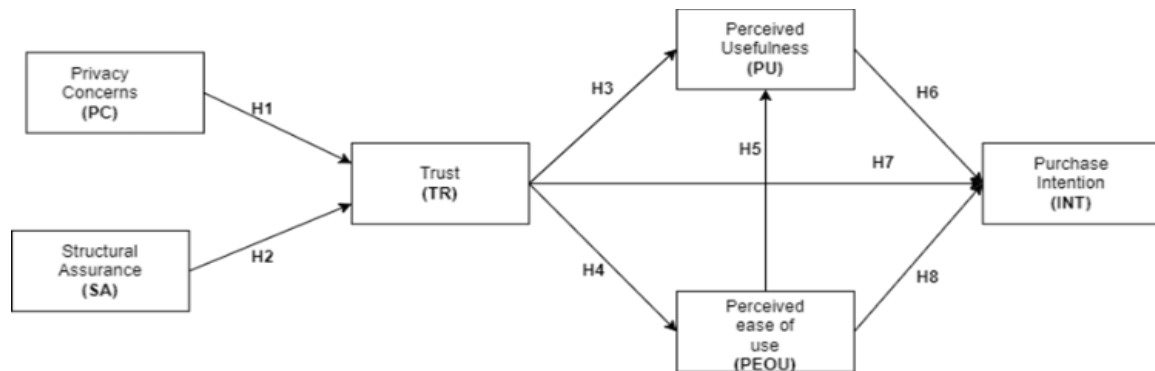


Figure 1. Research conceptual framework

2.6. Analysis and Results

The statistical analysis was conducted in two main phases. First, IBM SPSS version 23 was employed to assess the descriptive statistics of the sample and the measurement items, and to evaluate the internal consistency of the constructs. In the second phase, Partial Least Squares Structural Equation Modeling (PLS-SEM) was performed using SmartPLS 4 to analyze the research model. This involved a two-step approach: first, the measurement model was rigorously examined for reliability (using Cronbach's alpha and composite reliability) and validity (convergent and discriminant validity). We used structural equation modeling (SEM) in order to analyze the data collected and test the research model. SEM is a statistical technique that incorporates factor analysis (using a measurement model) and path analysis (using a structural model) [43]. The advantages of SEM compared to other statistical techniques include more flexible assumptions (e.g., partial allowance of multicollinearity) and less measurement error with confirmatory factoranalysis (CFA) enabled by multiple indicators per construct. In particular, we tested the model through partial least squares (PLS) using SmartPLS 4 with bootstrapping [43].

2.7. Descriptive Statistics

2.7.1. Sample Characteristics

Table 1. Sample Demographics (N = 162)

Characteristics	Item	Frequency	Percent
Gender	Female	87	53.7
	Male	75	46.3
Age	18–25 years	44	27.2
	26–30 years	71	43.8
	31–35 years	47	29.0
Online Shopping Experience	Less than 1 year	34	21.0
	1–2 years	48	29.6
	3–5 years	55	34.0
	More than 5 years	25	15.4
Online Shopping Frequency	Rarely	33	20.4
	Every few months	50	30.9
	Monthly	38	23.5
	Weekly	41	25.3

Prior to the main survey, we conducted a pilot test using 25 students in order to make sure that the questionnaire items were properly developed to meet the research objectives. We examined the responses to the preliminary instrument for

consistency and revised the items in the questionnaire, such that there are no redundant items; all items are phrased clearly and concisely. Then, we surveyed a total of 237 students in order to access a suitable sample of consumers who experienced B2C online shopping. After eliminating observations with missing and unusable data, we used 162 observations to test the model and hypotheses. Prior power analysis was done to determine the sample size. G*Power was used with the following settings: alpha: 0.05; effect size: 0.15; and power: 0.95. The sample size needed for this study calculated by G power is 132 and thus the sample met the requirement.

The demographic characteristics of the sample (N = 162) are detailed in Table 1. The sample consisted of 53.7% female and 46.3% male respondents. In terms of age, the largest proportion of respondents (43.8%) were between 26 and 30 years old, followed by those aged 31–35 years (29.0%) and 18–25 years (27.2%). Regarding online shopping experience, most participants (34.0%) reported 3–5 years of experience, while 29.6% had 1–2 years, 21.0% had less than one year, and 15.4% had more than five years. When asked about their online shopping frequency, 30.9% shopped every few months, 25.3% shopped weekly, 23.5% shopped monthly, and 20.4% shopped rarely.

2.7.2. Descriptive Statistics of Constructs

Table 2 provides the descriptive statistics of the constructs. Inference from the table indicates that all means substantially exceed the midpoint of the 7-point scale. The means range from a low of 4.13 for Privacy Concerns (PC), indicating a moderate level of concern regarding data handling, to a high of 4.94 for Perceived Usefulness (PU), reflecting strong agreement among respondents regarding the benefits of e-commerce, such as convenience and value. Other constructs—Structural Assurance (SA) (Mean = 4.81), Trust (TR) (Mean = 4.78), Perceived Ease of Use (PEOU) (Mean = 4.54), and Purchase Intention (INT) (Mean = 4.92)—also show moderately positive to high perceptions, suggesting overall favorable attitudes toward e-commerce platforms among South African respondents. The standard deviations range between 1.03 and 1.44, denoting moderate spread around the mean. The skewness values range from −0.705 to 0.144, and kurtosis values range from −0.689 to 0.810. All skewness and kurtosis values fall within ± 2 and according to Kline [43], absolute values of skewness below 3 and kurtosis below 10 are considered acceptable indicators of univariate normality. Following this recommendation, the data for this study were regarded as sufficiently normal for further PLS-SEM analysis.

Table 2. Descriptive Statistics

Construct	Items	Mean	SD	Skewness	Kurtosis
Privacy Concerns (PC)	3	4.13	1.22	0.144	-0.285
Structural Assurance (SA)	4	4.81	1.03	-0.473	0.752
Trust (TR)	4	4.78	1.10	-0.705	0.742
Perceived Usefulness (PU)	4	4.94	1.07	-0.156	-0.460
Perceived Ease of Use (PEOU)	3	4.54	1.08	-0.552	0.810
Purchase Intention (INT)	3	4.92	1.44	-0.431	-0.689

using measurement items or questions, with 7-point Likert scale from 1 (Strongly disagree) to 7 (Strongly agree), which have been validated in previous studies. A survey questionnaire was designed to measure the research constructs under consideration in this study. The questionnaire was developed from the adaptation of the scales presented in the studies of [44] for privacy concerns, [6] for structural assurance, [8] for trust, [45] for perceived usefulness, [46] for the perceived ease of use and [11] for purchase intention. Although the literature considers that privacy concerns, trust and sometimes structural assurance can be conceptualized as multidimensional constructs, we chose to use unidimensional scales that capture the major dimensions of those constructs so that the size of the questionnaire was not considered excessive by the respondents, decreasing the response rate. All items were measured with Likert scales of 7 points (1=totally disagree; 7=totally agree) which were extensively used on previous studies about E Commerce. (See table. 3).

2.8. Variable Measurement

A The constructs used in this study were measured

Table 3. Measurement items of the variables

Variables	Measurement items	Source
Privacy Concerns (PC)	1. I am concerned that the personal information I submit on the Internet could be misused. 2. I am concerned about submitting information on the Internet because of what others might do with it. 3. I am concerned that my online information could be used in a way I did not intend or authorize. 4. I am concerned about submitting information on the Internet, because it could be used in a way I did not foresee (Dropped)	Fortes, Rita [44]
Structural Assurance (SA)	1. I believe that online payment and security systems provide sufficient safeguards for conducting transactions. 2. I feel assured that legal and technological structures adequately protect me from problems on the Internet. 3. I feel confident that technological advances (like encryption) make the Internet a safe place to do business. 4. In general, the Internet is now a robust and safe environment in which to transact business.	McKnight [6]
Trust in Online Sellers (TR)	1. The web retailers are trustworthy. 2. The web retailers keep their promises and commitments. 3. The web retailers keep their customer's best interests in mind. 4. The web retailers would resolve any problems fairly.	Gefen [8]
Perceived Usefulness (PU)	1. Shopping on the internet allows me to find better deals and save money. 2. Shopping on the internet allows me to save time. 3. Shopping on the Internet provides me access to a wide variety of products and services. 4. For me, it is useful to make purchases on the Internet.	Park [45]
Perceived Ease of Use (PEOU)	1. Shopping on the internet is a clear and understandable process for me. 2. I become easily skilled at shopping on the Internet. 3. It is easy for me to shop on the Internet. 4. I learned easily to shop on the Internet (Dropped)	Koufaris [46]
Online Purchase Intention (INT)	1. It is likely that I will make purchases on the Internet in the future. 2. I intend to make purchases from online stores in the future. 3. If given the opportunity, I will transact with an online retailer soon.	Pavlou [11]

3. Results

3.1. Measurement Model Assessment

The measurement model represents how well the indicators measure the underlying constructs in the research model. It is evaluated to check convergent validity and internal consistency of the constructs. The factor loadings were above 0.733 (shown in Table 4). Moreover, Composite Reliability (CR) values were 0.852 or higher, a commonly accepted threshold for CR is 0.7 or higher, indicating good reliability. All the values of Cronbach's alpha are above the acceptable threshold of 0.70, indicating internal consistency. AVE

represents the amount of variance captured by the construct relative to the measurement error. A commonly recommended threshold for AVE is 0.5 or higher, indicating good convergent validity. The AVE values were above 0.652, indicates that overall convergent validity was also well established for the hypothesized model as suggested by [47-49]. Prior to evaluating the structural model, collinearity among the predictor constructs was examined to ensure unbiased path coefficients. High collinearity is indicated by inner VIF values of 5 or above, in which case one of the involved indicators should be removed [50]. As presented in Table 4, all inner VIF values were substantially below the conservative threshold of 5, ranging from 1.502 to 3.378 but is still within

the limit. These results confirm the absence of critical collinearity issues, allowing for reliable interpretation of the

structural path coefficients.

Table 4. Measurement Model Assessment

Latent Variable	Indicators	Factor Loadings	VIF	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Privacy Concerns (PC)	PC1	0.890	2.294	0.819	0.859	0.775
	PC2	0.865	1.870			
	PC3	0.886	2.423			
Structural Assurance (SA)	SA1	0.866	2.526	0.823	0.873	0.698
	SA2	0.845	2.368			
	SA3	0.828	1.816			
	SA4	0.843	1.940			
Trust (TR)	TR1	0.849	2.295	0.869	0.896	0.761
	TR2	0.894	2.950			
	TR3	0.844	2.088			
	TR4	0.900	2.905			
Perceived Usefulness (PU)	PU1	0.822	1.919	0.807	0.852	0.652
	PU2	0.776	1.644			
	PU3	0.733	1.502			
	PU4	0.890	2.244			
Perceived Ease of Use (PEOU)	PEOU1	0.884	2.324	0.837	0.848	0.759
	PEOU2	0.868	2.194			
	PEOU3	0.862	1.743			
Purchase Intention (INT)	INT1	0.917	3.286	0.889	0.912	0.799
	INT2	0.891	2.389			
	INT3	0.935	3.378			

Discriminant validity was calculated using the Heterotrait-Monotrait ratio of correlations (HTMT), currently regarded as the most reliable criterion in PLS-SEM [51, 52]. Heterotrait-Monotrait (HTMT) ratio has become the gold standard for assessing discriminant validity. As shown in Table 5, all HTMT values ranged from 0.065 to 0.722, well below the conservative threshold of 0.85 and comfortably below the more liberal threshold of 0.90. These results provide strong evidence that each construct is empirically distinct from the others, thereby confirming discriminant validity at both the construct and indicator levels.

Table 5. Discriminant Validity – Heterotrait-Monotrait Ratio of Correlations

	PU	PEOU	PC	INT	SA	TR
PU						
PEOU	0.722					
PC	0.065	0.088				
INT	0.577	0.495	0.084			
SA	0.190	0.109	0.123	0.224		
TR	0.511	0.429	0.132	0.464	0.602	

Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards.

Thus, establishing discriminant validity implies that a construct is unique and captures phenomena not represented by other constructs in the model. The Fornell–Larcker criterion is a conservative approach to assessing discriminant validity. Specifically, the square root of each construct's AVE should be greater than its highest correlation with any other construct [53]. This criterion can also be stated as the AVE should exceed the squared correlation with any other construct. The logic of this method is based on the idea that a construct shares more variance with its associated indicators than with any other construct [48, 50]. As shown in table 6, all square roots of AVE are greater than the inter-construct correlations (Fornell-Larcker criterion satisfied).

Table 6. Discriminant Validity – Fornell-Larcker Criterion

	INT	PC	PEOU	PU	SA	TR
INT	0.893					
PC	−0.034	0.880				
PEOU	0.441	−0.066	0.871			
PU	0.511	−0.016	0.615	0.807		
SA	0.203	0.098	0.097	0.165	0.835	
TR	0.420	−0.116	0.378	0.448	0.536	0.872

3.2. Structural Model Assessment

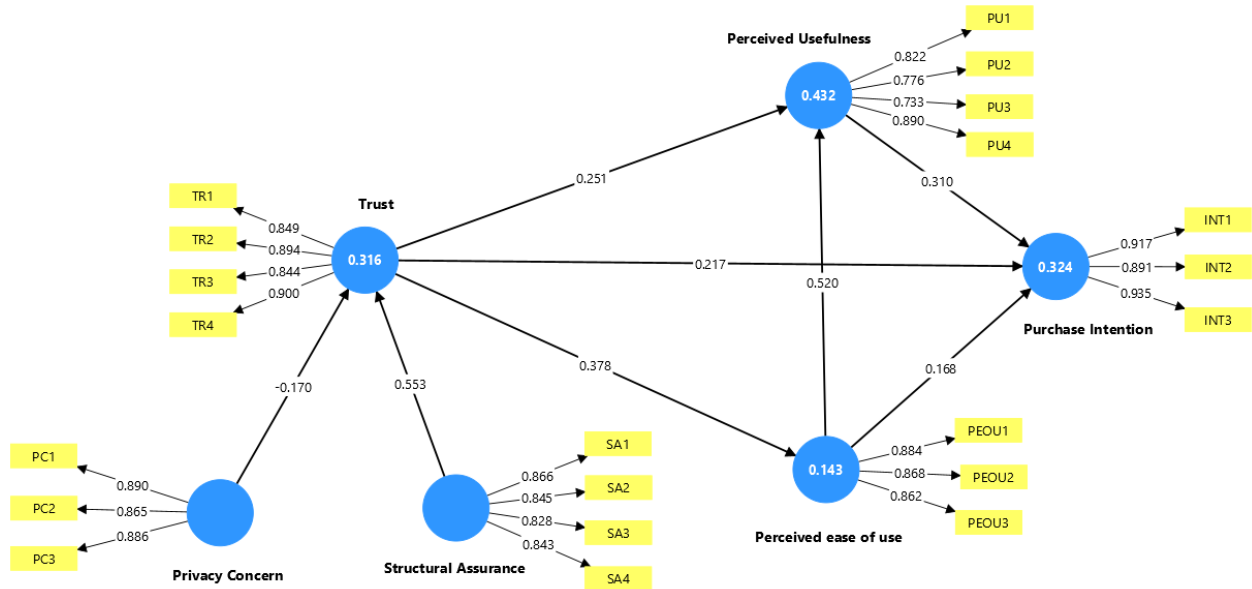


Figure 2. PLS-SEM factor loadings, path coefficients, and R2 Values

Table 7. shows the direct path results. Seven of the eight hypothesized direct relationships were supported. Structural Assurance ($\beta = 0.553$, $p = 0.000$) exerted the strongest positive effect on trust, whereas privacy concerns had a significant negative effect ($\beta = -0.170$, $p = 0.035$), supporting H1 and H2. Trust significantly influenced perceived usefulness ($\beta = 0.251$, $p = 0.000$), perceived ease of use ($\beta = 0.378$, $p < 0.001$), and purchase intention ($\beta = 0.217$, $p = 0.006$), supporting H3, H4, and H7. Perceived ease of use strongly predicted perceived usefulness ($\beta = 0.520$, $p = 0.000$) and, perceived usefulness positively affected purchase intention supporting both H5 and H6. The direct effect of

perceived ease of use on Purchase Intention was not significant ($\beta = 0.168$, $p = 0.099$), failing to support H8. The PLS algorithm was used to estimate the structural model's explanatory power, as indicated by the coefficient of determination (R^2) for each endogenous latent variable. The R^2 values were 0.316 for trust, 0.432 for perceived usefulness, 0.143 for perceived ease of use, and 0.324 for purchase intention. Following the guidelines for evaluating PLS-SEM results [52], these values suggest the model provides moderate explanatory power for trust and purchase intention, and substantial explanatory power for perceived usefulness in the context of this study (see Fig. 2).

Table 7. Path Coefficient

Hypothesis	Path Relationship	Mean (M)	Standard Deviation (STDEV)	Path Coefficient (β)	T-Statistics	P-Values	Supported?
H1	PC $\rightarrow$ TR	-0.176	0.081	-0.170*	2.107	0.035	Yes
H2	SA $\rightarrow$ TR	0.556	0.062	0.553***	8.903	0.000	Yes
H3	TR $\rightarrow$ PEOU	0.379	0.077	0.378***	4.921	0.000	Yes
H4	TR $\rightarrow$ PU	0.250	0.066	0.251***	3.809	0.000	Yes
H5	PEOU $\rightarrow$ PU	0.525	0.065	0.520***	7.994	0.000	Yes
H6	PU $\rightarrow$ INT	0.314	0.089	0.310**	3.469	0.001	Yes
H7	TR $\rightarrow$ INT	0.218	0.078	0.217	2.768	0.006	Yes
H8	PEOU $\rightarrow$ INT	0.167	0.102	0.168	1.650	0.099	No (marginally significant)

Notes: Significance at levels: *** $p < 0.001$, ** $p < 0.01$ * $p < 0.05$

3.3. Mediating Role of Trust

In the present study, the statistical significance of the structural model's direct and indirect (mediation) paths was assessed using a bootstrapping procedure with 5,000 subsamples in SmartPLS 4, as recommended in contemporary

PLS-SEM guidelines [52]. This method generated the standard errors, t-values, p-values, and bias-corrected confidence intervals for each path coefficient (β). Table 8 presents the full results of this analysis, including the sample mean and standard deviation for each estimated effect, allowing for the evaluation of the mediating roles of trust, perceived ease of use, and perceived usefulness. (See Fig. 3).

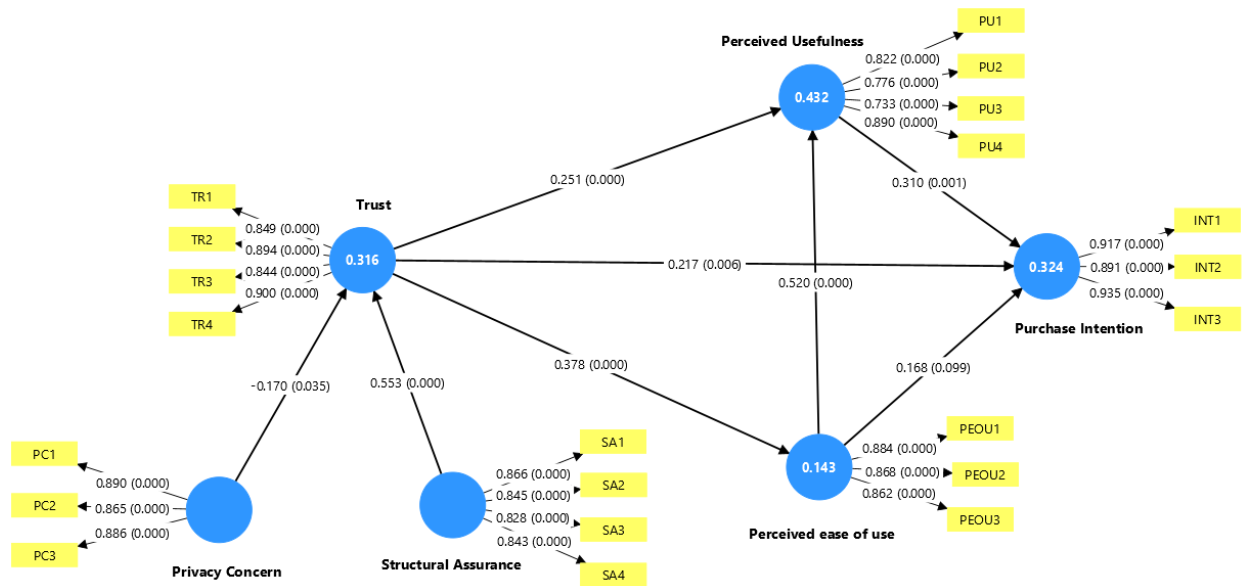


Figure 3. Mediating role of trust

Table 8 reveals that Structural Assurance has a strong significant positive total effect on online purchase intention ($\beta = 0.464$, $p = 0.000$), of which a substantial portion is transmitted through indirect paths (total indirect effect $\beta = 0.232$, $p = 0.000$), with all specific indirect effects involving Trust being statistically significant ($p \leq 0.020$). Notably, the path Structural Assurance $\rightarrow$ Trust $\rightarrow$ Purchase Intention ($\beta = 0.120$, $p = 0.011$), Structural Assurance $\rightarrow$ Trust $\rightarrow$ Perceived Usefulness $\rightarrow$ Purchase Intention ($\beta = 0.043$, $p = 0.009$), and the longer chain Structural Assurance $\rightarrow$ Trust $\rightarrow$ Perceived Ease of Use $\rightarrow$ Perceived Usefulness $\rightarrow$ Purchase Intention ($\beta = 0.034$, $p = 0.020$) jointly demonstrate that trust and the extended TAM constructs fully mediate a large part of the favourable influence of institutional safeguards on consumers' purchase intentions. In contrast, Privacy Concerns show a

significant negative total effect on online purchase intention ($\beta = -0.108$, $p = 0.019$), though the total indirect effect is only marginally significant ($\beta = -0.071$, $p = 0.059$), and all corresponding specific indirect effects through trust remain weak and statistically non-significant (highest $p = 0.124$ for PC $\rightarrow$ TR $\rightarrow$ INT; others $p \geq 0.098$). These findings suggest that, despite privacy concerns exerting an overall detrimental total influence on purchase intention, their transmission through trust-based paths is relatively weak and non-significant in this model. Meanwhile, robust structural assurance mechanisms exert a powerful positive impact primarily by building trust, which in turn enhances perceptions of usefulness and ease of use, ultimately driving stronger online purchase intentions.

Table 8. Mediation results

Path Relationship	β (Original Sample)	Sample Mean	Std. Dev.	t-value	p-value	Remark
Total Effect PC $\rightarrow$ INT	-0.108	-0.114	0.046	2.348	0.019	Significant
SA $\rightarrow$ INT	0.464	0.466	0.056	8.286	0.000	Significant
Total Indirect Effect PC $\rightarrow$ INT	-0.071	-0.075	0.038	1.889	0.059	Marginally significant
SA $\rightarrow$ INT	0.232	0.234	0.048	4.820	0.000	Significant
Specific Indirect Effects PC $\rightarrow$ TR $\rightarrow$ INT	-0.037	-0.039	0.024	1.537	0.124	Not significant
PC $\rightarrow$ TR $\rightarrow$ PU $\rightarrow$ INT	-0.013	-0.013	0.008	1.655	0.098	Marginally significant
PC $\rightarrow$ TR $\rightarrow$ PEOU $\rightarrow$ PU $\rightarrow$ INT	-0.010	-0.011	0.007	1.427	0.154	Not significant
SA $\rightarrow$ TR $\rightarrow$ INT	0.120	0.121	0.047	2.551	0.011	Significant
SA $\rightarrow$ TR $\rightarrow$ PU $\rightarrow$ INT	0.043	0.043	0.016	2.620	0.009	Significant
SA $\rightarrow$ TR $\rightarrow$ PEOU $\rightarrow$ PU $\rightarrow$ INT	0.034	0.035	0.014	2.336	0.020	Significant
Trust-TAM Effects TR $\rightarrow$ PU $\rightarrow$ INT	0.078	0.077	0.028	2.787	0.005	Significant
TR $\rightarrow$ PEOU $\rightarrow$ INT	0.063	0.062	0.040	1.583	0.114	Not significant
TR $\rightarrow$ PEOU $\rightarrow$ PU $\rightarrow$ INT	0.061	0.063	0.025	2.431	0.015	Significant

Notes: Significance at levels: *** $p < 0.001$, ** $p < 0.01$ * $p < 0.05$

Regarding the mediation hypotheses, H9 posits that Trust mediates the relationship between Privacy Concern (PC) and Purchase Intention (INT), but the specific indirect effect PC

$\rightarrow$ Trust $\rightarrow$ INT is negative yet not statistically significant ($\beta = -0.037$, $p = 0.124$), despite PC's significant negative effect on Trust ($\beta = -0.170$, $p = 0.035$) and Trust's positive influence on INT ($\beta = 0.217$, $p = 0.006$); thus, no significant mediation exists, and H9 is not supported. In contrast, H10 proposes that

Trust mediates the relationship between Structural Assurance (SA) and INT, with the specific indirect effect $SA \rightarrow Trust \rightarrow INT$ being positive and significant ($\beta = 0.120$, $p = 0.011$), supported by SA's strong positive effect on Trust ($\beta = 0.553$, $p = 0.000$) and the same Trust-to-INT path, confirming partial mediation by Trust (augmented by additional significant paths through PU/PEOU for fuller mediation in the extended model); therefore, H10 is supported.

3.4. Evaluation of Structural Model, Explanatory Power, and Predictive Relevance

3.4.1. Coefficient of Determination (R^2 Value)

The coefficient of determination (R^2) represents the most widely accepted measure of the structural model's explanatory power and in-sample predictive accuracy. It indicates the proportion of variance in an endogenous construct that is explained by its predictor constructs. R^2 values range from 0 to 1, with higher values reflecting greater explanatory power. Following Hair [48], R^2 values of approximately 0.75, 0.50, and 0.25 are typically interpreted as substantial, moderate, and weak, respectively. In the present study (see Table 9), the structural model explains 43.2% of the variance in Perceived Usefulness (PU; $R^2 = 0.432$), which approaches moderate explanatory power. Trust (TR) exhibits an R^2 of 0.316 (weak to moderate), Purchase Intention (INT) an R^2 of 0.324 (weak to moderate), and Perceived Ease of Use (PEOU) an R^2 of 0.143 (weak). These values are consistent with those commonly reported in consumer behavior and technology-adoption studies employing PLS-SEM and indicate acceptable explanatory power for the proposed theoretical model.

Table 9. Coefficient of determination (R^2 value)

Endogenous Construct	R^2	R^2 Adjusted
Trust (TR)	0.316	0.308
Perceived Ease of Use (PEOU)	0.143	0.138
Perceived Usefulness (PU)	0.432	0.425
Purchase Intention (INT)	0.324	0.311

3.4.2. Effect Size f^2

Table 10. Effect size f^2

Exogenous Construct	PEOU	PU	INT	TR
PEOU		0.407		
PU			0.081	
PC			0.042	0.095
SA				0.443
TR	0.167	0.081	0.025	0.055

In addition to evaluating the R^2 values of all endogenous constructs, the change in the R^2 value when a specified exogenous construct is omitted from the model can be used to evaluate whether the omitted construct has a substantive impact on the endogenous constructs. This measure is referred to as the f^2 effect size. Guidelines for assessing f^2 are those values of 0.02, 0.15, and 0.35, representing small, medium, and large effects, respectively, of the exogenous latent variable Cohen, [54]. As shown in Table 10, the f^2 values indicate the substantive impact of each exogenous construct if removed from the model: $SA \rightarrow TR$ (0.443) and $PEOU \rightarrow PU$ (0.407) have large effects; $TR \rightarrow PEOU$ (0.167) has a medium effect; $PC \rightarrow TR$ (0.095), $PU \rightarrow INT$ (0.081),

$TR \rightarrow PU$ (0.081), and $TR \rightarrow INT$ (0.025) have small effects; while $PC \rightarrow INT$ (0.042) also exhibits a small effect on the corresponding endogenous variables.

3.4.3. Blindfolding and Predictive Relevance Q^2

Beyond assessing in-sample explanatory power through R^2 , the model's out-of-sample predictive relevance was evaluated using Stone–Geisser's Q^2 [55]. A Q^2 value greater than zero indicates that the exogenous constructs possess predictive relevance for the corresponding endogenous construct [52]. As a relative measure, Q^2 values of 0.02, 0.15, and 0.35 are commonly interpreted as small, medium, and large predictive relevance, respectively. The blindfolding procedure (omission distance = 7) yielded the Q^2 values reported in Table 11. Trust ($Q^2 = 0.286$) exhibits clear predictive relevance, whereas Perceived Usefulness ($Q^2 = 0.015$) and Purchase Intention ($Q^2 = 0.036$) show weak but positive predictive relevance. The slightly negative Q^2 for Perceived Ease of Use (-0.006) is not uncommon for constructs that primarily serve a mediating role and does not impair the overall predictive performance of the structural model [52]. Taken together, these results confirm that the proposed model has acceptable predictive relevance for the key outcome variable (Purchase Intention) and the majority of its antecedents.

Table 11. Q^2 values

Endogenous Construct	Q^2 (1 – SSE/SSO)	Predictive Relevance
Trust (TR)	0.286	Yes (Medium)
Perceived Ease of Use (PEOU)	-0.006	No
Perceived Usefulness (PU)	0.015	Yes (Small)
Purchase Intention (INT)	0.036	Yes (Small)

Table 12. Hypothesis Results

Hypothesis	Supported?
H1: Privacy Concerns has a negative impact on trust.	Yes
H2: Structural Assurance has a positive effect on trust.	Yes
H3: Trust has a positive impact on perceived usefulness.	Yes
H4: Trust has a positive impact on perceived ease of use.	Yes
H5: Perceived ease of use has a positive impact on perceived usefulness.	Yes
H6: Trust has a positive impact on behavioral intention (purchase intention).	Yes
H7: Perceived Usefulness has a positive impact on purchase intention.	Yes
H8: Perceived ease of use has a positive impact on purchase intention.	No
H9: Trust mediates the relationship between Privacy Concerns and Purchase Intention.	No
H10: Trust mediates the relationship between Structural Assurance and Purchase Intention.	Yes

4. Discussion and Conclusion

The present study developed and tested an integrative model that combines structural assurance and privacy concerns, trust in the online sellers, and the extended Technology Acceptance Model (TAM) to explain consumers' purchase intentions on the internet in general. The results strongly support the proposed framework and reveal several novel insights. First, Structural Assurance emerged as by far

the strongest antecedent of trust, considerably outweighing the negative effect of Privacy Concerns. This finding indicates that South African consumers, when forming trust toward online shopping in general, rely more heavily on the perceived presence of structural safeguards across the internet ecosystem than on generalised privacy worries. Second, Trust proved to be a pivotal construct that simultaneously shapes perceived ease of use, perceived usefulness, and purchase intention in the broader online shopping environment. Of particular note is the strong influence of trust on perceived ease of use, which in turn creates a substantial indirect effect on perceived usefulness. This shows that when consumers trust online sellers, they not only see greater functional value in internet shopping but also perceive the process as considerably less effortful and more intuitive. The full sequential chain Trust → Perceived Ease of Use → Perceived Usefulness → Purchase Intention, which has rarely been theorised or tested in previous TAM-trust integrations, emerges as a significant pathway in the present study and represents a meaningful extension of existing e-commerce acceptance models. Third, the mediation analysis revealed an asymmetric pattern: Trust fully transmits the positive influence of structural assurance to purchase intention but the negative influence of privacy concerns is not carried through trust. This suggests that, at the general internet level, institutional assurances build behavioural intention primarily by fostering trust, whereas privacy concerns may affect intention through other unmodelled pathways. Finally, in line with decades of TAM research, perceived usefulness remains the strongest direct predictor of purchase intention and the indirect effect of trust via perceived usefulness is significant. The direct effect of perceived ease of use on intention, however, was not significant, reinforcing the now well-established view that ease-of-use influences behavioural outcomes mainly through usefulness in mature, familiar technologies such as general internet shopping.

5. Implications of the Study

5.1. Theoretical Implications

This research makes several scholarly contributions. First, it provides one of the few direct empirical comparisons between Structural Assurance and Privacy Concerns as competing antecedents of trust in online sellers. The finding that Structural Assurance exerts a markedly stronger positive effect on trust than the negative effect of Privacy Concerns challenges the dominant emphasis on privacy concerns in much of the Western and Asian literature and highlights the critical, yet under-appreciated, role of perceived structural safeguards in emerging-market contexts. Second, by integrating trust into the full TAM belief chain and demonstrating that Perceived Ease of Use fully mediates the trust–perceived usefulness relationship while sequentially transmitting trust’s effect to purchase intention, the study extends classic TAM-trust models in a way that has rarely been theorized or tested. Third, the asymmetric mediation pattern trust fully mediates the positive influence of Structural Assurance on intention but does not carry the negative influence of Privacy Concerns adds nuance to institutional trust theory and suggests that different institutional mechanisms operate through distinct psychological pathways at the general internet level. Collectively, these contributions advance theory by offering a more comprehensive and context-sensitive framework for understanding how

institutional factors and cognitive beliefs jointly shape online purchase behaviour.

5.2. Practical Implications

The findings also carry actionable insights for policymakers, industry bodies, and e-commerce practitioners operating in South Africa and similar emerging markets. The overwhelming dominance of Structural Assurance implies that visible, credible institutional safeguards such as widely recognized secure payment systems, clear return policies, third-party certifications, and strong consumer-protection legislation are far more effective at building consumer trust than merely addressing privacy concerns in isolation. Industry associations and government agencies should therefore prioritize the development and promotion of standardized structural assurances across the broader internet ecosystem rather than focusing solely on privacy-awareness campaigns. For individual online retailers, the results suggest that prominently displaying evidence of these institutional safeguards (e.g., SSL certificates, escrow services, and legal guarantees) on their websites will likely yield greater returns in trust and sales than lengthy privacy-policy statements alone. These actions directly minimize cart abandonment rates, eliminate common points of hesitation during the purchase journey, and ultimately increase conversion rates, average order value, and overall revenue. Finally, since perceived usefulness remains the strongest direct driver of purchase intention, managers should continue to emphasize clear functional benefits (fast delivery, competitive pricing, product variety) while ensuring that the overall online shopping experience feels effortless, an outcome that is itself significantly enhanced when consumers trust the sellers and the broader internet environment.

5.3. Limitations and Future Scope

Despite its contributions, this study has several limitations. First, the model includes only a limited set of antecedents; other important factors such as situational normality which is part of the institutional based trust together with structural assurance, perceived risk and social influence could be examined and would further explain online purchase intention. Second, the sample of 162 respondents, although adequate for PLS-SEM, remains relatively modest and was collected from two universities in the same city using a convenience sampling approach, which restricts the generalizability of the findings to other cultural or economic contexts. Third, the cross-sectional design of the study captures data at a single point in time, limiting the ability to infer causality or examine how relationships evolve over time; a longitudinal approach would provide stronger evidence of directional influences. Fourth, the study focused on a general online shopping context without specifying particular product categories (e.g., high-involvement vs. low-involvement items or digital vs. physical goods), which may moderate the effects of trust and TAM constructs on purchase intention. Finally, the study relied exclusively on self-reported intentions rather than actual purchase behaviour. Future research should address these limitations by incorporating additional predictors and employing larger and more diverse samples across multiple cities including rural or less developed areas.

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