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# CONSUMER TRUST IN SOCIAL NETWORK SITES IN VIETNAM: PLS-SEM-ANN ANALYSIS

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## Abstract:

While social network sites (SNSs) has emerged as one of the most promising futuristic trends in mobile commerce (m-commerce), how customers' trust impact on customer attitude and willingness to buy through SNSs remains largely underexplored. This study develops a theoretical model to examine the impacts of characteristics of trustees on customer's trust, customer attitude, and willingness to buy through theory of reasoned action (TRA). A survey was conducted and 200 valid questionnaires were collected from customers using Facebook, Twitter, and Tiktok platforms in Vietnam. Firstly, this study confirms that perceived reputation, multichannel integration, and system assurance exerted a positive influence on customer trust then customer trust has an influence on customer attitude and lead to willingness to buy. Secondly, the Neural Network Model was employed to rank relatively significant predictors obtained from structural equation modeling (SEM). This study contributes to the growing literature on the use of SNS apps in trying to elevate the m-commerce business. The new methodology and findings from this study will significantly contribute to the extant literature of m-commerce setting. Therefore, for practitioners concerned with fostering trust for their business when using SNS, the findings stress the importance of trust in m-commerce an integrated approach centered on key findings of this study.

Keywords: m-commerce, Willingness to buy, TRA, Artificial neural network

## 1. Introduction

Due to the lack of human interaction, the inability to examine the product in question in person, and the insufficiency of robust transaction safeguards, the internet is inherently dangerous. The lack of personal interaction inherent in online purchases makes the issue of trust more pressing than in traditional retail settings. Online transactions rely heavily on the notion of trust because of the many facets that are affected, including security and privacy.

While both customers and vendors stand to profit from mobile commerce (m-commerce), one unavoidable drawback is the elimination of the physical distance that has traditionally separated buyers, sellers, and their wares. Having reliable, long-lasting customer relationships is essential for suppliers to solve this problem. Nonetheless, there are still many questions that haven't been answered. Although many online businesses use different efficiently communication tools such as social network site (SNSs), there has been little research conducted on the efficacy of multi-channel integration cues such as SNSs, email, blog, e-review in an online retail environment through controlled experiments. More and more online stores are starting corporate blogs, m-review to attract customers and make their online shopping experiences more convenient. One example is how companies like Dell Inc. use bloggers to update their websites and respond to customer concerns (Brenngman & Karimov, 2012). Moreover, most of these studies have only focused on the consumers of countries widely recognized as global powers such as the USA,

China, and Singapore (Ashraf et al., 2021; Chopdar et al., 2018). These countries possess comparative online mobile shopping environment with high reputation-sized firm that lead to high perception of customers in terms of system assurance and trust.

There is a lack of evidence on the efficacy of such online mobile shopping's trust in less developed countries like Vietnam. The potential for future research and practical applications make m-commerce a potentially alluring field of study (Attar et al., 2021; Calzetta, 2012; Ngai & Gunasekaran, 2007). Therefore, the flaws in the multivariate assumptions of earlier research are remedied by employing structural equation modelling and neural networks. To further enhance the social commerce framework, m-commerce companies may benefit from investigating linear and non-compensatory interactions. Furthermore, there has been limited research into what factors influence customers' trust in mobile commerce and how dual theory from SEM and ANN might be applied to this setting (Lim et al., 2021). The artificial neural network (ANN) is a computational framework inspired by the way the human central nervous system stores and uses data (Lim et al., 2021). Today's ANN algorithms for assessing client sentiment might be useful for young businesses (Ooi et al., 2018). Combining the ANN approach with PLS-SEM methods has the added benefit of verifying the results of the SEM study even further. A precise assessment of the relative strength of each predictor is also obtained, and the approach may also capture dynamic, nonlinear interactions between the independent and dependent variables (Albahri et al., 2022). In order to close this knowledge gap, this research investigates the emotional and mental processes consumers go through in reaction to multi-channel integration and then identify how the antecedents of trust in online shopping environment affect customers' attitude and willingness to buy online in less developed countries. Specifically, it is claimed that the incorporation of multi-channel integration into e-tail web sites, reputation, system assurance would affect online trust and attitude of customer towards new m-commerce businesses that make them make decision to shop online. Our research also applies a sophisticated hybrid two-staged SEM-ANN approach to detect non-linear relationship to improve the understanding of trust in m-commerce setting.

This paper will follow the outline below. We begin by defining "initial online trust," a notion of paramount relevance for new m-commerce sites. We then present a theoretical basis, grounded in cue signaling theories, elaborating the effect of social network application integration into the website on the development of trust and the likelihood of a customer making a purchase. Our research framework and theories will emerge from this. Our data collecting and analysis methods are outlined next. After the presentation of the analysis and results, the debate and final thoughts follow in rapid succession. Lastly, we note some caveats and provide some recommendations for future study.

## **2. Literature review**

### **2.1 Trust**

Trust can be defined broadly as the confidence one has in their pessimistic predictions of what other people will behave, which are typically based on prior interactions. Exchanges carried out as planned foster confidence that the other party will behave as anticipated, even if the future actions of one or more individuals cannot be guaranteed to behave as intended. Without this level of assurance, people would be obliged to assess every possible scenario for each person in their immediate vicinity before making a decision. The need for trust grows as one becomes more dependent on others and vulnerable to their misbehavior. As a result, trust is, by definition, complicated, multifaceted, and context-specific (Gefen, 2000). Because trust is a crucial component of virtually every commercial deal and reduces perceived risk and transaction costs when necessary, it has a big impact on business partnerships in general. any exchange as a result

of the ability of the other side to behave strategically. As a result, the success of many partnerships in business is heavily influenced by trust, which also drives behavior in general. Contrarily, a lack of trust results in defensive and controlling communication, which lowers the effectiveness of communication and distorts crucial information. Trust has evolved into a crucial precondition for internet commerce due to its advantages, particularly the capacity to engage in dangerous actions without the ability to influence others (Gefen, 2000).

## **2.2 Theory of Reasoned Action (TRA)**

In order to explain the reflective psychological processes connections between observable attitudes, convictions, intentions, and acts, (Azjen, 1980) proposed the theory of reasoned action (TRA). According to the notion, the perspective of an individual toward a behavior—which is impacted by their beliefs - determines whether they intend to engage in it. TRA has been examined in numerous empirical investigations over the years. A number of meta-analytical studies on attitudes, intentions, and volitional behavior have also been published within the TRA framework, which has led TRA's supporters to assume that the method is reliable when used to attitude-behavior research. In fact, several researchers questioned the added benefit of alternative theories as TRA already has a good track record of accurately predicting the relevant occurrence. Additionally, TRA can be used in schools when teachers want to change their students' attitudes and intentions in order to assist them develop better school behaviors. The theoretical context for this research is provided by the theory of reasoned action (TRA). According to the idea, attitudes and beliefs about the likelihood that a conduct would result in a particular outcome influence behavioral intention, which was previously thought to be a direct prelude to behavior. According to (Hill et al., 1977), one's beliefs (attitudes) toward a particular behavior and subjective norms (the idea that those who are important to them may disapprove or approve of the behavior) are considered to have a direct impact on one's intention, which is a key determinant of one's behavior. Consumer beliefs may be one of the primary systems that affect willingness to buy.

## **3. Hypotheses development**

According to studies on conventional buyer-seller interactions in the industrial setting, the elements that buyers consider to be trustworthy include the seller's reputation and size (Doney & Cannon, 1997). The reason behind this is that a vendor's reputation and size can attest to their competence, generosity, and honesty (Jarvenpaa et al., 1999). Customers' opinions of an online retailer's reputation and size have an impact on how much they trust the business (Jarvenpaa et al., 2000).

How highly customers regard a vendor is ethical and trustworthy or has a solid professional reputation is known as reputation (Doney & Cannon, 1997). According to research, a company's reputation is known as priceless long-term commitment of time, money, and attention to the needs of its clients. Because it is more difficult to build a reputation than to destroy one, reputation is weak (Yaniv & Kleinberger, 2000). If not properly protected, it is a fragile strategic asset that gets damaged easily or ruined (Kartalia, 2000). A vendor with a strong reputation is therefore thought to be unwilling to endanger it by acting opportunistically (Chiles John F McMackin et al., 1996). Reputation has been linked favorably to the buyer's trust in the seller in the classic marketing literature (Shankar Ganesan, 2019). Consumers' perceived reputation of a seller has also been shown to be strongly correlated with their level of trust while shopping online. Consequently, we assume that:

H1. The degree of consumer trust in an m-commerce vendor is positively connected with the vendor's perceived reputation.

The size of a seller was characterized additionally to its market share and total size (Doney & Cannon, 1997). Size and market share that are significant overall suggest that a lot of customers choose to trust the company because it routinely keeps its commitments to them because a company with a sizable market share must cater to a wider range of customers (Griffin & Hauser, 1993). Otherwise, it wouldn't have been able to hold onto its market position (Doney & Cannon, 1997). Additionally, a large organizational size means that the business is likely to have the resources and networks needed to promote trust and loyalty (Chow & Holden, 1997). Additionally, larger businesses typically have Web sites that are better developed to promote transactions (Teo & Pian, 2004). Last but not least, a big scale in an online shopping environment shows that the seller is able to assume the risk of product failure or transit losses and to fairly compensate customers. The vendor has the resources necessary to take on the risk of a product failing or experiencing transit losses and to fairly compensate customers (Jarvenpaa et al., 2000). Thus, it is evident that:

H2. The degree of consumer trust in an m-commerce vendor is positively connected with the vendor's perceived size.

Companies are becoming more aware of the value of having many channels for interacting with customers and raising the degree of integration across all modes of communication as a result of the Internet's development as a commercial channel (For instance, a phone call, a fax, a catalog, an online store, an email, a physical store, etc.). Gulati and Garino considered a several methods to choose the ideal level of merging virtual and natural activities as they talked about the benefits and drawbacks of each choice from the perspective of the vendors (Gulati & Garino, 2000). One of the primary dynamic competencies required for e-business transformation is integration across channels to provide multichannel service, according to (Elizabeth & Wilson, 2003). Vendors must always give customers the option to communicate with them in the way that seems most comfortable to them. By expanding aided service to online clients and facilitating a more pleasant and seamless purchasing experience for consumers, merchants are given an efficient means of fostering their happiness and trust. Because there is less trust and communication, physical distribution is especially important for vendors who have physical locations because it ensures that products are offered to customers in the required amounts at the appropriate times and locations. Consequently, the following assertion is made:

H3. The vendor's multichannel integration is positively connected with the degree of consumer trust in an m-commerce setting

The dependability and security of a vendor's online transaction system, which permits secure and effective Internet transactions, is what we refer to as "system assurance". Previous studies have shown that consumers regard disclosing credit or debit card information online as carrying a considerable risk. Consumers frequently express concerns about the security and dependability of online transactions, according to (Ambrose et al., 1998). Additionally, (Kini & Choobineh, 1998) claimed that establishing and preserving consumer trust depends on the system's assurance features that users can access. This is what happens:

H4. The degree of consumer trust in an m-commerce vendor is positively connected with the vendor's system assurance.

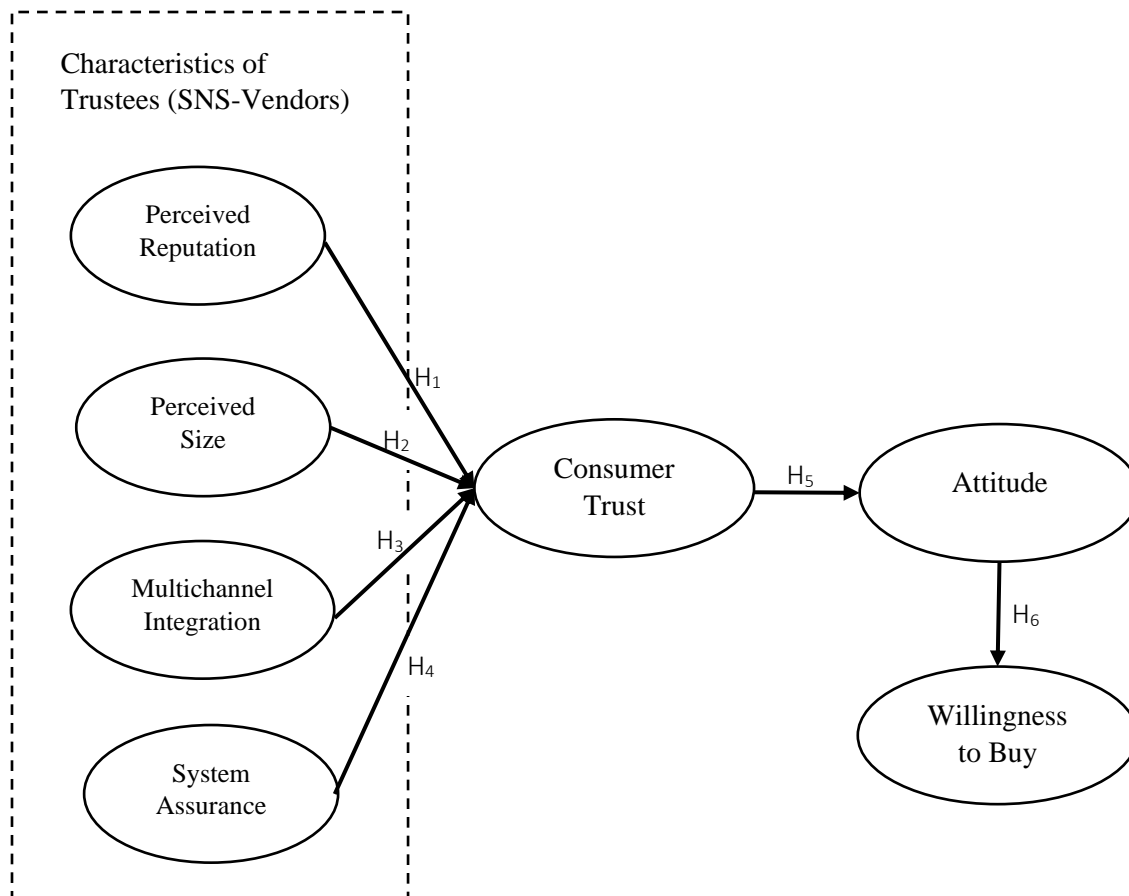
Recent research on trust development (McKnight & Chervany, 2001), especially when it comes to m-commerce (MacKnight et al., 2000), have also used TRA as their theoretical foundation. It is hypothesized that trust has a direct relationship with attitudes about buying from a vendor and an indirect relationship with consumer willingness to buy via purchasing attitudes because trust can be defined as a conviction, attitude, anticipation, or belief regarding the intentions

and/or anticipated behavior of a trade partner. Because they feel a connection to and identification with the vendor, buyers who are motivated by trust may concentrate more on the positive motivation. It then follows:

H5. Consumer trust in m-commerce vendors is related to good attitudes toward purchasing from the m-commerce vendors.

H6. Customers's willingness to buy through an m-commerce vendor are positively correlated with consumer trust in m-commerce vendors.

Our research builds a model to explain willingness to buy in m-commerce based on the TRA, trust literature and the online mobile purchasing perspective outlined above. In particular, our model represents characteristics of trustees from m-commerce vendor's processes like perceived reputation, perceived size, multichannel integration, and system assurance. We argue that consumers' propensity to make online mobile purchases can be influenced by their attitude toward m-commerce vendors. The proposed theoretical model is described below:



**Fig. 2.** Research model

## 4. Methodology

### 4.1 Data gathering process

Users of mobile commerce in Vietnam were surveyed for this research. The participants in the research were all residents of Vietnam who had used Shopee, Facebook, or Tiktok to make an online purchase in the past. Ho Chi Minh City, Dong Nai, and Binh Duong were chosen as the sample locations because they get a large number of tourists and have the highest reported internet usage rates worldwide. More than half of Vietnam's internet users live in these select cities (Leong et al., 2020a). Overall, 200 questionnaires were fully completed by women and men of varying ages and educational backgrounds. Preliminary survey instrument was evaluated by eight individuals with over ten years of management experience in m-commerce to ensure authenticity of material; tool was modified slightly based on their suggestions. As a result, after two weeks, shoppers in certain Vietnamese retail malls were given the final survey. The inquiry "have you participated in internet commerce before?" is an example of a shopping interception question. Due to COVID-19 and preventative measures, it was unable to directly contact the intended audience; as a result, an online survey was conducted instead. Among the 200 surveys sent out, only those with complete responses were received. According to Hair et al. (2011), a study's sample size should be more than or equal to 10 times the formative indicators utilized in construction or the number of structural routes specified in the structural model. There were 41% men and 59% women who participated; also, 43% were between the ages of 15 and 24, 36% were between the ages of 25 and 34, 9% were between the ages of 35 and 44, 7% were between the ages of 45 and 54, and 5% were between the ages of 55 and 64. The percentage of college graduates is as follows: 15% have an associate's degree, 23% have a bachelor's degree, 36% have an advanced degree, 25% have a master's degree, and 1% have additional certifications. Among the mobile commerce platforms, 25% of respondents relied on Facebook, 38% relied on Tiktok shop, and 37% relied on Twitter.

#### 4.2 Operationalization of measurements

There are two portions to the questionnaire: one covers demographics, and the other includes key queries involving consumer beliefs, attitudes, risks, and purchasing inclinations. Vietnamese is provided throughout the survey to make it accessible to responders. References from past successful studies are included in the researcher's survey. Each response is given a score on a seven-point Likert scale, with 1 signifying the strongest disagreement and 7 denoting the greatest level of agreement. The table below, which corresponds to Table 1, provides the components and measurement sources.

**Table 1**

Components and measurements

Constructs	Items	References
Perceived Reputation (PCR)	PR1. This m-commerce vendor is well-known.	(Doney & Cannon, 1997) (Shankar Ganesan, 2019)
	PR2. This m-commerce vendor has a positive market reputation.	
	PR3. This m-commerce vendor has a negative market reputation.	
	PR4. An m-commerce vendor's reputation is built on honesty.	
	PR5. An m-commerce vendor's reputation is built on fairness.	
	PR6. An m-commerce vendor's reputation is built on consumer needs.	

Perceived Size (PCS)	PS1. This m-commerce vendor is a huge corporation.	(Houghton et al., 2000)
	PS2. This m-commerce vendor is one of the industry's largest online suppliers.	
	PS3. This m-commerce vendor is a newcomer to the market.	
	PS4. This m-commerce vendor operates locally.	
	PS5. This m-commerce vendor operates globally.	
Multichannel Integration (MTI)	MI1. I can order online and pick up things at this m-commerce vendor's physical locations.	(Gulati & Garino, 2000)
	MI2. I can return the things I purchased online to any of this vendor's physical locations and receive a refund.	
	MI3. I can request after-sales services for any product I purchased online from this merchant.	
	MI4. I can request after-sales assistance online for any product I purchased from this merchant offline.	
	MI5. This m-commerce vendor's online and physical stores frequently have the same prices.	
	MI6. I can select whether to interact with this merchant offline or online (for example, browsing for and purchasing things).	
System Assurance (STA)	SA1. This m-commerce vendor's online transaction system is stable.	(Kini & Choobineh, 1998)
	SA2. This m-commerce vendor's online transaction system is reliable.	
	SA3. This m-commerce vendor's online transaction system is dependable.	
	SA4. This m-commerce vendor's online transaction system is secure.	
Consumer trust (CST)	CT1. This m-commerce vendor is trusthy.	(Doney & Cannon, 1997)
	CT2. Authentic data is provided by this online vendor.	
	CT3. M-commerce vendor honors its commitments and promises.	
	CT4. This m-commerce vendor looks out for my best interests.	



	CT5. The conduct of this m-commerce vendor is as I had anticipated.	(Macintosh & Lockshin, 1997)
Attitude (ATT)	ATT1. It's a pleasure to shop from this vendor via the Internet.	(Taylor & Todd, 1995)
	ATT2. It's a good idea to shop from this vendor via the Internet.	
	ATT3. It's appealed to shop from this vendor via the Internet.	
	ATT4. I appreciate the idea of shopping from this m-commerce vendor via the Internet..	
Willingess to Buy (WTB)	WTB1. I would visit this vendor's website again.	(Macintosh & Lockshin, 1997)
	WTB2. I would buy from this m-commerce vendor.	
	WTB3. In the next three months, I intend to make an online buy from this m-commerce vendor.	
	WTB4. In the coming year, I intend to make an online buy from this m-commerce vendor.	
	WTB5. I'm willing to purchase online goods or services from this vendor .	
	WTB6. I'd think about making a purchase from this m-commerce vendor.	

## 5. Results

### 5.1 Assessing the outer measurement model

The data's univariate normality was checked before the measurement model was put to the test. The values of skewness and kurtosis were all within the acceptable ranges of 2 and +2, and 7 and +7, respectively, demonstrating univariate normality (Hair et al., 2014). Following this, we used principal component analysis and exploratory factor analysis in SPSS.25 to look for signs of post-hoc CMB with the Harman one-factor test. Only 29.22% of the variance could be attributed to the single greatest factor, suggesting a likely absence of CMB in the data (L.-T. Nguyen, Nguyen, et al., 2022; L.-T. Nguyen, Duc, et al., 2023). The constructs' reliability, convergent validity, and discriminant validity were all evaluated using the measurement model. Good internal consistency and reliability of the items is demonstrated by Table 2's findings that all construct item loadings are more than 0.7, that Cronbach's alpha for each construct is better than 0.7, and that the composite reliability is greater than the 0.7 threshold (T. Q. Dang, Nguyen, et al., 2023; Leong et al., 2020; H.-B. Nguyen & Nguyen, 2021). Also, our measuring approach has sufficient convergent validity, as shown by the fact that the average variance extracted (AVE) from each construct is greater than 0.5 (Hair et al., 2011). The Fornell-Larcker value (the square root of AVE) and cross loadings are used to determine discriminant validity (D. T. V. Dang et al., 2022; Dao et al., 2023). Table 3 shows that for the Fornell-Larcker value, diagonal correlations between comparable latent

variables (in bold type along the diagonal) are greater than those between dissimilar latent variables. All indicators' outer loadings are higher than their cross loadings, as calculated by the cross-loading evaluation (Dang et al., 2023; Nguyen et al., 2023; Nguyen & Nguyen, 2017). Table 4 lays out the results of the cross-loadings analysis. There is evidence of discriminant validity in these two tests' results. When validity and reliability are established by a measurement model assessment, a structural model evaluation may be carried out.

Table 2

**Descriptive Statistics and Reliability Coefficients for Constructs**

	Loadings	Cronbach's alpha	Rho_a	Composite reliability	Average variance extracted (AVE)
ATT1	0.850	0.880	0.880	0.917	0.735
ATT2	0.840				
ATT3	0.868				
ATT4	0.871				
CST1	0.878	0.924	0.925	0.942	0.766
CST2	0.895				
CST3	0.889				
CST4	0.858				
CST5	0.856	0.892	0.897	0.917	0.649
MTI1	0.735				
MTI2	0.784				
MTI3	0.823				
MTI4	0.836				
MTI5	0.825				
MTI6	0.827				
PCR1	0.865	0.871	0.872	0.912	0.722
PCR2	0.864				
PCR3	0.861				
PCR4	0.806				
PCS1	0.892	0.738	0.738	0.884	0.792
PCS2	0.889				
STA1	0.870	0.861	0.865	0.905	0.705
STA2	0.827				
STA3	0.859				
STA4	0.802				
WTB1	0.840	0.923	0.924	0.942	0.765
WTB2	0.909				
WTB3	0.897				
WTB4	0.869				
WTB5	0.855				

Table 3

Fornell Larker Criterion

	ATT	CST	MTI	PCR	PCS	STA	WTB
ATT	0.857						
CST	0.833	0.875					
MTI	0.701	0.805	0.806				
PCR	0.706	0.710	0.711	0.850			
PCS	0.748	0.797	0.729	0.738	0.890		
STA	0.779	0.785	0.746	0.726	0.770	0.840	
WTB	0.837	0.840	0.722	0.684	0.786	0.792	0.874

**Table 4**

Cross loadings

	ATT	CST	MTI	PCR	PCS	STA	WTB
ATT1	<b>0.850</b>	0.726	0.594	0.594	0.694	0.661	0.711
ATT2	<b>0.840</b>	0.716	0.636	0.599	0.647	0.700	0.734
ATT3	<b>0.868</b>	0.678	0.535	0.586	0.605	0.617	0.683
ATT4	<b>0.871</b>	0.734	0.635	0.637	0.618	0.691	0.738
CST1	0.767	<b>0.878</b>	0.701	0.642	0.686	0.710	0.796
CST2	0.772	<b>0.895</b>	0.732	0.632	0.714	0.722	0.749
CST3	0.718	<b>0.889</b>	0.733	0.645	0.704	0.689	0.763
CST4	0.688	<b>0.858</b>	0.676	0.600	0.656	0.606	0.650
CST5	0.698	<b>0.856</b>	0.681	0.587	0.727	0.704	0.713
MTI1	0.465	0.541	<b>0.735</b>	0.589	0.528	0.589	0.550
MTI2	0.565	0.653	<b>0.784</b>	0.450	0.535	0.516	0.556
MTI3	0.488	0.592	<b>0.823</b>	0.470	0.555	0.528	0.476
MTI4	0.682	0.735	<b>0.836</b>	0.722	0.687	0.690	0.645
MTI5	0.524	0.651	<b>0.825</b>	0.503	0.521	0.545	0.571
MTI6	0.630	0.693	<b>0.827</b>	0.679	0.673	0.719	0.673
PCR1	0.570	0.632	0.586	<b>0.865</b>	0.654	0.600	0.587
PCR2	0.593	0.590	0.592	<b>0.864</b>	0.556	0.589	0.539
PCR3	0.615	0.600	0.634	<b>0.861</b>	0.668	0.616	0.622
PCR4	0.621	0.590	0.605	<b>0.806</b>	0.626	0.665	0.574
PCS1	0.679	0.714	0.644	0.676	<b>0.892</b>	0.681	0.698
PCS2	0.652	0.704	0.653	0.638	<b>0.889</b>	0.689	0.700
STA1	0.716	0.699	0.652	0.649	0.674	<b>0.870</b>	0.701
STA2	0.679	0.702	0.623	0.528	0.674	<b>0.827</b>	0.702
STA3	0.638	0.636	0.623	0.629	0.656	<b>0.859</b>	0.653
STA4	0.572	0.589	0.607	0.643	0.573	<b>0.802</b>	0.593
WTB1	0.713	0.733	0.646	0.629	0.727	0.695	<b>0.840</b>

WTB2	0.788	0.765	0.691	0.644	0.713	0.717	<b>0.909</b>
WTB3	0.727	0.730	0.627	0.570	0.677	0.689	<b>0.897</b>
WTB4	0.715	0.706	0.586	0.542	0.659	0.659	<b>0.869</b>
WTB5	0.711	0.738	0.604	0.601	0.658	0.701	<b>0.855</b>

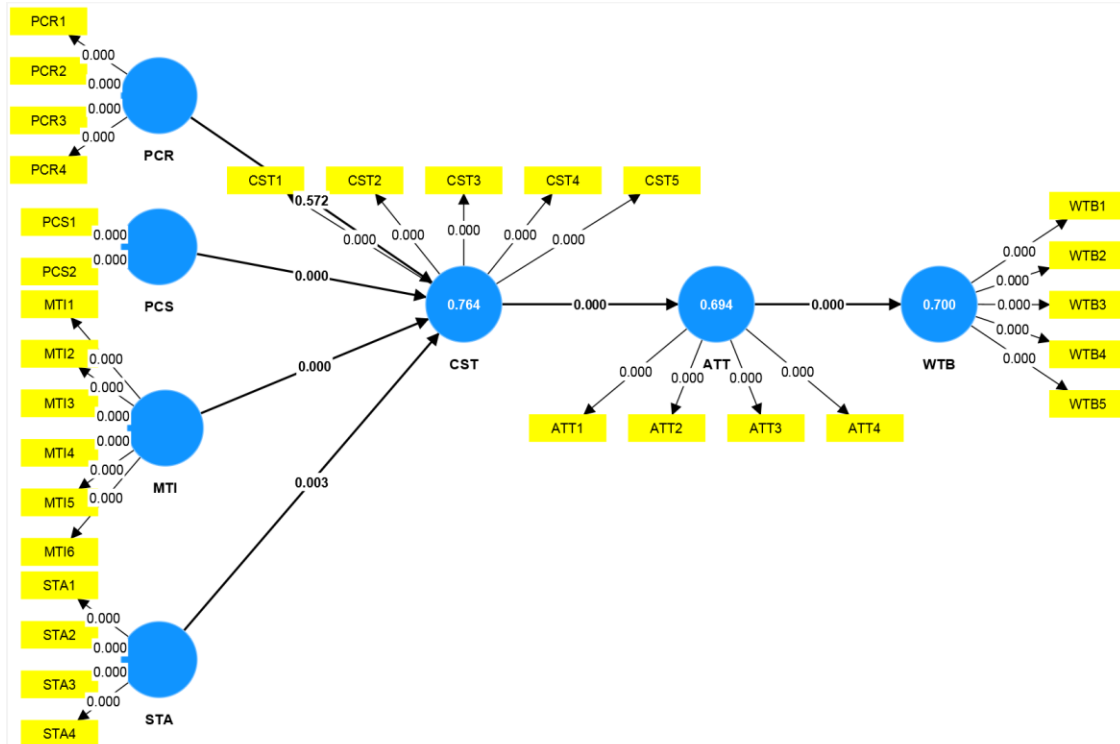
## 5.2 Assessing the structural model

Then, we looked at the structural model's route relationships and explanatory power to see how well they hold up under scrutiny. This study examined the structural model through the SmartPLS utilizing 5,000 introductory samples. The statistical significance of the parameter estimations was determined using the bootstrapping approach, allowing us to generate reliable standard errors or t-values (Monecke & Leisch, 2012; Nguyen, 2023; Tien et al., 2023). H1, H3 and H4 are both confirmed by the data in Fig. 2 and Table 5 which demonstrate that PCR, MTI, and STA are correlated with increased levels of customer trust. ( $\beta = 0.313$ ,  $p < 0.01$ ;  $\beta = 0.368$ ,  $p < 0.01$ ;  $\beta = 0.236$ ,  $p < 0.01$ ). H5 is supported by the fact that the consumer trust has substantial effects on users' attitude ( $\beta = 0.833$ ,  $p < 0.001$ ). The likelihood of making a willingness to buy increases with the degree to which the user's attitude toward m-commerce setting ( $\beta = 0.483$ ,  $p < 0.001$ ;  $\beta = 0.226$ ,  $p < 0.001$ ). That's why H6 is supported as well. Only H2 had non-significant beneficial effects on consumer trust ( $\beta = 0.046$ ,  $p > 0.01$ ).

**Table 5**

Path coefficient results

		Original sample (O)	Sample mean (M)	T statistics ( O/STDEV )	P values	Results
H1	PCR -> CST	0.313	0.304	3.744	0.0000	Supported
H2	PCS -> CST	0.046	0.047	0.565	0.5720	Not Supported
H3	MTI -> CST	0.368	0.369	3.916	0.0000	Supported
H4	STA -> CST	0.236	0.245	2.989	0.0030	Supported
H5	CST -> ATT	0.833	0.833	30.811	0.0000	Supported
H6	ATT -> WTB	0.837	0.839	32.277	0.0000	Supported



**Fig. 2.** Structural Model Evaluation

An examination of the study model's explanatory power reveals that our formulation accounts for 69.4% of the variance in attitude, 76.4% of the variance in consumer trust, and 70.0% of the variance in how much people willingness to buy through m-commerce. In addition, a small standard error of the mean relative error (SRMR = 0.052) indicates a very good level of model fit. Our findings show that the suggested model has strong explanatory power since the exogenous variables can account for a sizable amount of the endogenous variable's variance (T. Q. Dang, Tan, et al., 2023; J.F. Hair et al., 2016; L.-T. Nguyen, Nguyen, et al., 2023).

**Table 6**

R-square

	R-square	R-square adjusted
ATT	0.694	0.693
CST	0.764	0.759
WTB	0.700	0.699

### 5.3 Neural network analysis

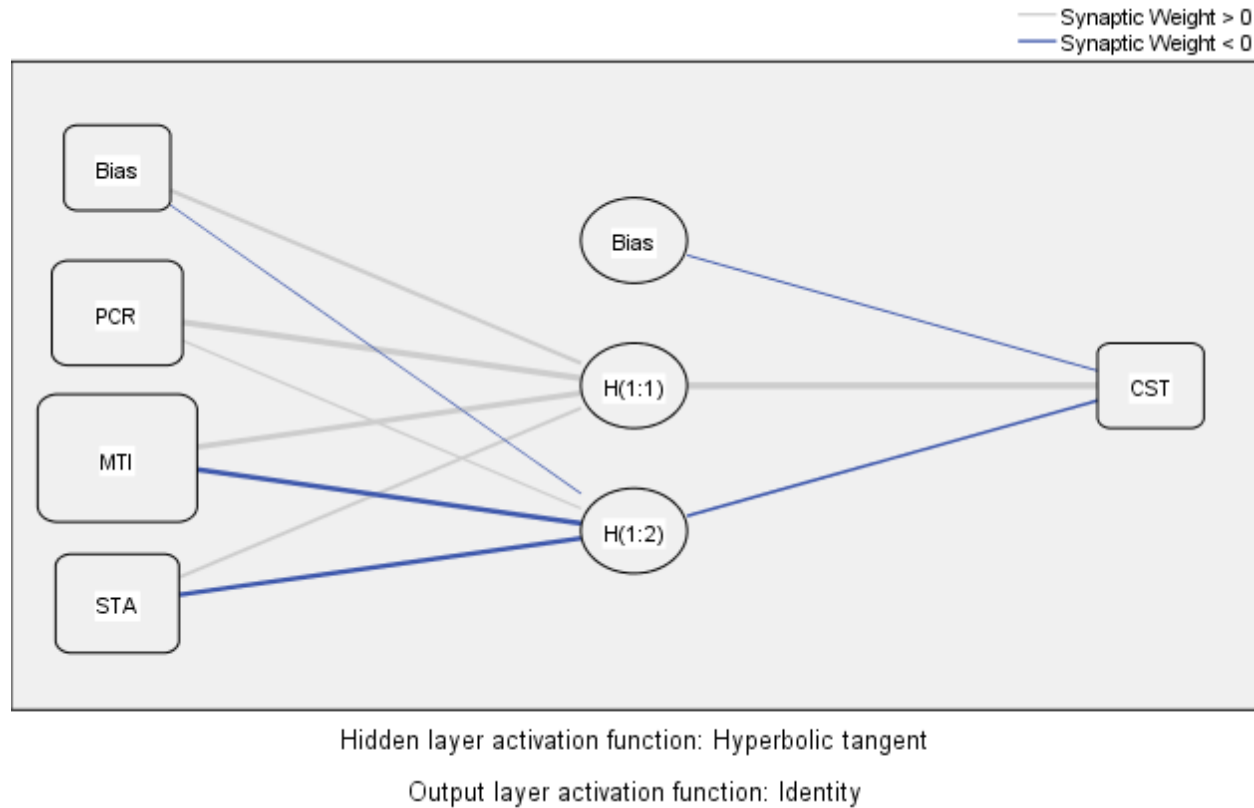
Hypothesis testing with PLS-SEM enabled the integration of SEM and ANN in the analysis of the neural network. Sigmoid functions were utilized for both the activation and result layers. Errors can be decreased and prediction accuracy can be increased through the numerous stages of the learning procedure.

We allocated 90% of the samples to be utilized in training activities, while the remaining 10% were used for testing. The ANN model's accuracy as a predictor was evaluated using the RMSE, or root-mean-squared-error (Leong et al., 2020; Nguyen et al., 2022). The learning process

contains multiple steps that can be used to refine the model and increase the reliability of predictions. We allocated 90% of the samples to be utilized in training activities, while the remaining 10% were used for testing. Predictive accuracy of the ANN model was evaluated using the mean root square of the error RMSE (Leong et al., 2020).

The values for the study variables fluctuate marginally between the training and testing phases. The RMSE values for both training and testing are 0.531 and 0.532 in table 7. Simultaneously, the sensitivity analysis is an evaluation of how each predictor affects trust in m-commerce shown in table 8. The weighted average of the relative importance of each implanted neuron was then divided by that of the most important neuron to determine the final weighted average. The findings show that MTI, PCR and STA are the most important predictors of customer trust with 100%, 73%, and 66% normalized relative importance, respectively in m-commerce.

Path Coefficient and Normalized Relative Importance are used to determine the order of importance in PLS-SEM and ANN, respectively. These findings also confirmed MTI ranks first in both ANN and PLS-SEM when considering the magnitude of its impact. This also represent the capable of modeling both linear and non-linear associations between variables (Lee et al., 2020), hence the employment of a two-stage analysis approach (PLS-ANN) in this investigation is highly warranted.



**Fig.3.** ANN networks result

**Table 7**

RMSE values of ANN

Input: PCR, MTI, STA

Output: CST

Neural Network	TRAINING			TESTING			TOTAL
	N	SSE	RMSE	N	SSE	RMSE	
1	180	300.263	0.515	20	36.105	0.550	200
2	184	286.236	0.535	16	28.472	0.543	200
3	178	334.264	0.556	22	42.539	0.536	200
4	177	315.150	0.558	23	38.420	0.535	200
5	179	325.472	0.543	21	26.082	0.533	200
6	180	335.092	0.515	20	33.625	0.500	200
7	179	309.710	0.517	21	43.894	0.510	200
8	182	318.696	0.522	18	38.518	0.522	200
9	175	293.399	0.514	25	44.317	0.560	200
10	181	321.391	0.537	19	34.027	0.526	200
Means		313.967	0.531		36.600	0.532	
SD		16.558	0.017		6.213	0.018	

**Table 8**

Sensitivity analyses: normalized importance of constructs for ANN model

Neural Network	PCR	MTI	STA
1	0.256	0.342	0.402
2	0.336	0.312	0.352
3	0.287	0.333	0.380
4	0.348	0.372	0.280
5	0.281	0.441	0.278
6	0.225	0.376	0.399
7	0.312	0.328	0.360
8	0.299	0.372	0.329
9	0.265	0.381	0.354
10	0.270	0.356	0.374
Means	0.306	0.418	0.276
Normalized Importance	73.00%	100.00%	66.00%

## 6. Discussion

Overall, the findings corroborate the hypothesized model of consumers' trust in online mobile businesses. As anticipated, it is discovered that factors such as PCR, MTI and STA of m-commerce vendors play a role in determining consumer trust in online mobile merchants. Primarily, the findings that all measures of PCR except for PCS had strong positive correlations with consumer trust are in line with previous research on this topic (Jarvenpaa et al., 2000). This has shown that both businesses and consumers lose faith in each other if no assurances are given that the things being produced are of a certain quality. Due to the prevalence of the internet and

readily available information, consumers are increasingly wary of doing business with companies that have a history of unethical practices, particularly those that have been publicly exposed.

Unsurprisingly, multi-channel integration (MTI) is linked to customer trust, which is completely different from (Teo & Liu, 2007). Perceived size and multichannel integration are closely related premise. It means that the more money a corporation is ready to spend on electronics, the bigger it is. To cut expenses and make it simple for customers to access, they chose to establish just one channel that merges many different channels rather than several channels to engage with customers. It is important to mention that because of the sudden outbreak of the Covid-19 pandemic and regulations on social distancing, companies are increasingly realizing the importance of integrating similar channels. Consumers are increasingly understanding the concept of this special service, so they can easily interact with their customers through the integrated online channel. This is not only beneficial for the company but also for society and the health of consumers.

The findings show that of all the antecedents of trust, system assurance has the greatest impact on consumer trust. This indicates that building and sustaining consumers' faith in Internet sellers depends critically on the dependability and security of an m-commerce vendor's online transaction system. Online shoppers' top worries when making purchases are security and privacy.

There are positive correlations between consumer attitudes and readiness to buy from a vendor as well as between consumer attitudes and trust in the seller. The perceived risk of making an online purchase is reduced by consumer trust, however the perceived risk is adversely correlated with consumers' attitudes and readiness to make a purchase. The study's findings, which show that confidence in an m-commerce seller is considerably positively correlated with attitudes toward the vendor and that good attitudes are positively correlated with customers' propensity to buy.

## **7. Conclusion and Future research**

This study contribute to the literature by providing valuable insights about trustee characteristics (i.e., an m-commerce vendor's perceived reputation and system assurance) are important determinants of consumer trust (Mayer et al., 1995). This study empirically examines vendor and consumer attributes in an m-commerce application. The system assurance of a m-commerce provider has a greater impact on customer trust than other factors, the study has found. We also propose the little-known concept of multi-channel integration as a characteristic of m-commerce firms in the study model. Our research demonstrates that consumers will have a lot of faith in an online retailer if their communication channels are integrated into a variety of ways, contrary to previous studies that did not find a positive correlation between omni channel integration and consumer trust. Second, system assurance is a special aspect of online mobile commerce that has been shown to have a significant impact on consumers' trust in a variety of national contexts. Online retailers might have to stress the security and dependability of their online transaction systems. Additionally, through publicity and advertising, they may improve their perceived reputation. The information that reflects the company's positive reputation, the steps taken to safeguard consumers' privacy, and the security offered while making purchases online should all be emphasized in the design of the websites. Finally, sellers must employ a variety of trust-building techniques to entice customers to complete transactions online. Vendors should, for instance, offer fast delivery, better after-sales support, and more precise product information.

Though our empirical findings do not back the link between a vendor's perceived size and consumer trust, further research may be needed to investigate the underlying reasons. This study's conclusions, for instance, that there is no correlation between consumers' perception of a company's size and their trust in that company, run counter to those of more conventional studies



of trust and marketing. Is the effect of a company's perceived size on customer trust just noticeable in large, well-known brands? What other factors, if any, mitigate the effect of a seller's perceived reputation on trust in their online store? Not only does this study not find the hypothesized relationship between consumer perceptions of a company's reputation and their propensity to make a purchase, but it's also not apparent whether or not this idea has any appreciable impact on trust in countries outside of the United States. The claim made by (P. M. Doney et al., 1998) is that trust is rooted in a country's unique cultural norms, hence this suggestion challenges that view. The data allows for the identification of cross-national associations between consumer assurance and future spending. All of these previous studies focused on one nation's culture; but, if researchers shift their attention to a country whose citizens draw from a variety of traditions, they would find quite different outcomes.

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