

How vividness and review quality influence purchase intention in mobile shopping

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ABSTRACT

This study investigates the effects of vividness (a web/app stimulus) and review quality (a situational stimulus) on consumers' risk perception and purchase intention in Vietnamese mobile shopping. In doing so, we analyzed quantitative research involving 400 respondents using Structural Equation Modeling (SEM). The findings show that a compelling and sociable experience has a significant effect on mitigating consumers' perceived risk while increasing their purchase intention. Creating the experience involves utilizing vivid features and high-quality online reviews from previous consumers. These results enrich the existing literature by supporting the use of the SOR model and introducing presence as a stimulus to explain consumers' risk perceptions and purchase behaviors. Furthermore, the study provides valuable guidance in app design that can stimulate purchases while lowering online perceived risk.

1. Introduction

In recent years, mobile commerce has been emerging and has grown tremendously. According to National Institute for Finance (NIF, 2018), Vietnam exhibits the fastest-growing mobile commerce market in Southeast Asia, with a growth rate of 26%. The revenue of the Vietnamese mobile commerce market is expected to reach \$10.2 billion by 2023 (Phi Nhat, 2021). The report of the Vietnam e-commerce association shows that 22% of investigated businesses have provided Vietnamese e-consumers with mobile-web versions to acquire more potential customers in 2023. However, the average time consumers spend browsing mobile apps is very low (mostly 05 - 10 minutes) (Vietnam E-Commerce Association [VECOM], 2023). According to Nguyen et al. (2018), perceived risk is considered a barrier to adopting mobile shopping in Vietnam. Therefore, inquiring about consumers' risk perceptions and behaviors to promote the attraction of mobile shopping apps is meaningful for researchers and practitioners.

Current research on perceived risk and purchase intention has mainly adopted the Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB), such as studies by Pham et al. (2022), Vo et al. (2022). Limited studies apply the Stimulus-Organism-Response (SOR) theoretical model to explain Vietnamese risk perception and behavior. The SOR paradigm was adopted in this study for two reasons. First, the SOR framework is a significant theoretical approach that improves descriptive analysis and offers a critical viewpoint for understanding individual behavior (Zhu et al., 2020). Second, it enables an understanding of consumers' risk perception and purchase intention through various path-dependent mechanisms. Furthermore, most current studies show that consumers' perceived risk and purchase intention in online shopping is affected by factors such as marketing factors (He et al., 2022), internal psychographic factors (Nilashi et al., 2022), and website factors based on consumers' evaluations and perceptions (Pham et al., 2022). The aspects of situation factors and web/app factors based

on network interface features have not been frequently investigated. Therefore, this study aims to address the following research questions:

RQ1. Does vividness (a web/app stimulus) impact consumers' risk perception and purchase intention in Vietnamese mobile shopping?

RQ2. Does review quality (a situational stimulus) impact consumers' risk perception and purchase intention in Vietnamese mobile shopping?

This study focuses on two major issues. First, it emphasizes the significant impact of perceived risk on consumers' purchase intention in Vietnam's mobile shopping. Second, it investigates the effects of web/app stimulus and situational stimulus in terms of telepresence (vividness) and social presence (review quality) on consumers' risk perceptions (organism) and behaviors (response). The study is meaningful for e-businesses in their attempts to retain and acquire consumers by incorporating effective social interaction tools and relevant IT software into their platforms.

2. Theoretical basis and research model

2.1. The Stimuli-Organism-Response (SOR) model

The SOR model shows that environmental cues (stimulus) may set off an individual's internal evaluation state (organism), which in turn can lead to responses (Mehrabian & Russell, 1980). Kimiagari et al. (2021) classify stimulus factors into external and internal stimuli. External stimuli include factors beyond the customer's control, such as the product, sellers, society, and website features. In contrast, internal stimuli (i.e., consumer characteristics) are those within the individual's control. In the extant literature, the SOR model has been applied to understand consumers' risk perceptions and purchase intentions. For instance, Chang et al. (2019) found that the quality of a branded website mitigates consumers' perceived risks while improving consumers' purchase intentions. According to He et al. (2022), product authenticity diminishes consumers' risk perception while increasing their purchase intention. The research by Kim and Lennon (2013) reveals two types of stimuli influencing consumers' perceived risk, including website quality and the reputation of the brand. However, prior studies have mainly focused on investigating stimuli associated with products, sellers, and website quality. The aspects of web/app functionality and society have not been examined frequently.

2.2. Risk perception in mobile shopping

Perceived risk is generally defined as the potential loss perceived by a consumer when purchasing products online (Ariffin et al., 2018). Most scholars measure overall perceived risk without specifying risk types (Nilashi et al., 2022). By contrast, other scholars agree that perceived risk derives from potential sources (Ariffin et al., 2018). Researchers and practitioners have preferred the multidimensional approach to perceived risk, as it might be useful in developing related IT tools (Glover & Benbasat, 2010).

At present, IT development has provided online consumers with many tools to lower specific types of perceived risk. For instance, the integration of mobile banking, mobile payment, and mobile shopping provides consumers with a seamless shopping experience and lowers their concerns about financial, performance, and time risk (American Society for Engineering Education [ASEE], 2022). Mobile shopping's security feature reduces consumers' perceived risk of security and privacy (Bashir et al., 2021). However, scholars also reveal that several aspects of perceived risk are still a concern in mobile commerce. From the principal-agent perspective, the potential fraud risk in mobile shopping may arise from the skepticism of online shoppers

regarding the possibility of a seller's unreliability (Pavlou et al., 2007). Chang et al. (2016) highlight that product risk stands out as a crucial element of perceived risk, involving potential losses when goods underperform. Furthermore, the delivery and logistics issues of the purchased products increase consumers' perceived risk. Ariffin et al. (2018) conceive of delivery risk as the possibility of not receiving the product on time or experiencing a long shipping time. Therefore, the current study mainly focuses on three prevalent dimensions of perceived risk, including fraud risk, product risk, and delivery risk in mobile e-commerce.

2.3. Telepresence and social presence theories

Prior scholars have introduced several definitions of the concept of "presence", emphasizing the perceptual illusion of non-mediation in the virtual environment (Lombard & Ditton, 1997). Previous studies have differentiated between two categories of presence, including telepresence and social presence. According to Steuer (1995), telepresence refers to the experience of being physically present in a specific location. Whereas social presence refers to the subjective perception of the presence of people inside a certain medium (Short et al., 1976). Telepresence and social presence play important roles in the online shopping environment, which lacks physical interaction between consumers and merchants (Kim et al., 2021).

Steuer (1995) shows that vividness is one of two necessary dimensions to evoke a sense of telepresence. It refers to the degree of representational richness. Researchers model vividness as a construct with two dimensions: sensory breadth and sensory depth. However, current mobile shopping is still limited in the use of multiple sensory channels, as e-consumers prefer to develop a holistic perception (Kim et al., 2021). By contrast, the social presence theory indicates three essential dimensions, including the interactions between consumers and consumers, between consumers and merchants, and between consumers and commodities (Jiang et al., 2019). According to Godes et al. (2005), the interaction among consumers significantly impacts individuals' purchasing behavior. Through these interactions, consumers gain knowledge, make informed decisions, and reduce their perceived risk when making purchases (Lee & Bell, 2013). Online consumer interactions involve opinion-based and behavior-based interactions, in which online reviews are considered an aspect of opinion-based social interaction.

2.4. Perceived risk and purchase intention

The cognitive state is an important aspect of an organism. It refers to concerns surrounding shoppers' interpretation of online information and the subsequent thoughts and beliefs regarding the product or service (Hajiheydari et al., 2017). Therefore, perceived risk can be one of the cognitive responses of customers (organisms) during online shopping. In this study, purchase intention is the cited response variable. Purchase intention is perceived as the willingness to engage in a purchase transaction (Hansen et al., 2018). Perceived risk negatively affects purchase intention (He et al., 2022). According to Tran and Nguyen (2022), fraud risk raises consumers' worries about online vendors' dependability and reliability. Accordingly, the higher the fraud risk that consumers perceive, the lower their intent to buy. Additionally, consumers' perception that a purchased product may not perform as expected can also lower their intention to buy (Bashir et al., 2021). According to Aminu et al. (2019), products purchased online can be lost, damaged, or even shipped to the wrong location after being bought. Consequently, the higher delivery risk also shrinks consumers' purchase intentions (Ashoer, 2016). The study postulates that:

H1a: Fraud risk negatively relates to purchase intention

H1b: Product risk negatively relates to purchase intention

H1c: Delivery risk negatively relates to purchase intention

2.5. Vividness, perceived risk, and purchase intention

In this study, vividness is considered a stimulus associated with shopping apps' interface features. Steuer (1995) defines vividness as the level of representational richness within a mediated context. Vividness in online shopping closely links to the quality of product display. A more comprehensive depiction of items characterized by enhanced picture quality results in an elevated degree of visual intensity (Yim et al., 2017). Prior research showed that the quality of a website's visualization decreases consumers' perceived risk while increasing their trust in the website (McKechnie & Nath, 2016). Further, David et al. (2021) also reveal that the ability of the app to produce realistic product presentations enhances consumers' purchase intentions. Patel et al. (2020) indicate that interface quality can positively influence consumers' purchase intentions, and lower their perceived risk. This study postulates that:

H2a: Vividness negatively relates to fraud risk

H2b: Vividness negatively relates to product risk

H2c: Vividness negatively relates to delivery risk

H4: Vividness positively relates to purchase intention

2.6. Review quality, perceived risk, and purchase intention

Situational stimuli are associated with the society or environment that consumers live in. Therefore, a situational stimulus may increase or decrease consumers' perceived risk and purchase intention (Kimiagari et al., 2021). Review quality is defined as the extent to which consumers find that online reviews accurately reflect users' experiences with products (Zhang et al., 2014). High-quality reviews may influence customers' purchasing decisions, as consumers are more likely to trust reviews from reliable sources (Wang & Chang, 2013). Scholars suggest that e-consumers prefer to acquire product reviews from other consumers to evaluate product quality, decrease risk, feel safe about the website (Xu et al., 2020), and motivate themselves to purchase products online (Zhang et al., 2014). Therefore, this current study investigates review quality as a situational stimulus. The authors propose the following hypotheses:

H3a: Review quality negatively relates to fraud risk

H3b: Review quality negatively relates to product risk

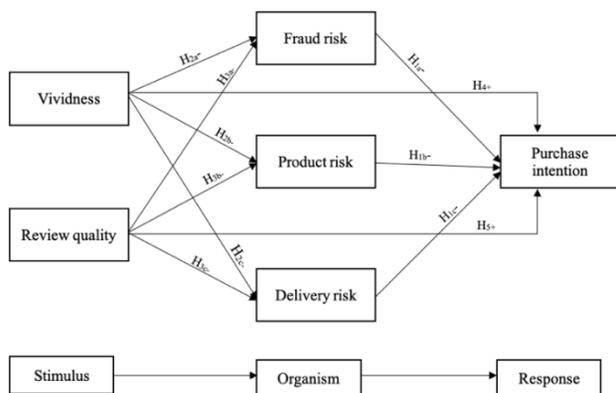
H3c: Review quality negatively relates to delivery risk

H5: Review quality positively relates to purchase intention

The research model is presented in Figure 1.

Figure 1

Conceptual Model



Note. Author's contribution

3. Methodology

The study follows a quantitative approach and applies online survey research techniques for data collection. Accordingly, Vietnam has been selected as the research site due to the significant growth of Vietnamese mobile shopping nowadays. The authors also employ a cross-sectional survey to assess the associations between variables. The survey contains 02 sections. Section 1 collects the demographic information of respondents. Section 2 requires participants to indicate their agreement or disagreement with each statement on a 5-point Likert scale ranging from 1 “strongly disagree” to 5 “strongly agree” (Table 1).

Table 1

Variables and Items

Variables and Items	Sources
Fraud risk <ul style="list-style-type: none"> • Information about products that sellers post on the shopping app may not be true. • It may be difficult to get support from sellers on the shopping app when the product fails. • I may not find a place to settle disputes with sellers on the shopping app. • The sellers on the shopping app may disappear after a short time. • Sellers on the shopping app may fail to keep the promise of post-services. 	Naiyi (2004)
Product risk <ul style="list-style-type: none"> • The quality of the product may not be accepted. • The product performance may not be consistent with the expectation. • The product may be false and the quality will be poor. • It is difficult to return when the product is not satisfied. 	Naiyi (2004)
Delivery risk <ul style="list-style-type: none"> • The delivered product may be lost. • The product may be delivered to the wrong place. • The product may be damaged during the delivery. 	Naiyi (2004)
Vividness <ul style="list-style-type: none"> • Vivid - vague • Clear - unclear • Indistinct - Distinct • Sharp - dull • Intense - Weak • Lifelike - Lifeless • Well-defined - Fuzzy 	Kim et al. (2021)

Variables and Items	Sources
<p>Review quality</p> <ul style="list-style-type: none"> • The reviews contain product information listed in a feature-wise manner. • The reviews contain a comparison of the product’s characteristics with those of other similar products (of the same brand or a different brand). • The reviews are understandable and contain fewer grammar mistakes. • The reviews contain timely information. 	<p>Kashyap et al. (2023); Park et al. (2007)</p>
<p>Purchase intention</p> <ul style="list-style-type: none"> • I am likely to purchase the products(s) on the shopping app. • I am likely to recommend this shopping app to my friends. • I am likely to make another purchase from the shopping app next time. 	<p>Zhang et al. (2012)</p>

Note. Author’s contribution

The target population is adult online shoppers in Vietnam, as 43% of all online shoppers in Vietnam make their purchases via smartphones (Statista, 2022). The respondents’ selection criteria include (1) they must be Vietnamese adults, and (2) they are familiar with mobile shopping apps in Vietnam, such as Tiki, Shopee, and Lazada. To conduct a probability sampling, the authors need to obtain permission to access the list of Vietnamese online shoppers. However, this target population is hidden and hard to reach. Consequently, a purposive sampling technique is applied as an alternative.

The study applied the variance-based SEM (PLS-SEM) technique to analyze the primary data. This is one of the most widely used techniques in Structural Equation Modeling (SEM). This application is based on the following reasons: First, PLS-SEM supports achieving a high level of statistical power even with small sample sizes. Second, it can also handle non-normally distributed data. It is essential, as the data collected for this study are not normally distributed. Third, PLS-SEM can work with a complex model, including formative and reflective constructs simultaneously (Afthanorhan et al., 2020).

According to Etikan (2019), the sample size does not change much for a population larger than 20,000. Consequently, a minimum sample size of 385 was necessary for this study. Further, the authors also applied an A-priori Sample Size Calculator for SEM to calculate the minimum sample size needed to detect an effect. Accordingly, a minimum sample size of 161 is recommended to run the SEM. The primary data collection occurred over four months. In all, 1,000 respondents were invited to participate in the survey. Out of this, 400 valid responses were selected for the analysis. The response rate is 40%.

4. Data analysis

4.1. Descriptive analysis

Table 2 indicates that the sample consisted of 50% males and 50% females. Regarding age distribution, the sample involves 03 groups, including 18 - 25, 26 - 35, and +36. These age groups are appropriate for this study’s purpose, as most Vietnamese people prefer mobile shopping to other channels due to its convenience. Furthermore, the student ratio was 37.5%, while the full-time employment ratio was 62.5%. This is significant because most Vietnamese people over the age of 22 are employed full-time. Additionally, this is the target of the study

because their financial independence situation may encourage people to purchase online. Regarding expenditure for online shopping, approximately 40.50% of the total sample spends under 02 million VND per month on online shopping. Meanwhile, 32% spend 02 - 05 million VND per month, and 27.5% spend over 05 million VND for online shopping monthly. It is also significant because Vietnamese consumers spend an average of 02 - 06 million VND on online shopping (Statista, 2022).

Table 2*Demographic Characteristics*

Sample		Actual (No)	(%)
	Size	400	100.00%
Gender	Male	200	50.00%
	Female	200	50.00%
Age	18 - 25	134	33.50%
	26 - 35	156	39.00%
	Above 36	110	27.50%
Employment status	Student	150	37.50%
	Full-time employment	250	62.50%
Monthly expenditure on online shopping	< 02M	162	40.50%
	02 - 05M	128	32.00%
	> 05M	110	27.50%

Note. Author's contribution

4.2. Measurement model analysis

The model's Goodness of Fit (GoF) is assessed based on the Standardized Root Mean squared Residual (SRMR) and the Unweighted Least Squares discrepancy (d_{ULS}). Accordingly, the GoF of the saturated model is achieved ($d_{ULS} = 0.2037$, $p > 0.01$). SRMR is 0.0272, below the recommended threshold of 0.08 (Hu & Bentler, 1999). The estimated model also achieves a good model fit ($d_{ULS} = 0.2772$, $p > 0.01$; SRMR = 0.0317). Therefore, the study concludes that at the 1% level, there is no significant amount of misfit, and thus no reason to reject the model.

A Confirmatory Composite and Factor Analysis (CCFA) assesses the measurement model of the study. The results show that all indicator loadings are higher than 0.7; Dijkstra-Henseler's rho (ρ_A) and Cronbach's Alpha (α) also exceed 0.7 for all reflective constructs. The weights of the formative construct (review quality) are significantly different from 0 on a 1% significance level (Hair et al., 2019). Therefore, the results conclude that the indicators and constructs in the measurement model are reliable. The AVEs measuring uni-dimensionality are greater than 0.5 for all reflective constructs, thus indicating acceptable convergent validity. This implies that the authors succeeded in extracting a dominant factor out of a set of indicators (Henseler, 2021). The Variance Inflation Factor (VIF) values for all indicators are also below the threshold of 03 to guarantee the collinearity problem of the model (Table 3). The results imply that multicollinearity fails to influence the indicator's validity. Further, the authors also assessed the T-values of each construct. The T-values are high, indicating strong associations between items and their constructs.

Table 3

Results for the Assessment of Measurement Model

Construct	Items	Types	Loadings/ Weights	Cronbach's Alpha	rho A	AVE	VIF	(Loadings/ Weights) T-Values
Vividness		Reflective		0.8781	0.8811	0.6438		
	VV1		0.8298				2.2551	25.0273
	VV2		0.7559				2.0858	19.592
	VV4		0.8621				2.354	26.7071
	VV7		0.7563				2.2769	20.9479
Review quality		Formative		NA	NA	NA		
	RQ1		0.286				2.4565	24.5334
	RQ2		0.2874				2.5953	28.3206
	RQ3		0.2748				2.803	26.6287
	RQ4		0.2893				2.9215	33.2037
Fraud risk		Reflective		0.889	0.892	0.6176		
	Fraud risk 1		0.8396				2.553	30.6254
	Fraud risk 2		0.7223				1.7962	21.3999
	Fraud risk 3		0.807				2.3381	30.3687
	Fraud risk 4		0.7379				2.2539	23.9251
	Fraud risk 5		0.816				2.1913	31.7892
Delivery risk		Reflective		0.8839	0.8886	0.7199		
	Delivery risk 1		0.8758				2.5455	29.6467
	Delivery risk 2		0.778				2.2747	23.148
	Delivery risk 3		0.8874				2.8419	32.6909
Product risk		Reflective		0.8798	0.8809	0.6478		
	Product risk 1		0.8096				2.3462	21.2918
	Product risk 2		0.7847				1.9249	22.2432
	Product risk 3		0.8375				2.6401	26.0776
	Product risk 4		0.7866				2.1726	24.4028
Purchase intention		Reflective		0.8859	0.8876	0.7224		
	PI1		0.8715				2.7615	35.3721
	PI2		0.8665				2.6525	34.0998
	PI3		0.8105				2.2957	29.1232

Note. Author's contribution

To assess discriminant validity, the authors apply the Fornell-Larcker criterion and the Heterotrait-monotrait ratio of correlation (HTMT) (Fornell & Larcker, 1981; Henseler, 2021). According to the Fornell-Larcker criterion, the AVE for a construct should be greater than its squared correlation with all other constructs to achieve discriminant validity (Table 4). Regarding HTMT, all values are smaller than 0.85 and statistically significantly smaller than 1 using the 95% percentile bootstrap confidence intervals (Table 5). Therefore, the study concludes that discriminant validity is achieved, indicating the meaningfulness of the conceptual model.

Table 4*Fornell-Larcker Criterion*

Construct	Delivery risk	Purchase intention	Product risk	Vividness	Review quality	Fraud risk
Delivery risk	0.7199					
Purchase intention	0.3622	0.7224				
Product risk	0.4157	0.3812	0.6478			
Vividness	0.2746	0.3367	0.2299	0.6438		
Review quality	0.2396	0.3386	0.2058	0.2243		
Fraud risk	0.428	0.4801	0.3742	0.4295	0.4133	0.6176

Squared correlations; AVE in the diagonal

Note. Author's contribution

Table 5*Heterotrait-Monotrait Ratio of Correlations (HTMT)*

Construct	Delivery risk	Purchase intention	Product risk	Vividness	Fraud risk
Delivery risk					
Purchase intention	0.6015				
Product risk	0.6439	0.618			
Vividness	0.5241	0.5795	0.479		
Fraud risk	0.6571	0.6931	0.6141	0.6553	

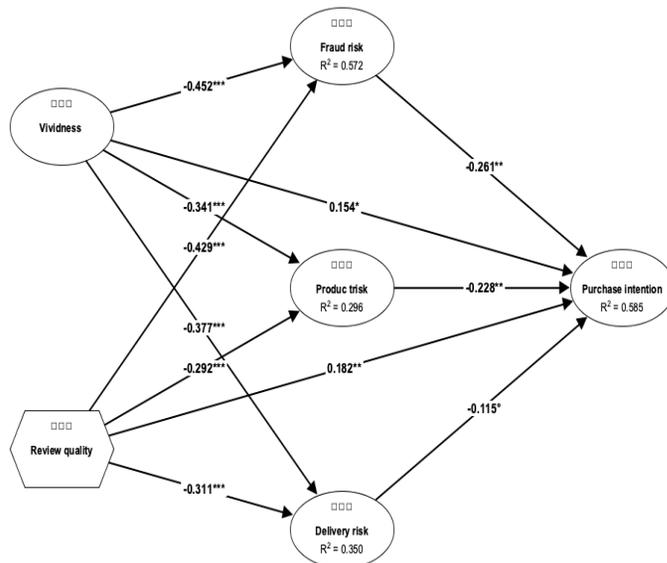
Note. Author's contribution

4.3. Structural model analysis

The structural model assesses the relationships between different constructs. Figure 2 shows the R-squared of the study. The R^2 quantifies the proportion of variance of a dependent construct that its predictors explain (Henseler, 2021). Accordingly, R^2 ranges from 0 to 1, with higher values indicating a greater explanatory power (Hair et al., 2019). The results of the study show that the explanatory powers of endogenous constructs (i.e., Fraud risk, Product risk, Delivery risk, and Purchase intention) in the research model are 57.2%, 29.6%, 35%, and 58.5%, respectively.

Figure 2

Graphical Representation of the Research Model



Note. Author's contribution

Table 6 presents the results of the structural model. Regarding the O-R pattern, the results show negative and significant effects of fraud risk and product risk on purchase intention ($\beta = -0.2607$, $p < 0.01$; $\beta = -0.2276$, $p < 0.01$, respectively). Therefore, the study supports hypotheses H1a-b. However, the effect sizes of product risk and fraud risk are weak ($0.02 < f^2 = 0.0647$ and 0.0565 , respectively < 0.15). Delivery risk is found to insignificantly affect purchase intention ($\beta = -0.1147$, $p > 0.05$). Consequently, the study fails to support hypothesis H1c.

Regarding the S-O pattern, the research shows that the vividness negatively influences fraud risk, product risk, and delivery risk ($\beta = -0.4523$, $p < 0.01$; $\beta = -0.3412$, $p < 0.01$; $\beta = -0.3767$, $p < 0.01$ respectively). Therefore, hypotheses H2a-b-c are also supported. The effect sizes of these relationships also range from medium to strong ($f^2 > 0.15$) (Cohen, 1988). Notably, the effect size of vividness on fraud risk is the strongest ($f^2 = 0.3708$) compared to other outcome variables. Further, the study indicates that review quality also negatively influences consumers' fraud risk, product risk, and delivery risk ($\beta = -0.4287$, $p < 0.01$; $\beta = -0.2920$, $p < 0.01$; $\beta = -0.3111$, $p < 0.01$, respectively). Therefore, hypotheses H3a-b-c are also supported. Significantly, the effect size of review quality on fraud risk is also the strongest ($f^2 = 0.333$) compared to other outcome variables.

Regarding the S-R pattern, the results show that review quality and vividness positively affect purchase intention in mobile shopping ($\beta = 0.1820$, $p < 0.01$; $\beta = 0.1540$, $p < 0.01$, respectively). As a result, hypotheses H4 and H5 are supported. However, the f^2 values < 0.15 indicate weak effect sizes.

The S-O-R pattern is assessed through mediating effects. Accordingly, fraud risk and product risk mediate the relationships between vividness and purchase intention ($\beta = 0.1179$, $p < 0.01$; $\beta = 0.0777$, $p < 0.01$, respectively). Fraud risk and product risk also mediate the relationship between review quality and purchase intention ($\beta = 0.1117$, $p < 0.01$; $\beta = 0.0665$, $p < 0.01$, respectively). This implies that environmental stimuli are able to stimulate consumers' risk perception, which in turn affects their behavior. However, delivery risk fails to work as a mediator in these relationships.

Table 6*Results of the Structural Model*

	Hypothesis	Direct/ Indirect Effect	T- value	P-value (2-sided)	95% Confidence Interval (Percentile Bootstrap)	Effect size (f²)	Supported
H1a	Fraud risk -> Purchase intention	-0.2607	-2.7915	0.0053	[-0.4851, 0.0050]	0.0565	YES
H1b	Product risk -> Purchase intention	-0.2276	-3.2278	0.0013	[-0.4108, -0.0382]	0.0647	YES
H1c	Delivery risk -> Purchase intention	-0.1147	-1.8295	0.0676	[-0.276, 0.0773]	0.0148	NO
H2a	Vividness -> Fraud risk	-0.4523	-9.5879	0.0000	[-0.5811, -0.3124]	0.3708	YES
H2b	Vividness -> Product risk	-0.3412	-5.8504	0.0000	[-0.4958, -0.1889]	0.1283	YES
H2c	Vividness -> Delivery risk	-0.3767	-6.3737	0.0000	[-0.5174, -0.2271]	0.1693	YES
H3a	Review quality -> Fraud risk	-0.4287	-9.4275	0.0000	[-0.5404, -0.3182]	0.333	YES
H3b	Review quality -> Product risk	-0.2920	-4.9820	0.0000	[-0.4327, -0.1279]	0.0939	YES
H3c	Review quality -> Delivery risk	-0.3111	-4.9582	0.0000	[-0.4702, -0.1490]	0.1154	YES
H4	Vividness -> Purchase intention	0.1540	2.4394	0.0149	[-0.0033, 0.3073]	0.0314	YES
H5	Review quality -> Purchase intention	0.1820	2.7905	0.0054	[0.0264, 0.3495]	0.0458	YES
	VV->FR->PI	0.1179	2.6943	0.0072	[-0.0023, 0.2406]	NA	YES
	VV->PR->PI	0.0777	2.9796	0.003	[0.0136, 0.1595]	NA	YES
	VV->DR->PI	0.0432	1.7488	0.0806	[-0.0288, 0.1131]	NA	NO
	RQ->FR->PI	0.1117	2.5933	0.0096	[-0.0021, 0.2309]	NA	YES
	RQ->PR->PI	0.0665	2.6848	0.0074	[0.0138, 0.1398]	NA	YES
	RQ->DR->PI	0.0357	1.6225	0.105	[-0.0201, 0.1018]	NA	NO

Note. Author's contribution

5. Discussion

The study demonstrates that consumers' perceptions can influence their behavioral intentions. Accordingly, consumers' perceived risks (i.e., fraud risk and product risk) negatively impact their purchase intentions in mobile shopping. This indicates that as Vietnamese consumers' perceptions of fraud risk and product risk increase, their intentions to make purchases decrease. This finding aligns with observations made by Andrian and Selamat (2022), Bashir et al. (2021). However, it is not guaranteed that all perceptions can shape behavior. It is the point of this study. Different from previous research, such as Ashoer (2016), this study finds the insignificant impact of delivery risk on purchase intention. This implies that consumers' perceptions of delay, loss, and damage in the shipping process do not influence their purchase intention. It is meaningful because 69% of e-businesses in Vietnam confirm using self-delivery, while 59% use third-party delivery services. Additionally, tracking software is installed in mobile shopping apps (Statista, 2022). These points suggest that mechanisms are in place to mitigate the delivery risk in mobile commerce. The findings imply the effectiveness of mitigation measures, which somewhat adjust behavior no matter what the consumer's perception is.

The research also reveals that the vividness that consumers experience on the shopping app can mitigate their perceived risk (i.e., fraud risk, product risk, and delivery risk). Consequently, it improves their purchase intention. This implies that the vividness of images and product presentation that the mobile apps provide consumers can enhance their trust in online merchants and products and lead consumers to the intent to purchase. The results are consistent with the studies by David et al. (2021), Patel et al. (2020), who found that interface quality in

terms of product presentation lowered consumer perceived risk. Furthermore, based on the SOR model, the study indicates that the stimulating mechanism of vividness has a twofold effect on consumers' purchase intentions. It can either directly affect the intention or mediate through the organism's cognitive state (perceived risk).

Further, this study suggests that the quality of online reviews also plays an important role for Vietnamese consumers in mobile shopping. Positive and highly qualified reviews from other consumers lower perceived risk in terms of the sellers' credibility, product quality, and delivery quality. Therefore, it increases the purchase intentions of later consumers. The results are consistent with the studies of Wang and Chang (2013), Zhang et al. (2014), who revealed that trusted and high-quality reviews motivated consumers to buy. In the case of this study, cultural values also contribute to explaining these mechanisms. Accordingly, Vietnam is a collectivist society. It is reflected in a close, long-term commitment to the "member" group as a family or a society. People are concerned about others' opinions and easily follow the crowd's previous selections. Therefore, the reviews and comments may highly impact their perception of mobile shopping. Further, the study also reveals the two-fold stimulating mechanism of review quality on purchase intention. In other words, high-quality reviews directly stimulate consumers' intentions. Alternatively, they stimulate their cognitive evaluation and then encourage their behavioral intentions.

6. Conclusion

The study concludes that the vividness that consumers experience on the shopping app can directly stimulate their behavioral intentions to buy. Additionally, it also contributes to mitigating consumers' perceived risks (i.e., fraud risk, product risk, and delivery risk) in mobile e-commerce. Further, high-quality reviews also serve as situational stimuli, which diminish consumers' perceived risk while increasing their purchase intention.

6.1. Theoretical implications

This study contributes in several ways to the existing literature on marketing and online consumer behavior. First, this study suggests that the use of the SOR model is also fruitful in explaining online shopping behavior and risk perception. Following the SOR paradigm, the study develops a conceptual framework where the vividness of the product presentation and review quality diminish consumers' risk perception, which in turn influences purchase intentions. The study shows that vividness and review quality share a similar mediation mechanism, as both influence consumers' risk perceptions in mobile commerce. This study also reveals the sequential role of cognitive state (perceived risk) as a mediator of the relationship between vividness, review quality, and purchase intention. Further, the SOR model enables researchers to compare and contrast various patterns, such as the S-O, the S-R, and the S-O-R patterns, to comprehend the contributions made by each in explaining online consumer behavior. This implies that consumers' mechanisms of receiving and processing sensory inputs often overlap. In some cases, encountering environmental stimuli will sequentially influence consumers' risk perception, which then results in behaviors. However, in other cases, environmental stimuli can directly trigger consumers' intentions.

Second, this study captures the overall virtual experience that a shopping app brings about by integrating presence, including telepresence and social presence. Although presence has been widely acknowledged as a fundamental design concept, this study highlights its role by offering a theoretical justification for its influence on consumers' risk perception and consumer

behavior in mobile shopping. This is particularly important in mobile e-commerce, as the study conceptualizes the term “presence” in terms of the level to which reviews are understood by consumers and the level of effectiveness of the product presentation.

Third, given the recognition that studies on the effects of web/app stimuli are more concerned, most studies conceptualize and operationalize website stimuli in terms of consumers’ beliefs and perceptions about website usage, such as the quality of the website, website reliability, website reputation, etc. Therefore, it would be promising to explore the impacts of website stimuli relating to network interface features (e.g., vividness) on consumers’ risk perceptions and purchase intentions in mobile e-commerce. This study offers empirical evidence of the impact of telepresence (i.e., vividness) on the risk perception-purchase intention relationship. The results conclude that Vietnamese consumers are attracted to products presented vividly in shopping apps, which mitigates their risk perceptions and improves purchase intentions.

6.2. Practical implications

This paper provides recommendations for practitioners to enhance online consumers’ purchase intention and reduce risk perception in mobile e-commerce. Although Vietnamese consumers are familiar with e-commerce, they are still worried about the reliability of e-sellers and the quality of online products. Therefore, e-businesses should strongly require e-retailers to display comprehensive information on shopping platforms, including contact details, addresses, emails, product information, return policies, and guarantees. This mandatory information has the potential to improve sellers’ transparency and promote consumers’ trust and purchase intentions. The study also offers practical marketing suggestions to managers of e-commerce platforms and apps. Accordingly, design features that increase the vividness of the shopping app are effective in delivering better shopping experiences and mitigating perceived risk. For instance, the augmented reality and virtual reality features that contribute to increasing product presentation can reduce consumers’ product risk. Mobile shopping apps may integrate features such as virtual product try-ons, AR product visualization, interactive product demos and experiences, etc.

Additionally, e-commerce platforms and apps also need to pay attention to the quality of customer reviews. Marketing strategies must encourage customers to post reviews with personal experiences, considering that many consumers are reluctant to leave feedback. Furthermore, e-commerce platforms and apps now provide simple review instructions. For example, the review’s content includes (1) rating the product on a five-star Likert scale, (2) providing images of the product (if any), and (3) providing an open assessment of the product. This does not provide accurate instructions for consumers to review. Therefore, it is important to develop a high-quality product review system for platforms and apps. For example, a post-purchase survey may be sent to consumers to ask about their personal experience with the actual products and their comparison of their characteristics. Then, the platform revises the survey to present information in a feature-wise manner. Additionally, incorporating comment and sharing functions can encourage online consumers’ social presence, further enhancing the quality and credibility of reviews.

6.3. Limitations and future research

The paper acknowledges several limitations that can guide future research. The study focused on only three types of perceived risk (i.e., fraud risk, product risk, and delivery risk). Therefore, future research can expand to investigate different perceived risks to provide a holistic picture of the effect of perceived risk on purchase intention in mobile shopping.

Furthermore, the authors adopted cross-sectional research to provide a snapshot of associations at a certain moment in time. Therefore, the causality of the relationships must be evaluated. A longitudinal study will be useful for investigating changes in the impact of stimuli on customers' perceptions and behaviors. Furthermore, the study was conducted in Vietnam, a country known for its high degree of collectivism. This cultural context may influence the results regarding the impact of social interactions on consumers' perceived risk of mobile shopping. Therefore, conducting comparative studies across different countries and cultures would be valuable for future research.

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