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Exploring the Determinants of Consumers Intention to Use Virtual Supermarket

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Abstract
While the importance of virtual supermarket and consumers' responses has been widely discussed in marketing and management literature, little research has emphasized the factors affecting consumers' behavioral intention to use a virtual supermarket. Hence, the purpose of the current study were to investigate factors that affect consumers' intention to use virtual supermarket, include performance expectancy, effort expectancy, social influence, personal innovativeness, and image vividness. Totally, 380 questionnaires were distributed to Vietnam consumers, that 341 questionnaires were used for the final analysis, which the results from analysis of them based on simple linear regression show that five variables include performance expectancy, social influence, personal innovativeness, and image vividness had a positive and significant effect on consumers' behavioral intention to use virtual supermarket services. Results from the current study not only fill the gap in the knowledge by expanding the body of knowledge of virtual supermarket consumption, but also provide retailers and marketers with in-depth understanding into consumers' underlying demands that move them to use virtual supermarket.

Keywords: Virtual Supermarket, Consumer, Intention, Determinants

1. Introduction

Recently, virtual supermarket shopping has entered a phase of commercial mainstreaming as retailers aim at developing their revenue. A virtual supermarket displays merchandise as if it were on a physical shelf on the streets, customers scan the barcode of the items they want with the app by their smartphones, and delivery is made at the end of the day. Consumers recognize that if the virtual supermarket is a intergation of online and real supermarkets, it is actually the revolution of buying and therefore they prefer this way of shopping (DK Marketing, 2018).

With virtual supermarket shopping is growing at a rapid pace, e-retailers need a clear strategy to understand the reasons that lead the customer to use virtual supermarkets and leverage their behavioral intention. The behavioral intention may be influenced by several factors. In addition, there is no consistency in the study regarding the factors that impact the behavioral intention to use a specific technology. Moreover, different technologies have different factors that affect their acceptance (Gefen *et al*, 2003) [14]. Meanwhile, an investigation conducted by Suh & Lee (2005) [37] concluded that using a virtual supermarket can influence behavioral intention. Hence, it is necessary to study and identify the specific factors. Despite the general consensus that factors have a strong influence on behavioral intention and provide important reasons for virtual supermarket consumption behavior, it is a topic that has not yet been researched in the current virtual supermarket shopping literature. Therefore, it is necessary to complement these contributions by studying which factors of the virtual supermarket service affect consumer behavioral intention. The aim of the current study is to recognize the relevant factors in the consumers' behavioral intention to use virtual supermarkets. To achieve this objective, the current study includes a review of the body of knowledge about virtual supermarket factors and their impact on behavioral intention, as well as proposes a framework integrating the so far incoherent frameworks as suggested by previous studies, and develop an empirical study for measuring virtual supermarket shopping intention. These results also have important managerial implications for the manager of a virtual supermarket to appreciate the service quality.

2. Literature Review

2.1 Virtual Supermarket

A virtual supermarket is a form of applying e-commerce to the retail sector according to the supermarket model, providing standardized products to consumers. It uses posters with shelves filled with products, located on the walls of the dock or at the station.

Consumers see the items on the shelves as if they were in a grocery store. If they want to purchase them, they simply scan the barcode with their smartphone (after downloading the app), and the item is placed in their online shopping cart. Once they've paid, they simply drive home and the items they bought are delivered to them right away. If consumers have purchased a product in the past and they simply want to order it again, they can just go into their smartphone app and order it via the product's barcode.

2.2 Behavioral Intention

Behavioral intention has been defined in previous technology acceptance studies as the individual willingness to use a technology system (Venkatesh *et al*., 2012; Venkatesh *et al*., 2003; Davis *et al*., 1989) [39, 38, 9]. Based on the study of Venkatesh *et al*. (2012) [39], the current study defines behavioral intention as the consumer willingness to use and continue to use virtual supermarket shopping.

On the other hand, there is consensus among scholars that intention to use a certain technology is a strong predictor of the actual use of technology. Due to this, the behavioral intention to use a technology is a central concept of the technology acceptance models (Nikou & Economides, 2017) [28]. However, not much consensus is presented among scholars on the aspects that determine the intention to do a certain behavior, in case use virtual supermarket shopping services. Different researchers point out different factors that affect the behavioral intention to use e-retail shopping services (Beck & Crié, 2018 [3]; Grewal *et al*., 2017; Papagiannidis *et al*., 2013) [29]. This will be illustrated in the following sections by looking at several previous studies.

2.3 Factors Affecting Consumers' Virtual Supermarket Behavioral Intention

2.3.1 Performance Expectancy

Performance expectancy refers to the extent to which an individual believes that adopting a certain service or technology will enable them to successfully achieve related tasks (Venkatesh *et al*., 2003) [38]. This factor is equivalent to Perceived Utility (PU) in the Technology Acceptance Model (TAM) (Venkatesh *et al*., 2003) [38]. In previous studies, PE has been shown to have a significant influence on consumer behavioral intention in the contexts of e-commerce (Chong, 2013) [4], mobile Internet (Venkatesh *et al*., 2012) [39]. Furthermore, the virtual supermarkets allow users to shop at convenience time. At meanwhile, Activity lifespan has consistently been shown to be the strongest predictor of behavioral intention (e.g., Venkatesh *et al*., 2003, 2012; Escobar-Rodríguez & Carvajal-Trujillo, 2014) [38, 39, 12] and purchase intention (Miguel *et al*., 2015) [30]. Therefore, these results lead to the forecast that when the convenience aspect of virtual supermarket's performance expectations are met, the VS-shopper's intention to use will be worthwhile. Therefore, the hypothesis is proposed:

> ***H1:*** *Performance expectancy affects the behavioral intention to use a virtual supermarket.*

2.3.2 Effort Expectancy

Effort expectancy refers to the level of ease or complexity an individual perceives to adopting a certain service or technology to complete related tasks (Venkatesh *et al*., 2003) [38]. This concept is compatible with perceived ease of use (Dwivedi *et al*., 2017; Hung *et al*., 2013; Lu *et al*., 2010; Navavongsathian *et al*., 2020) [11, 18, 21, 27] and positively affects purchase intention (Venkatesh *et al*., 2012) [39]. According to previous studies, effort expectancy has been a vital factor on technology acceptance, where the degree of the ease of use of the technology system affected significantly the behavioral intention of various technologies, such as 3G (Liao *et al*., 2007) [20], wireless internet (Lu *et al*., 2003) [22], electronic commerce (Ha & Stoel, 2009) [17] and m-commerce (Chong, 2013) [4]. Likewise, in the virtual supermarket shopping environment, effort expectancy is how customers believe that shopping through a virtual supermarket can help them complete shopping easily and efficiently. Therefore, the hypothesis is proposed:

> ***H2:*** *Effort expectancy affects the behavioral intention to use a virtual supermarket.*

2.3.3 Social Influence

Social influence is a term of the degree to which consumers of certain technology perceive that people who are important to them (e.g. family, friends, relatives) think they should use the technology (Venkatesh *et al*., 2012) [39]. Social influence understood as a direct determinant of behavioral intentions is included as the subjective norm in TRA, TAM2, and TPB (Fishbein & Ajzen, 1975; Schifter & Ajzen, 1985; Davis, 1989; Davis *et al*., 1989; Moore & Benbasat, 1991) [13, 35, 8, 9, 25]. The social influence, subjective norm, and social norm constructs all contain the explicit or implicit notion that individual behavior is influenced by how people believe others will view them as a result of having used the technology (Venkatesh *et al*., 2003) [38] and positively affect purchase intention (Venkatesh *et al*., 2012) [39]. Likewise, because the virtual supermarket is not a mandatory channel, it means that the consumers have the free option to use it. Hence, social influence has the potential to impact the behavioral intention to use the virtual supermarket shopping. Therefore, the hypothesis is proposed:

> ***H3:*** *Social influence affects the behavioral intention to use a virtual supermarket.*

2.3.4 Personal innovativeness

Personal innovativeness is defined as the degree to which a person prefers to try new and different products or channels and to seek out new experiences requiring a more extensive search (Midgley & Dowling, 1978). When shoppers come into contact with a new technology or innovation, they have the opportunity to adopt or refuse it. Prior research has shown that innovative customers prefer to explore and use new alternatives (e.g., Steenkamp & Baumgartner, 1992; Rogers, 1995; Konuş *et al*., 2008) [36, 33, 19]. In addition, several studies in the e-commerce literature have demonstrated the important role that innovativeness plays in purchase intention in different contexts (Escobar-Rodríguez & Carvajal-Trujillo, 2014; San Martín & Herrero, 2012;

Citrin *et al*., 2000) [12, 34, 6]. Therefore, the hypothesis is proposed:

> ***H4:*** *Personal innovativeness affects the behavioral intention to use a virtual supermarket.*

2.3.5 Image vividness

Image vividness is determined by image features including shape and color, detail, context, genericity (the ease with which the image can be formrd from generic information in long-term mamory), and saliency (Cornoldi *et al*., 1992) [7]. Many scientists proved that visual information is easier to remember than the verbal dimension (Ha *et al*., 2019) [16]. Analyzing all Imagery characteristics, it is believed in the literature that there is a relationship between imagery and consumer behavioral intentions (Yoo & Kim, 2014) [40]. According to the study conducted by Miller *et al*. (2000) [24], the imagery environment provokes positive emotions during the shopping experience. The virtual supermarket posters are designed to look like real shelves of the shops and thus the experience is more user-friendly. Images with color vividness were furthermore to influence behavior intentions of consumer. Therefore, the hypothesis is proposed:

> ***H5:*** *Image vividness affects the behavioral intention to use a virtual supermarket.*

2.3.6 Conceptual Framework and proposed hypotheses

By analyzing each topic of literature review and linking with the initial objectives for this research, the current study can create the model to follow. The current model proposes that Performance Expectancy, Effort Expectancy, Social Influence, Personal Innovativeness, and Image Vividness influence the behavioral intention to use a virtual supermarket. The proposed research model is presented in Fig 1.

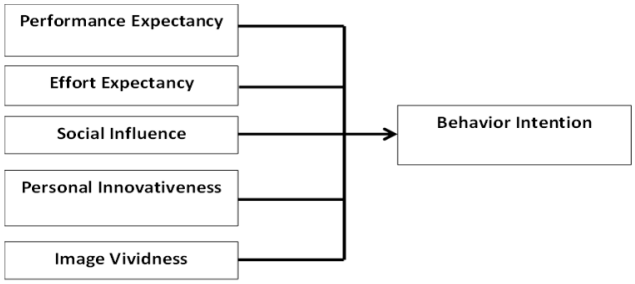

Fig 1: An Integrated Conceptual Framework

3. Methodology

This study employs quantitative methods to examine the influence of Performance Expectancy, Effort Expectancy, Social Influence, Personal Innovativeness, and Image Vividness on Behavioral intention to use a virtual supermarket in the Vietnamese market. A survey was conducted among individuals who will purchase products through a virtual supermarket in Vietnam.

The questionnaire was designed in two parts: Part 1 collected demographic information of the survey participants, while Part 2 aimed to survey consumer attitudes and intentions regarding the use of the virtual supermarket. A standard questionnaire which also consisted of 17 items developed by Al-Awadhi & Morris was used to evaluate constructs of performance expectancy, effort expectancy, and social influence. Consumer related behavioral intentions were measured utilizing an adapted six-items version of the Zeithaml *et al*. (1996). For the personal innovativeness scale, we adapted a questionnaire from Agarwal and Prasad (1998) [1] which also consisted of six items. Six items of Image Vividness scale developed by Dimitrios *et al*. (2010) [10] and Christine *et al*. (2009) [5]. A Likert 5-point scale (ranging from 1 = "strongly disagree" to 5 = "strongly agree") was utilized.

According to Gorsuch (1983) and (Kline, 2005), the minimum sample size is n > 5* variables entered into the analysis, and it should be at least 100. The questionnaire was distributed to 380 participants, yielding 341 valid responses. This sample size is deemed appropriate for this study. The survey participants consisted of 84 males, accounting for 24.6%, and 257 females, accounting for 75.4%. Regarding age, the age group under 22 years old comprised 21 individuals (6.2%), this group is quite sensitive to technology trends, hence their participation rate in the survey is relatively high, but they have limited income for shopping. There were 191 individuals aged 22-35, constituting the majority (56%) of the survey sample. This group tends to follow societal trends and they also have the income to cover personal expenses. The remaining group, aged over 35, is the most financially comfortable, accounting for 37.8%. The average monthly income of the survey participants corresponds to their age and occupation. There were 11.9% individuals earning less than 5 million VND per month, typically students or low-income earners. Those earning between 5 and 15 million VND were making up 69.4%, commonly employed as staff in businesses or self-employed. The remaining individuals earned over 15 million VND, constituting 18.7%, typically holding managerial positions in businesses.

4. Results

4.1 Cronbach's Alpha reliability analysis

Internal consistency measures were calculated, and items with low reliability were either removed or adjusted as needed. A total of 34 items underwent refinement through the computation of item-to-total correlations, applying a suggested cutoff of 0.50. This process and its results are outlined in Table 1.

To enhance the item-to-total correlations and coefficient alphas, 2 items spanning the six factors were removed. Following the criteria outlined by Hoang Trong & Chu Nguyen Mong Ngoc (2008), a Cronbach's alpha ranging from 0.836 to 0.919 indicates a good measurement scale, while a range of 0.7 to 0.8 denotes usability. Therefore, based on the aforementioned factor analysis, the study demonstrates readiness for further advancement.

4.2 Exploratory factor analysis

The items, filtered from the Cronbach's alpha reliability test, will be subjected to factor convergence testing. The results are as follows: Firstly, the Kaiser-Meyer-Olkin (KMO) measure = .915, which is ≥ 0.5, and the significance level of the Bartlett's test = 0.00, which is ≤ 0.05, meeting the requirements as proposed by Gerbing and Anderson (1988). Additionally, the results concerning Eigenvalues (with respective values ranging from 1.693 to 8.352), factor loading coefficients (> 0.5), and Total Variance Explained (71.877) all meet the criteria proposed by Hair *et al*. (2006).

4.3 Testing the research model

This step is to check the multicollinearity phenomenon. The results show that the four independent variables have a relationship in the same direction with the dependent variable, with p values of 0.000 less than the 5% significance level. The independent variable has a strong correlation with the dependent variable, highest Pearson coefficient = 0.542 (Hair *et al*., 2006).

4.4 Regression Analysis

The results of multivariate regression analysis with variables in the research model are as follows (see Table 4).

Table 1: Cronbach Alpha analysis

Constructs	Before item deletion			After item deletion		
	Number of items	Item-total correlation	Cronbach's alpha	Number of items	Item-total correlation	Cronbach's alpha
Performance Expectancy	6	.081-.797	0.851	5	.723-.817	.912
Effort Expectancy	6	.463-.722	0.873	5	.707-.738	.888
Social Influence	5	.708-.859	.915	5	.708-.859	.915
Personal Innovativeness	6	.562 - .723	.836	6	.562 - .723	.836
Image Vividness	6	.724-.867	.919	6	.724-.867	.919
Behavior Intention	5	.711-.763	.896	5	.711-.763	.896

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.915
Bartlett's Test of Sphericity	Approx. Chi-Square	8717.818
	df	496
	Sig.	.000

Table 3: Exploratory factor analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.352	27.841	27.841	8.352	27.841	27.841
2	3.876	12.920	40.760	3.876	12.920	40.760
3	2.967	9.891	50.652	2.967	9.891	50.652
4	2.575	8.583	59.234	2.575	8.583	59.234
5	2.100	6.999	66.233	2.100	6.999	66.233
6	1.693	5.644	71.877	1.693	5.644	71.877

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.762a	.581	.575	.76387
a. Predictors: (Constant), PI, IV, EE, SI, PE				

The results show that the adjusted R-squared value is 0.575, showing that the independent variables explain 57.5% of the variation of the dependent variable, the remaining 42.5% is due to variables outside the model and random errors. Sig value of F-test equals 0.000 < 0.05, therefore, the regression model is appropriate (Hair *et al*., 2006).

Table 5: ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	270.817	5	54.163	92.825	.000b
	Residual	195.473	335	.584		
	Total	466.290	340			
a. Dependent Variable: BI b. Predictors: (Constant), PI, IV, EE, SI, PE						

Table 6: Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.145	.218		-.663	.508		
	PE	.181	.045	.184	4.037	.000	.604	1.655
	EE	.311	.048	.282	6.445	.000	.653	1.531
	SI	.207	.042	.211	4.929	.000	.680	1.470
	IV	.258	.041	.270	6.206	.000	.661	1.512
	PI	.067	.043	.064	1.542	.124	.725	1.380
a. Dependent Variable: BI								

The results of the regression analysis indicate that four of five factors influence Behavioral intention to use, including Performance Expectancy, Effort Expectancy, Social Influence, and Image Vividness. Data analysis indicates that Sig value of these variables are less than 0.05, meaning that the independent variables have an impact on the behavioral intention. Additionally, the VIF of the collected variables ranges from 1.380 to 1.655, all of which are less than 2, indicating that the data does not violate multicollinearity. Particularly, Effort Expectancy has the strongest impact with a regression coefficient of 0.282; conversely, the factor with the least impact is Performance Expectancy with a regression coefficient of 0.184. Personal Innovativeness does not affect the dependent variable (Sig > 0.942), thus H2 is rejected. Therefore, the regression equation is written as follows:

BI = 0.282EE + 0.270IV +0.211SI+ 0.184PI

5. Discussion and Conclusion

Based on a comprehensive literature review, this study further extends theoretical implications by suggesting framework research for consumers' intention to use virtual supermarkets. In fact, during the extensive literature review, it has been found that previous findings investigated different factors of virtual supermarket consumer behavior in a very scattered manner. For example, Performance Expectancy, Effort Expectancy, Social Influence, Personal Innovativeness, and Image Vividness. All these factors are actually interrelated and are asked to be organized to propose a more comprehensive framework that will integrate all the variables of virtual supermarket consumers and describe a set of hypothesized explanatory variables which the framework has addressed.

The objective of current study was to define the relationships between their key factors affecting the behavioral intention to use virtual supermarket. Four of the five hypotheses were supported, include Performance Expectancy, Effort Expectancy, Social Influence, and Image Vividness. The model explains 57.5% of consumer's intention. Collectively, the model successfully identified the factors that determine the consumers' intention to use virtual supermarket.

It also provides a springboard for a further extension of virtual supermarket shopping research in relation to empirical study as well as virtual supermarket shopping dissemination. It further expands the current understanding of this shopping behavior that is more focused on level factors affecting consumers' behavioral intention to use virtual supermarket.

For managerial contribution, the results of this study can also support virtual supermarket marketers and consumers. The investigation of the factors that affect consumers' intention to use the virtual supermarket has created a fruitful outcome that can support the retailer industry in several ways. Retailers need to analyze the consumer behavior they are targeting before designing and implementing virtual supermarket services in the market. It is crucial to know the factors that consumers consider in their shopping consumption behavior to maximize their enjoyment of virtual supermarket shopping. In addition, the findings of the current study will suggest consumers to better understand possible factors that impact their consumption activities.

Although it has many theoretical and applied values, this research still has certain limitations, which are also directions for future research. First, the scope of data collection is limited to Vietnamese consumers, so this result may not be appropriate in other contexts. Second, there is an obvious practical problem that virtual supermarket applications are still not popular in Vietnam. This may influence the study results to some extent, and so future studies may corroborate the study results after virtual supermarket technology has been widely commercialized. Finally, the study did not focus on socio-demographic characteristics of consumers, such as gender, age, occupation, education, income and marital status, thus, future studies could examine differences in behavioral acceptance of virtual supermarket technology applications across these demographic variable groups.

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