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Website Quality and Intention to Use Real Estate Website in Housing Market

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Abstract
The purpose of this study is to operationalize the impact of some factors of real estate website quality on behavioral intention to use in searching information about housing market. Research model is the integration of extended Technology Acceptance Model (TAM) of Davis and Information Success System of DeLone and McLean. The data of 847 real estate website users from Hanoi and Ho Chi Minh City was analyzed by Structural Equation Model (SEM) and multiple group analysis. The findings indicate that most of all hypotheses received support from data, specifically, Perceived Enjoyment has the most positive impact on Attitude and Behavioral Intention of real estate website users. Moreover, there is difference in the degree of impact of website quality between the perception of users in Hanoi and Ho Chi Minh City.
Keywords: real estate website, website quality, housing market, searching information
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1. Introduction

Web sites are being widely deployed commercially (Cao et al., 2005). In real estate sectors, the world witnessed the success of real estate website in support customers to find information since 200s, such as: Zillow in the United States or Rightmove in the UK. This is also the basis to develop a real estate technology – PropTech later. In addition to the achievements of the fourth industrial revolution, the website is still a popular tool for users with a special importance during digital transformation in the field of real estate.

In Vietnam, the application of real estate websites to seek and exchange information has developed in recent years. Internet are increasingly used to decide about brand and products. Besides, because of the impact by the Covid-19 epidemic, real estate investors are hesitant to go and seek the information, which strongly boost the digital transformation of real estate to seek and access the information of real estate.

The benefits of real estate websites bring were affirmed in many previous studies. It also has been proved that using the real estate websites does not reduce the seeking time of home buyers (D'Urso, 2002); Bayne (2006); Yuan et al. (2013). Therefore, it is necessary to study the quality of real estate websites because it meets the general context of society and is a useful search engine of users. This article contributes to clarifying the quality of real estate website in three aspects: system quality, information quality and service quality based on assessing user experience to seek the information about housing market, thereby proposing several solutions and recommendations for the development of Vietnam's real estate websites.

2. Literature Review

Four main topics that related to the relationsip between real estate website quality and behavioral intention in searching information about housing market were chosen to review:

- Firstly, the studies about housing information search in the country and in the world.
- Secondly, the studies about the use of real estate websites in searching information, the main results include: (1) Real estate website brings both benefits and disadvantages to home buyers. While it encourages buyers to search more deeply, explore and visit more properties, websites are also wasting more time and energy (Xiaofang et al., 2013); (2) The real estate website also dominates the business activities of companies (Muhanna, 2000).
- Thirdly, the studies about website quality in the world and gives criteria to evaluate website quality.
- The fourth, the research works on the quality of real estate websites in the world, the main results include: (1) Information quality is the aspect of website quality that attracts the most attention. Accordingly, it is necessary to make information as clear, accessable and engaging as possible (Littlefield, Bao & Cook, 2000); (2) The search engine on the real estate website is also focused on exploiting by many previous studies (Yuan et al., 2013); (3) The association between content, text, images and audio elements is critical to the success of an online platform (Choi, Jacelon, Kalmakis, 2016); (4) For service quality, online service satisfaction is the focus of success (Littlefield, Bao & Cook, 2000).

In general, the studies all confirm the close causal relationship between the quality of a website and the behavior of the users. Moreover, the studies have shown that the factors that customers are interested in when searching for real estate on the website help businesses improve the types of information that will appear on the page to meet the needs of customers. Finally, the impact of using real estate websites is also shown on the search process of home buyers such as search time, number of visits to a model house.

However, it still exists some reaseach gap such as: (1) Currently, there are no studies applying the successful information systems model of DeLone and McLean (2003) to evaluate the quality of real estate website; (2) There are many lacks similarities in the use of general scales to evaluate the quality of real estate websites and (3) Vietnam is a potential research context to conduct real estate website quality research.

3. Theoretical Framework and Research Model

3.1. Theoretical Framework

3.1.1. Technology Acceptance Model (TAM) and Extended TAM

Technology Acceptance Model was introduced by Davis (1989), which aims to understand the behavior of users of a techonology, determined by two main factors: Perceived Usefulness and Perceived Ease of Use. Perceived Enjoyment is an intrinsic belief or motive, which is shaped from individual experience in the environment (Moon & Kim, 2001). Earlier studies found a way to expand the TAM model to clarify the intrinsic motivations for using technology and they showed that the feeling significantly affects attitude (Moon & Kim, 2001; Bruner & Kumar, 2005) and behavioral intention (Igbaria et al.,1995; Teo, Lim & Lai, 1999; Moon & Kim, 2001).

3.1.2. Information System Success Model of DeLone and McLean (2003)

The IS model of DeLone and McLean (2003) was applied to directly assess the properties of a website (Kuan et al, 2008). Instead of listing many single criteria, DeLone and McLean only proposes 03 main scales of website quality: System Quality, Information Quality, and Service Quality. When using the three criteria, the properties of a website are arranged in a more comprehensive and organized quality framework. The specific criteria for each quality group of real estate website mentioned in Table 1.

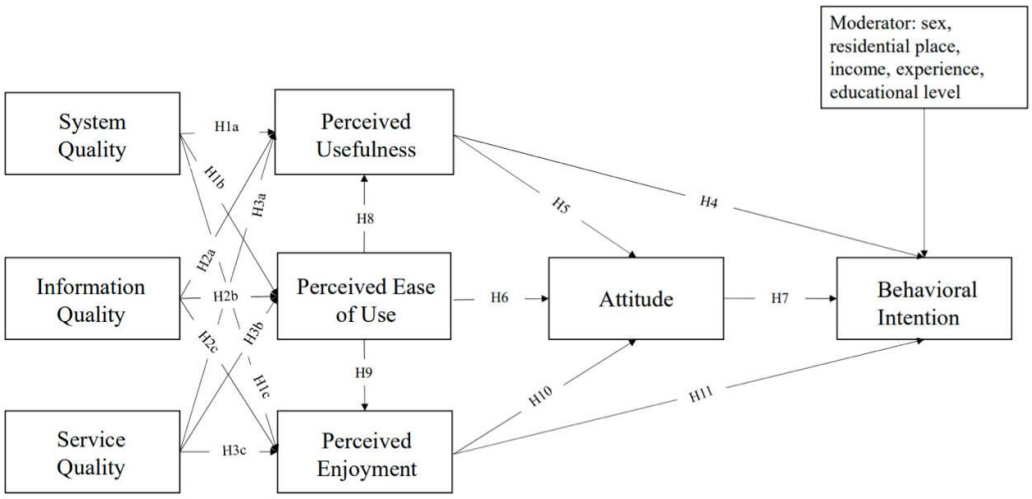
Table 1. Criteria of real estate website

Real estate website quality	Measuring items	Sources
System Quality	navigation, responsiveness, multimedia features	Parasuraman et al., 2005; Cao et al., 2005; Ahn et al., 2007; Clyde, 2000.
Information Quality	accuracy, updating, relevance	Chang et al., 2012; Cao et al., 2005.
Service Quality	reliability, empathy	Chang et al., 2012; Cao et al., 2005.

Source: the authors

3.2. Research model and hypotheses

Figure 1. Research model



Source: the authors

Hypothesis 1a: System Quality has a positive effect on Perceived Usefulness.

Hypothesis 1b: System Quality has a positive effect on Perceived Ease of Use.
Hypothesis 1c: System Quality has a positive effect on Perceived Enjoyment.
Hypothesis 2a: Information Quality has a positive effect on Perceived Usefulness.
Hypothesis 2b: Information Quality has a positive effect on Perceived Ease of Use.
Hypothesis 2c: Information Quality has a positive effect on Perceived Enjoyment.
Hypothesis 3a: Service Quality has a positive effect on Perceived Usefulness.
Hypothesis 3b: Service Quality has a positive effect on Perceived Ease of Use.
Hypothesis 3c: Service Quality has a positive effect on Perceived Enjoyment.
Hypothesis 4: Perceived Usefulness has a positive effect on Behavioral Intention.
Hypothesis 5: Perceived Usefulness has a positive effect on Attitude.
Hypothesis 6: Perceived Ease of Use has a positive effect on Attitude.
Hypothesis 7: Attitude has a positive effect on Behavioral Intention.
Hypothesis 8: Perceived Ease of Use has a positive effect on Perceived Usefulness.
Hypothesis 9: Perceived Ease of Use has a positive effect on Perceived Enjoyment.
Hypothesis 10: Perceived Enjoyment has a positive effect on Attitude.
Hypothesis 11: Perceived Enjoyment has a positive effect on Behavioral Intention.

4. Data Analysis and Research Results

Based on the result of in-depth interview and pilot test, the official questionnaires were spread both online and offline in Hanoi and Ho Chi Minh City from January to March 2021. 5-point Likert scale were used to measure the variables. 847 ouf 1000 forms met the requirements for the final analysis.

4.1. Descriptive statistics

Table 2. The relation between real estate website and purpose of using these websites.

		PURPOSE									
		To get information about interested real estate		To get information about investors, brokers, agents, …		To compare the price of real estate		To post information about real estate (buying, renting selling, …) on the website		To get information about real estate market	
		Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
WEBSITE	batdongsan.com.vn	362	100.00	177	48.90	185	51.10	184	50.83	178	49.17
	cafeland.vn	191	100.00	94	49.21	97	50.79	99	51.83	92	48.17
	cenhomes.vn	135	100.00	73	54.07	62	45.93	65	48.15	70	51.85
	chotot.com.vn	89	100.00	44	49.44	45	50.56	47	52.81	42	47.19
	online.vinhomes.vn	70	100.00	34	48.57	36	51.43	34	48.57	36	51.43

Sources: Authors' calculation

Find information about the real estate they are interested in is the purpose of every respondents (100%). Besides, there was a clear difference in the least-interested purpose in each real estate website that the group surveyed. In which the website for the purpose of learning about investors, brokers and agents that are least interested in information searching is batdongsan.com.vn with 177 options, accounting for 48.90%; cafeland.vn users, the least interested purpose is to find out information about the market with 92 options, accounting for 49.21%; in the website cenhomes.vn, the least interested purpose is to compare the price of real estate with 62 options and accounting for 45.93%. At online.vinhomes.vn, the least interested purpose is to learn about investors, brokers, agents and to post information about real estate with 34 options and accounting for 48.57%.

4.2. Measure reliability

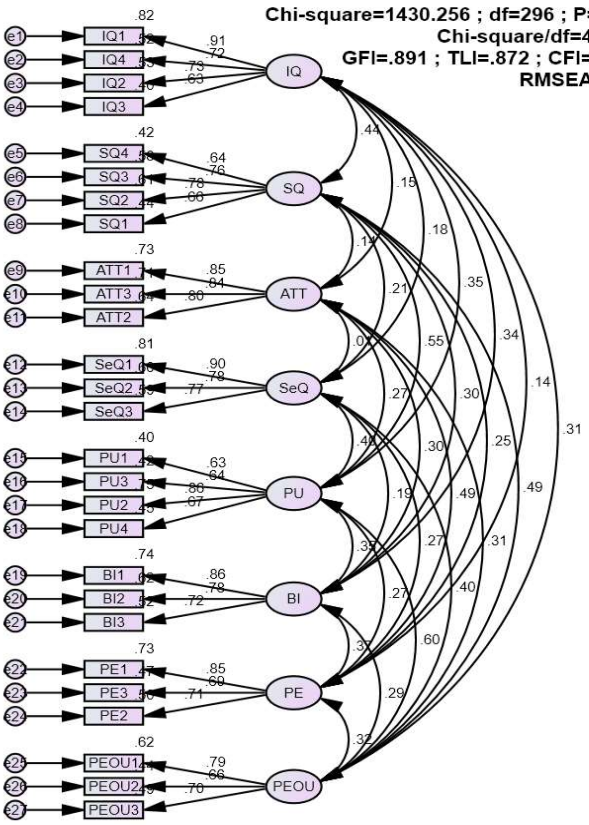
Cronbach's Alpha value was applied to measure the reliability of each variable. The obtained results show that all of them are meet the above both requirements, which are the value of Cronbach's Alpha coefficient is greater than 0.7 and the value of corrected item – total correlation is greater than 0.5. Moreover, none of observed variables is

deleted because these Cronbach's Alpha if Item Deleted is smaller than the main Cronbach's Alpha value (see in appendix table 1)

4.3. Measure validity

Exploratory Factor Analysis was conducted, using Principle Components extraction method with Promax rotation. The KMO is 0.831, higher than 0.5, which proves that the data used for factor analysis is completely appropriate. The Significant level is 0.000 < 0.05, the variables are correlated with each other and satisfy the conditions of factor analysis. The total value of the extracted variance is 71.289% > 50% and the value of the Eigenvalues convergence coefficient of this factor is > 1, therefore these new factor group can be used to represent the variability of the survey data. Overall, the theoretical model indicates adequate validity and reliability, and the factors ensure convergent validity and discriminant validity in CFA analysis (see in appendix table 2). Confirmatory Factor Analysis (CFA) result (see in figure 2) shows that the standardized regression weight of all variables is greater than 0.5, showing the model reaches a convergent validity, the common criteria used for assessing the model's compatibility with market information including: $\chi 2$ (Chi-square), $\chi 2$ - adjusted by degrees of freedom (Chi-square/df), GFI, CFI, TLI and RMSEA are considered. The result show that the value $\chi 2$ has the corresponding P-value <0.05; CMIN/df = 4.832 ≤ 5; CFI = 0.892, GFI = 0.891 and TLI = 0.872 are close to 0.9; RMSEA is 0.068 ≤ 0.08, showing that the model's compatibility with data is very good. Correlation coefficients of the variables are all smaller than the unit value, so the scale achieves distinct value (Steenkamp & Van Trijp, 1991).

Figure 2. CFA test results

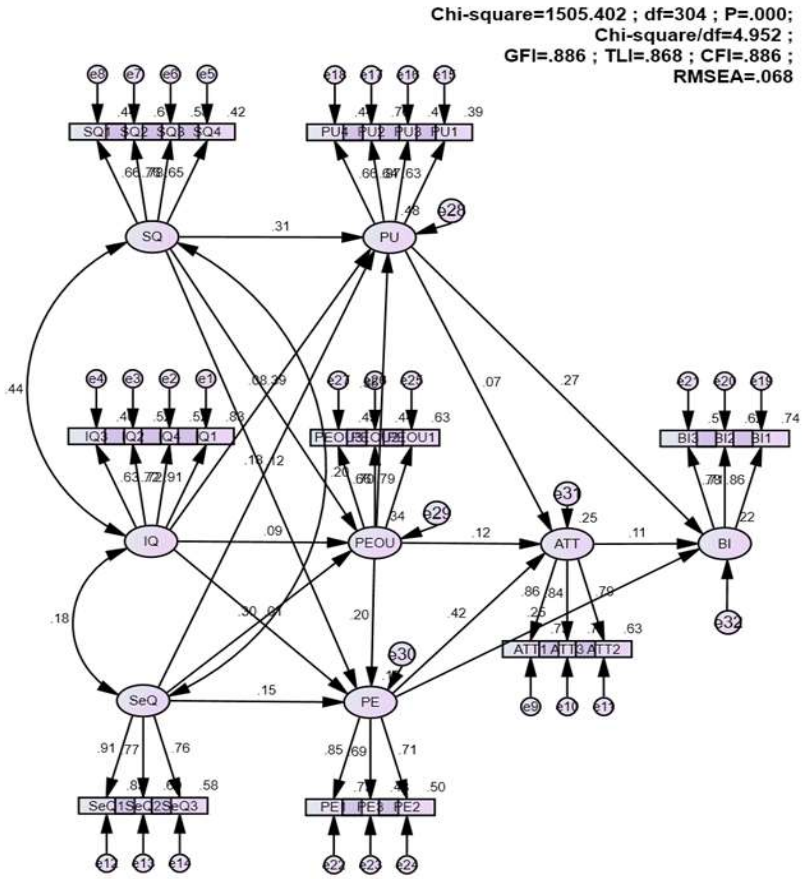


Sources: the authors

4.4. Hypotheses testing

Hypotheses and model were tested by Structural Equation Modeling (SEM) with the value χ 2 = 1505.402, the degree of freedom equals 304; GFI = 0.886, TLI = 0.868, CFI = 0.886 are closer to 0.9, in addition RMSEA = 0.068 <0.08, therefore, it is satisfied if compared with the requirements of data compatibility and most hypotheses are confirmed (Statistical significance). See the results summarized in Figure 3

Figure 3. SEM results



Source: authors' calculation

It can be shown that 15/ 17 hypotheses are supported (P <0.05), showing that the model proposed by the research group reaches a good effect in explaining the relations among the variables. H2c and H5 are 02 rejected hypotheses with P> 0.05 (See in Table 3).

To be specific, both System Quality and Service Quality directly affect Perceived Usefulness, Perceived Ease of Use and Perceived Enjoyment of real estate website users. It is quite similar with the effect of Information Qualtiy. Howerver, there is a contrary to the initial hypotheses. Even a website meets quality in information or not, it does not affect the enjoyment feeling of real estate website users. Additionally. most of the hypotheses related to TAM model are supported. In terms of Perceived Usefulness, it directly affects to real estate website users' Behavioral Intention with standardized regression coefficient is 0.07, but it does not affect real estate website users' Attitude, contradict to the initial hypothesis. In general, 15/17 hypotheses are confirmed (H1a, H1b, H1c, H2a, H2b, H3a, H3b, H3c, H4, H6, H7, H8, H9, H10, H11), while the rest hypotheses are not supported (H2c; H5). Specially, Perceived Enjoyment has strongest positive effect to Attitude (42.1%) and Behavioral Intention (24.7%). Therefore, it is emphasized that if website users feel interested and joyful in seeking information on the website, they will have a positive perspective and want to use the website in the next times.

Table 3. Summary of testing hypotheses result

Hypothesis	Content of hypothesis	Result	Standardized regression weight
H1a	System Quality has a positive effect on Perceived Usefulness.	Supported	0.313***
H1b	System Quality has a positive effect on Perceived Ease of Use.	Supported	0.390***
H1c	System Quality has a positive effect on Perceived Enjoyment.	Supported	0.121*
H2a	Information Quality has a positive effect on Perceived Usefulness.	Supported	0.078*
H2b	Information Quality has a positive effect on Perceived Ease of Use.	Supported	0.089*
H2c	Information Quality has a positive effect on Perceived Enjoyment.	Not supported	
H3a	Service Quality has a positive effect on Perceived Usefulness.	Supported	0.176***
H3b	Service Quality has a positive effect on Perceived Ease of Use.	Supported	0.297***
H3c	Service Quality has a positive effect on Perceived Enjoyment.	Supported	0.148***
H4	Perceived Usefulness has a positive effect on Behavioral Intention.	Supported	0.071***
H5	Perceived Usefulness has a positive effect on Attitude.	Not supported	
H6	Perceived Ease of Use has a positive effect on Attitude.	Supported	0.119*
H7	Attitude has a positive effect on Behavioral Intention.	Supported	0.109*
H8	Perceived Ease of Use has a positive effect on Perceived Usefulness.	Supported	0.352***
H9	Perceived Ease of Use has a positive effect on Perceived Enjoyment.	Supported	0.199***
H10	Perceived Enjoyment has a positive effect on Attitude.	Supported	0.421***
H11	Perceived Enjoyment has a positive effect on Behavioral Intention.	Supported	0.247***

Note: * p < .05, ** p < .01, *** p < .001; standardized beta.

Source: Authors' calculation

4.5. Multiple group analysis

A linear structural model (SEM) was conducted agained to analyze the impact of website quality on behavioral intention of users in Hanoi and Ho Chi Minh City, further test if there is any difference between the users living these areas. SEM results of the invariant model for two groups of geographical areas: Ho Chi Minh City and Hanoi City: x2 = 1829.535; df = 625; p = 0.000; x2 / df = 2,927; GFI = 0.866; TLI = 0.872; CFI = 0.886; RMSEA = 0.048. SEM results of the variable model for two groups of geographical areas are Ho Chi Minh City and Hanoi City: x2 = 1810.138; df = 608; p = 0.000; x2 / df = 2,977; GFI = 0.867; TLI = 0.869; CFI = 0.886; RMSEA = 0.048. Therefore, it proves that both the invariant and partially variable models of the two groups of geographical areas, Ho Chi Minh City and Hanoi, are consistent with the actual data. The results of testing the difference of compatibility criteria between the volatile and partial invariant models showed that the chidish index = 0.306> 0.05. Therefore, the invariant model is chosen to read the results (table 4). In the two cities, the relationship between Information Quality to Perceived Enjoyment and Perceived Usefulness to Attitude had no impact, coinciding with the results of previous hypothesis testing.

In Hanoi, the relationship between Perceived Enjoyment and Attitude has the strongest impact (44.1%), ranked second as the impact of Perceived Ease of Use on Perceived Usefulness (39.7%). The relationship with the weakest impact was the Information Quality on Perceived Usefulness (9.4%). In Ho Chi Minh City, the impact of System Quality on Perceived Ease of Use is the strongest out of all relationships (40.5%), ranking second for the impact of Perceived Enjoyment to Attitude (36.4%). Similar to Hanoi, the relationship between Information Quality and Perceived Usefulness has the lowest impact (8.5%).

Table 4. Invariant model result of multiple group testing

RELATION			Hanoi	Ho Chi Minh City
PEOU	<---	SQ	0.386***	0.405***
PEOU	<---	IQ	0.095*	0.11*
PEOU	<---	SeQ	0.283***	0.29*
PU	<---	SQ	0.288***	0.234***
PE	<---	SQ	0.116*	0.14***
PE	<---	IQ	No impact	No impact
PU	<---	IQ	0.094*	0.085*
PU	<---	SeQ	0.182***	0.145***
PE	<---	SeQ	0.142***	0.166***
PU	<---	PEOU	0.397***	0.309***
PE	<---	PEOU	0.19***	0.218***
ATT	<---	PU	No impact	No impact
ATT	<---	PE	0.441***	0.364***
ATT	<---	PEOU	0.118*	0.111*
BI	<---	PU	0.276***	0.297***
BI	<---	ATT	0.117*	0.103*
BI	<---	PE	0.249***	0.182***

Note: * p < .05, ** p < .01, *** p < .001; Standardized beta.
Source: Authors' calculation

5. Conclusion, Recommendations, Limitations and Futher Research Directions

5.1. Conclusion

Research results show that the website quality factors (System Quality, Information Quality and Service Quality) have significant impact on perception, attitude anh intention of real esate website users. Besides, the factor has the strongest impact is also defined (Perceived Enjoyment). At the same time, research also shows that in Hanoi, the relationship between Perceived Enjoyment and Attitude has the strongest effect, while in Ho Chi Minh City, this is the relationship between System Quality and Perceived Ease of Use.

5.2. Recommendations

Firstly, real estate websites need to define specific target audience. Research results have shown that users have many purposes when using real estate websites: to find information about the real estate they are interested in, to find information about investors / brokers, agents, to post information on real estate, to find out market information, ... Define clearly who is using your website and what needs they have will help businesses easier to access and expand potential customers. Enterprises can focus on a system of diverse keywords search to help users quickly grasp information. In addition, for groups of people with real needs to buying a home, businesses need to pay more attention to detailed documents on real estate segments, together with specific reviews and analysis on attached utilities, habitats, residential areas because this information is useful to them.

Secondly, Ensuring the legality and safety on real estate websites. When the Internet and e-commerce are developing strongly, users are especially concerned with issues of legality and transparency due to the risk of leaking or selling personal information. For real estate, transparency is enhanced by the fear of risks available from buyers and the excessive value of this special commodity. Businesses, real estate website developers must ensure that the services on the web are built purely for the purpose of optimizing the user experience, so that they do not feel worried about having to visit. website. This can be demonstrated through the disclosure of information about the ownership of the website, providing complete legal business certificates, evidence showing web operationn, the formula and long operating time of the business in the field.

Thirdly, research results show the difference in the degree of impact between Hanoi and Ho Chi Minh City, therefore, businesses with target customers in Hanoi should focus on customer experience, creating a sense of joy and comfort when using the website. In Ho Chi Minh City, businesses can focus on developing real estate website systems, focusing on the layout on the page, search filters and multimedia features. In addition, special attention should be paid to the quality of website information, ensuring accuracy, transparency and being updated

continuously, building trust with customers so that real estate website will truly become into a search engine useful information for users.

5.3. Limitations and Futher Research Directions

The results basically solve the research objectives. However, it still has some limitations in the research. Firstly, the research of housing market is only implemented in Hanoi and Ho Chi Minh city due to geographical and time limits. Secondly, the research objects are those who used to apply real estate websites to seek the information on housing market, other than those who have not experienced in real estate websites. In the future, an additional study on those who have not experienced in websites will be comprehensively done to forecast and propose effective marketing solutions. Thirdly, the research only considers behavioral intention in seeking the information on housing market, other than actions after seeking the information, such as: discussions with brokers or visiting the model houses. Therefore, in the future, need to further carry out to prove that seeking the information on real estate websites is closely related to the users' behavior in the housing market.

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Appendix

Table 1. Scales of Reliability

Explanatory Factor	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Cronbach's Alpha SQ = .804				
SQ1	10.530	3.928	.579	.774
SQ2	10.510	3.695	.657	.736
SQ3	10.430	3.893	.664	.734
SQ4	10.540	4.036	.579	.774
Cronbach's Alpha IQ = .824				
IQ1	10.870	4.428	.783	.718
IQ2	10.820	4.926	.637	.784
IQ3	10.880	4.479	.572	.823
IQ4	10.890	4.805	.630	.787
Cronbach's Alpha SeQ = .853				
SeQ1	7.030	2.337	.788	.731
SeQ2	7.070	2.504	.698	.819
SeQ3	7.040	2.613	.687	.827
Cronbach's Alpha PU = .799				
PU3	11.070	3.216	.570	.768
PU1	11.060	3.125	.607	.750
PU2	10.890	2.776	.702	.700
PU4	10.890	3.114	.567	.770
Cronbach's Alpha PEOU = .755				
PEOU3	7.550	1.338	.557	.704
PEOU1	7.470	1.195	.662	.580
PEOU2	7.610	1.321	.538	.725
Cronbach's Alpha PE = .789				
PE2	7.090	1.941	.598	.747
PE3	7.020	1.858	.597	.751
PE1	6.950	1.781	.699	.640
Cronbach's Alpha ATT = .869				
ATT1	7.280	2.373	.773	.793
ATT2	7.400	2.550	.722	.840
ATT3	7.280	2.489	.753	.812
Cronbach's Alpha BI = .828				
BI1	7.250	2.458	.736	.711
BI2	7.280	2.563	.683	.764
BI3	7.300	2.677	.639	.807

Source: Authors' calculation.

Table 2. The result of EFA

	Component							
	1	2	3	4	5	6	7	8
IQ1	0.901							
IQ4	0.822							
IQ2	0.772							
IQ3	0.732							
SQ4		0.857						
SQ3		0.847						
SQ2		0.746						
SQ1		0.700						
ATT1			0.915					
ATT3			0.857					
ATT2			0.799					
SeQ1				0.9				
SeQ2				0.858				
SeQ3				0.823				
PU1					0.868			
PU3					0.867			
PU2					0.714			
PU4					0.59			
BI1						0.883		
BI2						0.852		
BI3						0.822		
PE1							0.84	
PE3							0.788	
PE2							0.779	
PEOU1								0.889
PEOU2								0.778
PEOU3								0.72
Eigenvalue	6.816	2.701	2.351	1.96	1.646	1.494	1.227	1.054
Cumulative (%)	25.244	35.246	43.953	51.214	57.309	62.842	67.385	71.289
Sig. = 0.000; KMO = 0.831								

Source: Authors' calculation

Table 3. Analysist of regression weight

			Estimate	S.E.	C.R.	P
PEOU	<---	IQ	.062	.029	2.099	.036
PEOU	<---	SeQ	.194	.026	7.600	***
PEOU	<---	SQ	.400	.050	8.053	***
PU	<---	IQ	.046	.022	2.077	.038
PE	<---	IQ	.009	.032	.267	.790
PU	<---	SeQ	.098	.021	4.740	***
PE	<---	SeQ	.102	.030	3.407	***
PU	<---	SQ	.272	.042	6.520	***
PE	<---	SQ	.131	.057	2.293	.022
PU	<---	PEOU	.298	.042	7.104	***
PE	<---	PEOU	.210	.058	3.615	***
ATT	<---	PU	.120	.085	1.418	.156
ATT	<---	PE	.574	.059	9.669	***
ATT	<---	PEOU	.171	.077	2.217	.027
BI	<---	PU	.478	.072	6.680	***
BI	<---	PE	.346	.065	5.308	***
BI	<---	ATT	.112	.045	2.466	.014

Source: Authors' calculation