Journal of Science and Technology
ISSN: 2456-5660 Volume 06, Issue 05, SEP-OCT 2021

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

Factors influencing housing purchase decisions in the context of the COVID-19 pandemic

Pham Phuong Nam[1], Tran Thai Yen[2], Phan Thi Thanh Binh[3]

[1]*Land Management Department, Vietnam National University of Agriculture (VNUA), Hanoi, Vietnam*
[2]*Land Management Department, Nghe An University of Economics (NACE), Nghe An, Vietnam*
[3]*Law Department, Nghe An University of Economics (NACE), Nghe An, Vietnam*
Corresponding Author: Email: ppnam@vnua.edu.vn.

To Cite this Article
Pham Phuong Nam[1], Tran Thai Yen[2], Phan Thi Thanh Binh "Factors affecting housing purchase decisions in the context of COVID-19 pandemic", Journal of Science and Technology, Vol. 06, Issue 05, Sep-Oct 2021, pp.:99-110.

Article Info
Received: 25-05-2021 *Revised: 09-09-2021* *Accepted: 23-10-2021* *Published: 25-10-2021*

Abstract: *The study aims to identify the influencing factors and their impact levels on the decision to buy houses in the context of the COVID-19 pandemic in Vietnam as a basis for proposing some solutions for people to be able to buy houses and to ensure housing businesses with stable incomes and the State effectively manages the housing market. The study used a multivariate regression model to determine the impact of factor groups on housing purchase decisions. Data were processed using SPSS20.0 software. The study has identified 11 groups with 39 factors influencing the decision to buy houses. The group of COVID-19 factors has the strongest impact with an impact percentage of 16.30%, followed by 10 other factor groups, of which the housing service factor group has the smallest impact percentage of 4.27%. The proposed solutions include good implementation of measures to prevent and control the COVID-19 pandemic; changing working methods; financial support for house buyers; applying information technology in housing brokerage, consulting, and advertising; creating houses that better meet the needs of buyers.*

Keywords: *COVID-19 pandemic, factors influencing, housing purchase decisions, Vietnam*

I. Introduction

The COVID-19 pandemic appeared for the first time in China and spread around the world, including Vietnam (Pham, 2020; Tien, 2020). The COVID-19 pandemic made many economic sectors stagnant, production scale decreased, many businesses went bankrupt or had to stop operating or reduce human resources to participate in production and business. The housing market has also been adversely affected by the COVID-19 pandemic and has caused many small-scale housing businesses to go bankrupt, many real estate agents counteract shutdown or change operating methods such as real estate brokerage through the internet, not directly contacting customers due to the implementation of social gap (Qu et al., 2020; Rogers and Power, 2020; Allam and Jones, 2021). In particular, the COVID-19 pandemic also affects customers' decisions to buy houses (Pham et al., 2020).

So far there have been several studies related to purchasing decisions in different areas with different socio-economic conditions (Ahmed et al., 2020; Pham et al., 2020). Grum and Grum (2015) studied the factors influencing real estate buying decisions and pointed out 04 groups of factors related to real estates and 04 groups of factors related to the psychology of real estate buyers. Other research focused on assessing the impact of financial factors, real estate specificity, customer personality, real estate location factors (Lei, 2017). Chin (2016) focused on assessing the impact of demographic factors, housing characteristics, housing design factors, and the group of environmental factors around housing on decisions to buy houses. Cho et al. (2005) studied the factors influencing rural housing purchase. Di (2009) studied the influence of a second home on the client's search for another main home. Li et al. (2020) studied the impact of the housing purchase restriction policy on the real estate market, including the decision to buy houses. Rogers and Power (2020) researched housing policy in the context of the COVID-19 Pandemic. Al-Haddad (2011) studied the impact of age and gender on the decision to buy an apartment. Kamal and Pramanik (2015) studied the impact of amenities, infrastructure, location, and price on the decision to buy a house.

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

Besides, buyer habits also influence housing purchase decisions (Kamal and Pramanik, 2015; Grum and Grum, 2015). Thanaraju et al. (2019); Salleh (2015) argued that the determinants of housing purchase include living space, individuality, gender, age, education, distance to the center, financial capacity, environment. Chen et al. (2020) only focused on assessing the impact of housing saving policies on housing purchasing decisions. Other studies focused on assessing the impact of housing policy on housing prices and housing purchasing decisions (Chen et al., 2018; Davis et al., 2020; Daniell and Struyk, 1997); or factors influencing real estate buying behavior such as financial factors, habits, and preferences of home buyers (AL-Nahdi et al., 2015). The study of Ratchatakulpat et al. (2009) focused on assessing the impact of individual factors, distance, finance, and environment on the intention to buy a house. Song and Zhang (2020); Chin (2016) studied the size effect of cities on housing purchasing decisions. Another study on the impact of policy on housing prices and the affordability of home buyers (Kim and Cho, 2010). Du and Zheng (2020) focused on assessing the impact of traffic factors on renting prices and deciding to buy houses.

Dewita et al. (2018) examined the impact of transport prices and affordability of those wishing to buy housing. Another study focused on the impact of collective housing policy on housing prices and the affordability of the people (Archer, 2020). Źróbek et al. (2015) focused on the study of environmental factors influencing the behavior of home buyers. Ullah and Sepasgozar (2020) studied the factor influencing regrets after buying or renting a home. Other studies focused on housing purchase behavior (AL-Nahdi et al., 2015; Li, 2000; Li et al., 2020; Ullah and Sepasgozar, 2020; Źróbek et al., 2015), or research on the degree of impact of housing prices on housing purchase decisions (Archer, 2020; Chia et al., 2016; Dewita et al., 2018; Li et al., 2020; Thanaraju et al., 2019).

The above studies have assessed the influence of one or more factors on customers' decision to buy houses. However, studies have not shown the impact rates of factors on home-buying decisions in the context of the COVID-19 pandemic. Therefore, this study aims to present a method to determine factors and their impact rates on the customer's decision to buy a house in the context of the COVID-19 epidemic to have a basis for proposing solutions to ensure the steady development of the housing market and to meet the demand for housing, and to ensure housing companies operate more efficiently.

II. Material and methods

2.1. Research scope

The study selects Bac Ninh city, Vietnam (Fig. 1) as a test site for the research model, because Bac Ninh city is only 30 km away from Hanoi capital of Vietnam, and has a rapid process of industrialization, and urbanization. The real estate market in Bac Ninh city is strongly affected by the COVID-19 pandemic. This also affects people's decision to buy houses, in addition to other factors such as finance; credit; location and characteristics of housing; buyer's psychology, etc. However, there have not been yet researches on the impact of factors on housing purchase decisions in the context of the COVID-19 pandemic.

2.2. Data Collection

Secondary data on housing purchases during the first 6 months of 2019 and the first 6 months of 2020 were collected at the Bac Ninh City Branch of the Land Registration Office. Data on natural and socio-economic conditions were collected at the Statistical Office of Bac Ninh City. Primary data on the factors influencing the decision to buy a house were collected through a random survey of people who have bought houses and carried out the registration of homeownership at the Bac Ninh City Branch of Land Registration Office. Primary data were collected in 2 steps. Step 1 identifies the factors influencing the decision to buy a house with the pre-printed questionnaire. Step 2 determines the impact of the factors selected in step 1 on the housing purchase decision.

The impact factors selected after the survey in step 1 are those with an evaluation rate of over 50% of the total number of respondents. The content of the questionnaire in step 1 includes the personal information of the survey respondents and the hypothetical factors that affect the decision to buy a house so that the respondent rates it with an impact or not. The hypothetical factors are the factors the author has inherited from relevant studies. In addition, the survey respondents can also add other impact factors that are not included in the questionnaire. The number of questionnaires is determined according to formula 1.

$$n = t^2 . p.q/e^2 \text{ (Hair et al. 1998)} \qquad (1)$$

www.jst.org.in DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110

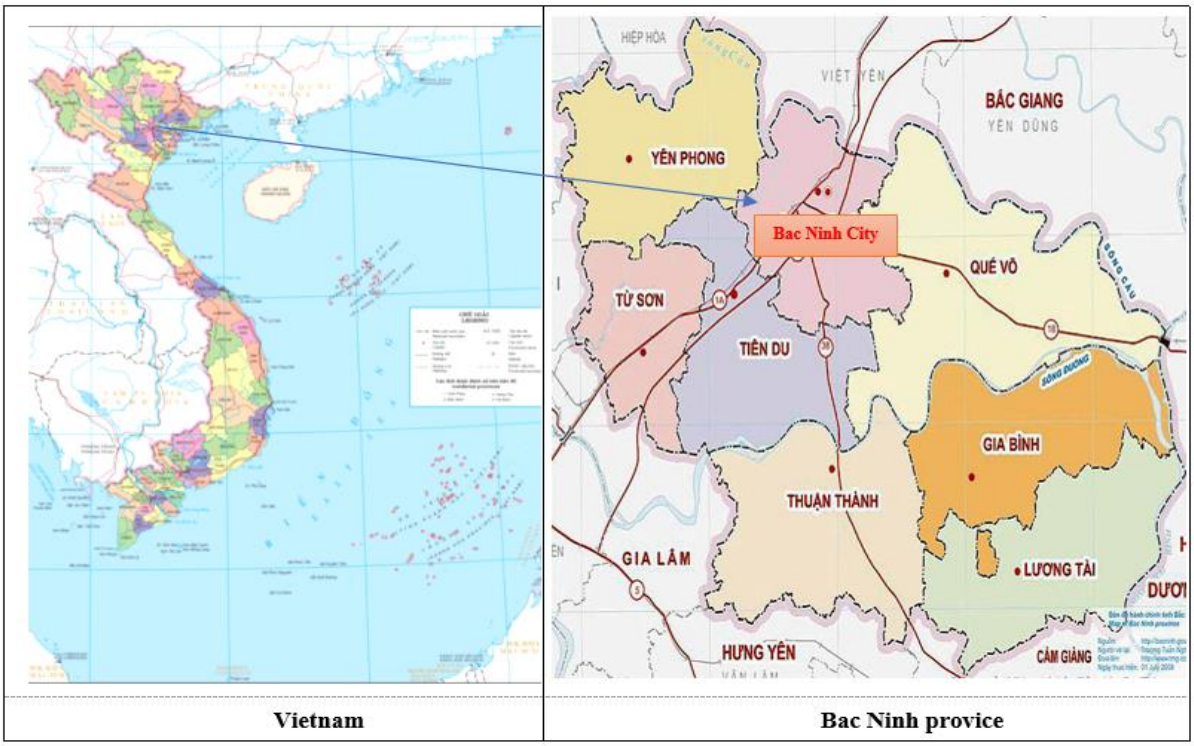

Fig. 1. Location map of Bac Ninh city, Bac Ninh province

Where n is the number of respondents; t - distribution value corresponding to the selected confidence level; p - estimated percentage of the population; q = 1 - p; e - permissible error (5 ÷ 15%). Choosing the confidence level is 95%, the corresponding distribution value is 1.96, the error is allowed to choose 5% and the assumption (pxq) is large, the most likely to happen is (0.5x0.5), the number of respondents is 384, the study surveyed 400 people.

The results of processing survey data in step 1 show that there are 39 hypothetical factors with an evaluation rate of over 50% of the total number of respondents and selected to assess the impact of each factor on the house purchase decisions. The selected factors are classified into 11 groups of influencing factors according to the characteristics of factors (Table 1). The research model of factors influencing housing purchase decisions is shown in Fig. 2.

Table 1. Factor groups influencing housing purchase decisions

Factor groups	Factor groups
1. Group of COVID-19 factors (CO)	Housing quality
Situation of the COVID-19 pandemic	Number of floors
Forecasting development of the COVID-19 pandemic	Reputation of the investor
2. Group of position factors (PO)	7. Group of housing service factors (SE)
Distance to center	Fire protection
Distance to hospital	Maintenance and repair
Distance to school	Environmental sanitation
Distance to entertainment venues	8. Group of real estate supply factors (SU)
3. Group of neighboring factors (NE)	housing supply
Infrastructure	Land supply
Environment	Real estate supply forecast
Security	9. Group of economic factors (EC)
4. Group of financial factors (FI)	Ability to use housing for business purposes

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

Housing price	Possibility of housing prices increase in the future
Buyer's financial ability	Housing use fees
Payment method	10. Group of buyers' individual factors (BU)
Credit	Sex
5. Group of real estate service factors (RE)	Age
Real estate brokerage	Motivation
Real estate consulting	Emotion
Real estate management	11. Group of legal factors (LE)
6. Group of individual factors (IN)	Regulations on who are allowed to buy houses
House area	Term of use of housing
Number of functional rooms	Home buying procedures
Direction of housing	Property taxes and fees

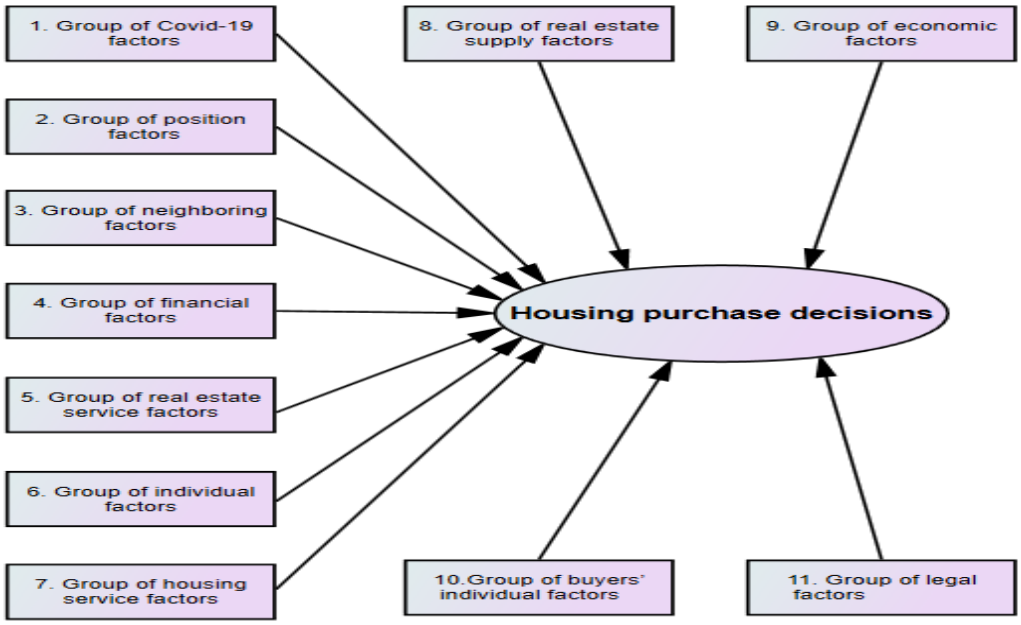

Fig. 2. Research model of factor groups influencing housing purchase decisions

The second step investigates factors' impact levels on housing purchase decisions according to the Likert scale (Likert, 1932). Influence levels are calculated (very influential - 5 points, fairly influential - 4 points, little influential - 3 points, very little influential - 2 points, not influential - 1 point). The number of samples was determined based on the requirements of Exploratory Factor Analysis and multivariate regression with at least 5 observations for 1 measurement variable (Hoang and Nguyen, 2005). Therefore, with 39 variables measuring the number of samples is 195. For multivariate regression analysis, the minimum sample size to achieve is 50 + 8 * p (p is the number of variables - p = 11) (Tabachnick and Fidell, 1996), so the minimum number of samples to be surveyed is 50 + 8 * 11 = 138. To ensure both the minimum requirement of exploratory factor analysis and multivariate regression analysis, the survey investigated 200 samples. The multivariate regression model determining the influence of factors on housing purchase decisions has the following formula:

$$Y = \beta o + \beta 1 * CO + \beta 2 * PO + \beta 3 * NE + \beta 4 * FI + \beta 5 * RE + \beta 6 * IN + \beta 7 * SE + \beta 8 * SU + \beta 9 * EC + \beta 10 * BU + \beta 11 * LE + \varepsilon \quad (2)$$

Where Y is the dependent variable representing the extent to which the commercial housing price is affected; β1, β2, β3, β4, β5, β6, β7, β8, β9, β10, β11: Regression coefficients of the corresponding variables are Groups of COVID-19

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

factors; position factors; neighboring factors; financial factors; real estate service factors; individual factors; housing service factors; real estate supply factors; economic factors; buyers' individual factors; legal factors; βo is constant; CO, PO, NE, FI, RE, IN, SE, SU, EC, BU, LE: the independent variables, respectively are Groups of COVID-19 factors; position factors; neighboring factors; financial factors; real estate service factors; individual factors; housing service factors; real estate supply factors; economic factors; buyers' individual factors; legal factors.

2.3. Statistical Analysis

Survey data on influencing factors and their influence were processed by SPSS20.0 software. The reliability of the scale was verified by Cronbach's Alpha coefficient. Data ensure reliability when Cronbach's Alpha coefficients were in the range [0.6-0.95] (Hair et al., 1998), total correlation coefficient> 0.3 (Hair et al., 1998). The exploratory factor analysis was used to shorten many measurement variables into a set of variables (factors) to make them more meaningful but still contain most of the information of the original set of variables (Hair et al., 1998). The exploratory factor analysis was assessed through KMO appropriate coefficient, Bartlett test, Eigenvalues coefficient, total explanatory variance, and load factor. Variables are only accepted when KMO is in the range [0.5-1] and its weight factors in other factors are less than 0.35 (Igbaria et al., 1995) or the distance between two load weights. The same variable in 2 different factors is greater than 0.3. According to Hair et al. (1998), with a sample size of about 200, weights of 0.40 should be chosen, so for sample size 200 in this study, we choose a load weight greater than 0.40. Besides, the scale is only accepted when the total variance explained is greater than 50%; Barlett's coefficient with Sig significance level less than 0.05 to ensure the factors are correlated with each other; Eigenvalue coefficients are valued from 1 to ensure the groups of factors are different.

III. Results

3.1. Overview of Bac Ninh city

Bac Ninh city is 30 km south of the center of Hanoi capital, Vietnam. In 2019, Bac Ninh city has an area of 82.64 km² and a population of 531,136 people. The economic growth rate (GDP) in the city reaches 12.3%; The economic structure has shifted positively, increasing the proportion of trade - service, industry - construction to over 98.6%. Bac Ninh city has 2 concentrated industrial zones and 5 industrial clusters and trade villages. Trade - services have been dynamically developed, especially financial services, training, healthcare, accommodation, dining. The city is planned quite synchronously, methodically in a modern, sustainable and urban direction. Urban infrastructure construction planning and investment have been actively implemented, many traffic routes connecting the inner suburbs and central roads are newly built and upgraded; many large-scale urban area projects were invested and put into use such as Vu Ninh - Kinh Bac, Hoa Long - Kinh Bac, Ho Ngoc Lan III; New urban area on Le Thai To street; New urban area in King Duong Vuong street; Nam Vo Cuong new urban area, etc (Bac Ninh City People's Committee, 2020).

3.2. Overview of the housing purchase in Bac Ninh city

The housing transactions are concentrated mainly in the residential areas of Vo Cuong, Vu Ninh, Nam Son, Vu Ninh, Kinh Bac, Dai Phuc wards, etc (Fig. 3.). According to the results collected at the Bac Ninh City Branch of Land Registration Office in the first 6 months of 2020, the number of home buyers and homeownership registration procedures decreased compared to the first 6 months of 2019 (Table 2). Specifically, the number of house buyers and the number of houses bought and registered ownership during the COVID-19 pandemic equals about 78% of the total transactions in the same period in 2019.

The main reason is the social gap, and so many factories, factories, and service establishments have to reduce the scale or stop operating so the income decreases, the number of workers also decreases, so the number of people buying houses also decreases.

Table 2. The results of buying a house in Bac Ninh city

Criteria	Unit	The first 6 months of 2019	The first 6 months of 2020	Volatility	
				House buyers	Percentage (%)
Number of house buyers	buyer	1369	1073	296	78.38
Number of houses purchased	house	1407	1105	302	78.54

Source: Bac Ninh City Branch of Land Registration Office (2020)

Fig. 3. Ocean commercial-residential area, Bac Ninh city

3.3. Results of analyzing the impact of factors on commercial housing prices

The results of assessing the reliability of the scale through Cronbach's Alpha coefficients for 7 groups of factors show that Cronbach's Alpha coefficients range from 0.632 to 0.898, the correlation coefficient of the total variable is greater than 0.3 (Table 3). Thus, the scale used to evaluate the factors influencing housing purchase decisions is reliable and suitable for subsequent analysis.

Table 3. Results of reliability analysis of the scale

Element and measurement variables	Correlated total variable	Element and measurement variables	Correlated total variable
1. Group of COVID-19 factors (CO - Alpha = 0.852)		Housing quality	0.828
Situation of the COVID-19 pandemic	0.874	Number of floors	0.794
Forecasting development of the COVID-19 pandemic	0.823	Reputation of the investor	0.784
2. Group of position factors (PO - Alpha = 0.763)		7. Group of housing service factors (SE - Alpha = 0.632)	
Distance to center	0.765	Fire protection	0.762
Distance to hospital	0.798	Maintenance and repair	0.743
Distance to school	0.693	Environmental sanitation	0.634
Distance to entertainment venue	0.681	8. Group of real estate supply factors (SU - Alpha = 0.895)	
3. Group of neighboring factors (NE - Alpha = 0.874)		housing supply	0.827
Infrastructure	0.884	Land supply	0.851
Environment	0.816	Real estate supply forecast	0.864

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

Security	0.835	9. Group of economic factors (EC - Alpha = 0.761)	
4. Group of financial factors (FI - Alpha = 0.833)		Ability to use housing for business purposes	0.803
Housing price	0.847	Possibility of housing prices increase in the future	0.782
Buyer's financial ability	0.865	Housing use fees	0.74
Payment method	0.733	10. Group of buyers' individual factors (BU - Alpha = 0.813)	
Credit	0.754	Sex	0.842
5. Group of real estate service factors (RE - Alpha = 0.771)		Age	0.793
Real estate brokerage	0.832	Motivation	0.784
Real estate consulting	0.783	Emotion	0.743
Real estate management	0.706	11. Group of legal factors LE - Alpha = 0.898)	
6. Group of individual factors (IN - Alpha = 0.861)		Regulations on who are allowed to buy houses	0.876
House area	0.875	Term of use of housing	0.818
Number of functional rooms	0.832	Home buying procedures	0.832
Direction of housing	0.878	Property taxes and fees	0.861

The exploratory factor analysis's suitability test is done through KMO appropriate coefficient. The research results have determined that KMO = 0.697 and satisfy the condition of 0.5 <KMO <1, so analyzing the discovery factor is suitable with actual data. Besides, Barlett test results give Sig values equal to 0.00 and less than 0.05 (Table 4). This proves that the measurement variables are linearly correlated with the representative factor. The load factor of the components is greater than 0.60 (Table 5), so the exploratory factor analysis has practical significance, independent variables ensure the accuracy included in the regression analysis model to determine the extent of influence of factors on housing purchase decisions.

Table 4. KMO and Bartlett's Test results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.697
Bartlett's Test of Sphericity	Approx. Chi-Square	1972
	df	167
	Sig.	0.000

The results of multivariate regression analysis in Table 6 show that the Sig. coefficient equals 0.00 less than the significance level of $\alpha = 1\%$, so the regression model is significant, the independent variables affect the dependent variable Y. The corrected R^2 value equal to 0.824 shows the independent variables included. Regression run affects 82.4% of the change of the dependent variable, the remaining 17.6% is due to non-model variables and random errors. In addition, the Durbin Watson coefficient has a value of 1.876, ranging from 1.5 to 2.5, so no first-order correlation occurs. The variance magnification (VIF) of all variables included in the model is less than 2, so the research model does not have multi-collinear phenomena. In addition, the variables included in the study are statistically significant (Sig. Equals 0 and is less than 0.05). From the standardized regression coefficients, the regression equation has been determined as formula 3.

Table 5. Weight of rotation matrix

Measurement variable	Group of influencing factors										
	1	2	3	4	5	6	7	8	9	10	11
CO1	0.872										
CO2	0.833										
PO1		0.817									
PO4		0.806									

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

PO2		0.794									
PO3		0.761									
NE2			0.753								
NE3			0.712								
NE1			0.693								
FI1				0.863							
FI2				0.857							
FI4				0.826							
FI3				0.791							
RE2					0.766						
RE3					0.754						
RE1					0.711						
IN4						0.867					
IN2						0.803					
IN3						0.784					
IN1						0.741					
IN5						0.692					
IN6						0.683					
SE1							0.821				
SE3							0.813				
SE2							0.794				
SU1								0.852			
SU2								0.841			
SU3								0.794			
EC3									0.765		
EC1									0.714		
EC2									0.678		
BU1										0.831	
BU2										0.811	
BU4										0.796	
BU3										0.774	
LE3											0.784
LE2											0.712
LE1											0.687
LE4											0.624

$$Y = -7.836 + 0.946 * CO + 0.524 * PO + 0.603 * NE + 0.697 * FI + 0.375 * RE + 0.482 * IN + 0.341 * SE + 0.248 * SU + 0.527 * EC + 0.465 * BU + 0.597 * LE \quad (3)$$

Table 6. Results of regression analysis

Group of factors	Regression coefficient	t	Multicollinearity statistics		Impact percentage (%)	Order of influence
			Error (Sig.)	VIF		
Constant	- 7.836					
CO	0.946	0.547	0	1.752	16.30	1
FI	0.697	0.521	0	1.443	12.01	2

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

NE	0.603	0.652	0	1.328	10.39	3
LE	0.597	0.113	0	1.645	10.28	4
EC	0.527	0.032	0	1.885	9.08	5
PO	0.524	0.613	0	1.564	9.03	6
IN	0.482	0.451	0	1.873	8.30	7
BU	0.465	0.576	0	1.572	8.01	8
RE	0.375	0.422	0	1.783	6.46	9
SE	0.341	0.448	0	1.435	5.87	10
SU	0.248	0.542	0	1.034	4.27	11
Sig. F = 0.000						
Coefficient R^2 = 0.873						
Corrected R^2 coefficient = 0.824						
Durbin-Watson = 1.846						

IV. Discussion

The data processing results show that all 39 factors belonging to 11 groups of impact factors included in the multivariate regression analysis model affect the decision to buy a house with different percentages of effects. The COVID-19 factor group has the strongest impact with an impact percentage of 16.30%, followed by the remaining 10 groups of factors. The group of demand factors for real estate has the smallest percentage of impact (4.27%) (Fig. 4). Due to the impact of the COVID-19 pandemic, production and business activities decreased in size due to the decrease in demand for chemical products, especially for goods exported abroad because of many border closures. Therefore, the income of workers decreased, so the demand for housing also decreased. However, because Vietnam, including the city of Bac Ninh, has well implemented the COVID-19 prevention measure, the number of foreigners doing production and business in Bac Ninh has increased, leading to an increase in demand for housing. These entities increase over the same period in 2019, but the total number of houses purchased in the first 6 months of 2020 decreases compared to the same period in 2019.

The group of financial factors has the second level of impact (12.01%) on the decision to buy a house because the house price is quite high compared to the income of the people. Besides, the financial ability of the buyer is also limited, while the bank interest rate on the loan has not decreased, so it does not affect the increase in demand for housing. The group of neighboring factors such as infrastructure, environment, security, and the group of legal factors has a similar level of impact (10.39% and 10.28%). The same goes for the group of economic factors and the group of house location factors with the impact level of 9.08% and 9.03% respectively. The individual factor group of the house and the group of individual factors of the house buyer have a similar rate of impact (8.30% and 8.01%). Real estate services such as brokerage, consulting, and real estate management have an impact level of 6.46% greater than that of housing service factors 5.87% such as fire prevention and fighting factors. The group of real estate supply factors such as housing supply, residential land, and housing supply forecast also have an impact on the decision to buy a house, but with the smallest level of impact.

Compared to previous studies, this study has shown more groups of factors influencing the decision to buy a house. Specifically, the study of GRUM and GRUM, (2015) indicated 8 groups of influencing factors or the study of Chin, (2016) showed 4 groups of influencing factors. This study showed 11 groups of influencing factors on decisions to buy houses and with the number of more influencing factors (39 factors). The level of impact of the factor groups on housing purchase decisions is also different. Some studies have shown that the group of factors most influencing the decision to buy a house is the financial factor (AL-Nahdi et al., 2015; Archer, 2020; Dewita et al., 2018). Some other studies have shown that the group of factors most influencing the decision to buy housing is the legal factor (Chen et al., 2018; Kim and Cho, 2010; Rogers and Power, 2020).

Several studies have shown that the group of factors that most influence housing buying decisions is the particular group of home buyers (Chin, 2016; Kamal and Pramanik, 2015). In Bac Ninh city, the above groups of factors have an impact on the decision to buy a house but do not have the strongest impact, but the COVID-19 factor group has the biggest impact. The difference in the groups of influencing factors and the level of impact of the groups on the decision to buy a house is due to differences in natural, socio-economic conditions, individual characteristics of the home buyers, and decided by the disease factor.

www.jst.org.in *DOI: https://doi.org/10.46243/jst.2021.v6.i05.pp99-110*

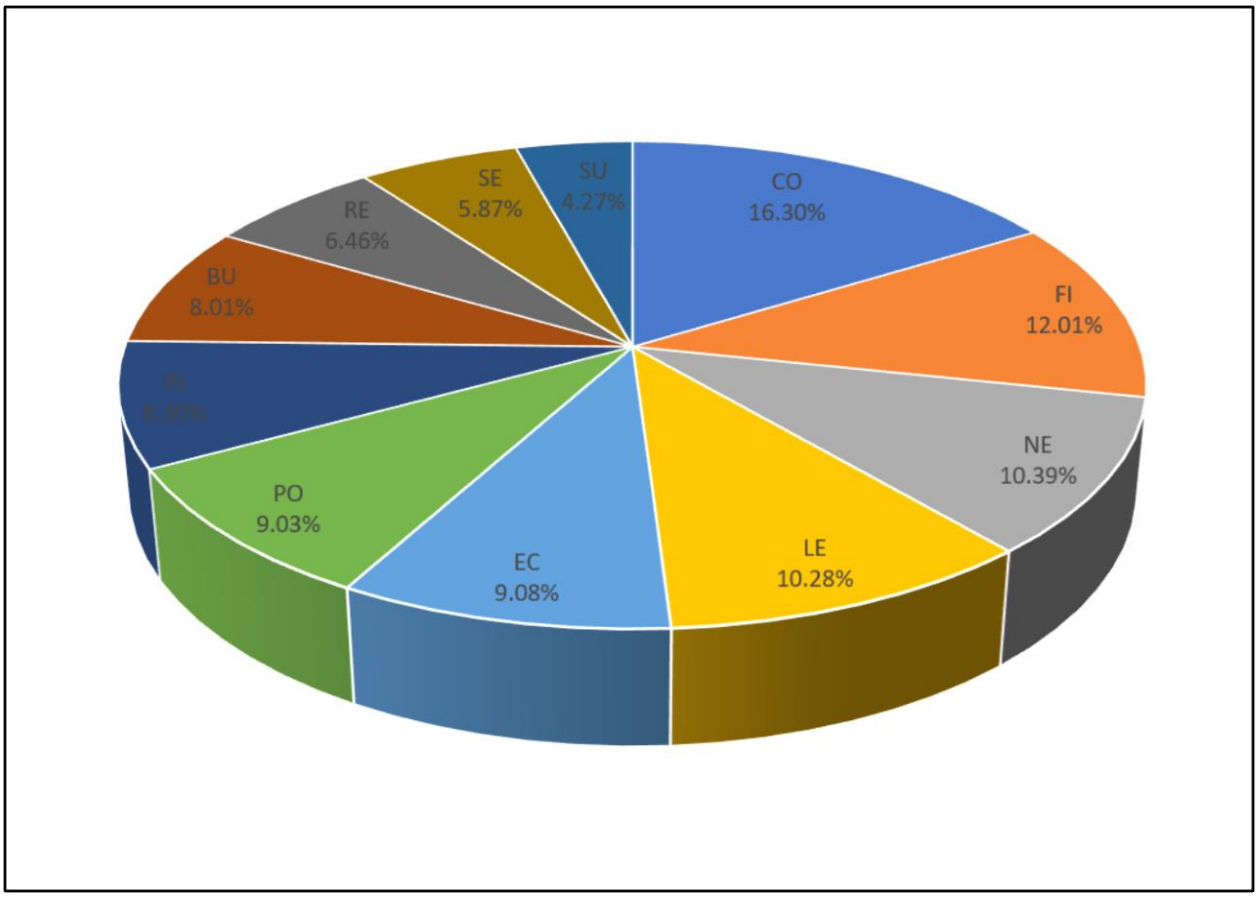

Fig. 4. Impact percentage ratios of factor groups on housing purchase decisions

For the housing market to meet the needs of buyers in the context of the COVID-19 pandemic, at the same time to ensure stable business operations of businesses need to implement some key solutions in order of priority on the level of impact of factors influencing the decision to buy a house. Specifically, measures to prevent and control COVID-19 epidemics should be strengthened, such as checking the health of inbound persons, limiting crowds, wearing masks and checking body temperature in public places; quarantining people at risk of infection, vaccinating against COVID-19, disclosing information, and forecasting of the COVID-19 pandemic, etc.

For people to have the income to buy houses, it is necessary to be implemented policies to ensure stable jobs and change the actual form of working directly to the form of working online; at the same time, there is a reduction in interest rates on housing loans; increasing the time to pay the money to buy a house and reducing the first payment when buying a house. In addition, it is necessary to apply information technology in brokerage, consultancy, and promotion of housing products so that people can look up online without the need for real estate agents. Besides, it is necessary to improve infrastructure, ensuring security and living environment in housing areas to best meet the requirements of home buyers along with reducing housing use fees. In addition, it is necessary to study buyers 'preferences and needs in terms of location, area, number of bedrooms, and direction of houses to build houses to meet buyers' desires.

V. Conclusion

The decision to buy houses is influenced by 11 factor groups with 39 influencing factors. The group of factors COVID-19 has the strongest impact with an impact percentage of 16.30%, the group of demand factors for real estate has the smallest impact with an impact percentage of 4.27%. The remaining groups of factors influence the decision to buy a house with the impact percentage from 5.87% to 12.01%. For people to be able to buy houses, it is necessary to be implemented solutions such as promoting measures to prevent and control pandemic COVID-19; changing the way of working from direct to online; reducing interest rates on housing loans; increasing loan repayment period, and reducing the first amount to pay when buying houses; promoting the application of information technology in online housing brokerage, consulting and advertising; housing creation to better meet the needs of homebuyers. The study

only assessed the impact of the COVID-19 pandemic on the decision to buy houses in Bac Ninh city, so it is necessary to study its impact in other localities in the future.

References

Ahmed, H., Jilani, T. A., Haider, W., Hasany, S. N., Abbasi, M. A., & Masroor, A. (2020). Producing Standard Rules for Smart Real Estate Property Buying Decisions based on Web Scraping Technology and Machine Learning Techniques. *International Journal of Advanced Computer Science and Applications (IJACSA)*, *11*(3), Article 3. https://doi.org/10.14569/IJACSA.2020.0110363.

Al-Haddad, S. (2011). *Factors Affecting Buying Behavior of an Apartment: An Empirical Investigation in Amman, Jordan*. /paper/Customers%E2%80%99-Intention-Towards-Purchasing-Apartment-Kamal-Pramanik/7125284151b4f6ab3a785782ef5c5d61e28ed1e6.

AL-Nahdi, T. S., Nyakwende, E., Banamah, A. M., & Jappie, A. A. (2015). *Factors Affecting Purchasing Behavior in Real Estate in Saudi Arabia*. *6*(2), 13.

Archer, T. (2020). The mechanics of housing collectivism: how forms and functions affect affordability. Hous. Stud., 1–30. https://doi.org/10.1080/02673037.2020.1803798.

Bac Ninh City Branch of Land Registration Office (2020). Statistics on registration of land use rights, house ownership in Bac Ninh city.

Bac Ninh City People's Committee (2020). Report on socio-economic development of Bac Ninh city.

Chen, B., Yang, X., & Zhong, N. (2020). Housing demand and household saving rates in China: Evidence from a housing reform. *Journal of Housing Economics*, *49*, 101693. https://doi.org/10.1016/j.jhe.2020.101693.

Chen, J., Hui, E. C.-M., Seiler, M. J., & Zhang, H. (2018). Household tenure choice and housing price volatility under a binding home-purchase limit policy constraint. *Journal of Housing Economics*, *41*, 124–134. https://doi.org/10.1016/j.jhe.2018.06.004.

Chia, J., Harun, A., Kassim, A.W.M., Martin, D., Kepal, N. (2016). *Understanding factors that influence house purchase intention among consumers in Kota Kinabalu: an application of buyer behavior model theory*. undefined. URL /paper/understanding-factors-that-influence-house-purchase-chia-Harun/ff377bd7c5df372139d2e1a5851cc539fa2a1f1e (accessed 11.30.20).

Chin, K. S. (2016). *Attributes Influencing Home Buyers' Purchase Decision: A Study of Residential Property in Setia Alam*. Undefined. /paper/Attributes-Influencing-Home-Buyers%E2%80%99-Purchase-A-of-Chin/897300f3e8e4c9c07be86b4cbd2790bccc41ef42.

Cho, S.-H., Newman, D. H., & WEAR, D. N. (2005). Community Choices and Housing Demands: A Spatial Analysis of the Southern Appalachian Highlands. *Housing Studies*, *20*(4), 549–569. https://doi.org/10.1080/02673030500114433.

Daniell, J., & Struyk, R. (1997). The Evolving Housing Market in Moscow: Indicators of Housing Reform. *Urban Studies*, *34*(2), 235–254. https://doi.org/10.1080/0042098976168.

Davis, M. A., Oliner, S. D., Peter, T. J., & Pinto, E. J. (2020). The Impact of Federal Housing Policy on Housing Demand and Homeownership: Evidence from a Quasi-Experiment. *Journal of Housing Economics*, *48*, 101670. https://doi.org/10.1016/j.jhe.2020.101670.

Dewita, Y., Yen, B. T. H., & Burke, M. (2018). The effect of transport cost on housing affordability: Experiences from the Bandung Metropolitan Area, Indonesia. *Land Use Policy*, *79*, 507–519. https://doi.org/10.1016/j.landusepol.2018.08.043.

Di, Z. X. (2009). Does Second-Home Ownership Affect Primary Housing Demand? *Housing Studies*, *24*(3), 321–332. https://doi.org/10.1080/02673030902814606.

Du, R., & Zheng, S. (2020). Agglomeration, housing affordability, and new firm formation: The role of the subway network. *Journal of Housing Economics*, *48*, 101668. https://doi.org/10.1016/j.jhe.2020.101668.

Grum, B., & Grum, D. K. (2015). A model of real estate and psychological factors in decision-making to buy real estate. *Urbani Izziv*, *26*(1), 82–91.

Hair, Jr. J. F., Anderson R. E., Tatham R. L. and Black W. C. (1998). "Multivariate Data Analysis (5th ed.)". New York: Macmillan Publishing Company.

Hoang, T. C. and Nguyen, M. N. (2008). "Analyzing research data with SPSS". Hong Duc Publishing House. Ho Chi Minh City.

Igbaria, M., Pavri, E, and Huff, S. (1989). "Microcomputer application: An empirical look at usage". Information & Management, 16(4), 187-196.

Kamal, M., & Pramanik, S. A. (2015). *Customers' Intention Towards Purchasing Apartment in Dhaka City, Bangladesh: Offering an Alternative Buying Intention Model* (SSRN Scholarly Paper ID 2823377). Social Science Research Network. https://papers.ssrn.com/abstract=2823377.

Kim, K.-H., & Cho, M. (2010). Structural Changes, Housing Price Dynamics and Housing Affordability in Korea. *Housing Studies*, *25*(6), 839–856. https://doi.org/10.1080/02673037.2010.511163.

Lei, L. (2017). *The Study of Factors Influencing Chinese Customers' Purchase Decision of Residential Condo in Bangkok*. http://dspace.bu.ac.th/handle/123456789/2262.

Li, S.-M. (2000). The Housing Market and Tenure Decisions in Chinese Cities: A Multivariate Analysis of the Case of Guangzhou. *Housing Studies*, *15*(2), 213–236. https://doi.org/10.1080/02673030082360.

Li, Y., Zhu, D., Zhao, J., Zheng, X., & Zhang, L. (2020). Effect of the housing purchase restriction policy on the Real Estate Market: Evidence from a typical suburb of Beijing, China. *Land Use Policy*, *94*, 104528. https://doi.org/10.1016/j.landusepol.2020.104528.

Likert, R. A. (1932). "A technique for measurements of attitudes", Archives of Psychology, Vol. 140, No 55.

Pham, P., N., (2020). Trading in real estate in the context of the COVID-19 epidemic in Vietnam. *National scientific conference: "Policy overcoming the impact of COVID-19 for economic recovery and development"*, October 15, 2020, National Economics University, Hanoi.

Pham, P., N., Doan, T., D., & Ngo, K., N., (2020). Impact of COVID-19 epidemic on Vietnam's real estate market. National *Scientific Workshop: "COVID-19 Policy Impact and Reflection*", June 19, 2020, Academy of Finance, Hanoi.

Ratchatakulpat, T., Miller, P., & Marchant, T. (2009). Residential Real Estate Purchase Decisions in Australia: Is it More Than Location? *International Real Estate Review*, *12*(3), 273–294.

Rogers, D., & Power, E. (2020). Housing policy and the COVID-19 pandemic: The importance of housing research during this health emergency. *International Journal of Housing Policy*, *20*(2), 177–183. https://doi.org/10.1080/19491247.2020.1756599.

Salleh, N. A. (2015). *Influencing Factors of Property Buyer in Hillside Residential Development*. 10.

Song, Y., & Zhang, C. (2020). City size and housing purchase intention: Evidence from rural-urban migrants in China. *Urban Studies*, *57*(9), 1866–1886. https://doi.org/10.1177/0042098019856822.

Tien, N., (2020). Opportunities and challenges for Viet Nam real estate brokers covid-19 climate. https://doi.org/10.13140/RG.2.2.24430.23369.

Thanaraju, P., Mentaza Khan, P. A., Juhari, N. H., Sivanathan, S., & Md Khair, N. (2019). factors affecting the housing preferences of homebuyers in Kuala Lumpur. *planning Malaysia journal*, *17*(9). https://doi.org/10.21837/pmjournal.v17.i9.593.

Ullah, F., & Sepasgozar, S. M. E. (2020). Key Factors Influencing Purchase or Rent Decisions in Smart Real Estate Investments: A System Dynamics Approach Using Online Forum Thread Data. *Sustainability*, *12*(11), 4382. https://doi.org/10.3390/su12114382.

Źróbek, S., Trojanek, M., Źróbek-Sokolnik, A., & Trojanek, R. (2015). The influence of environmental factors on property buyers' choice of residential location in Poland. *Journal of International Studies*, *8*, 11.