House purchase intention during pandemic COVID-19 in Surabaya, Indonesia

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Abstract

Purpose – Since the COVID-19 occurred, large-scale social restriction (Pembatasan Sosial Berskala Besar-PSBB) has taken place, and that has led family members to carry out their activities at home. This condition impacts both directly and indirectly the intention of house purchase, as a result of lifestyle changes during the pandemic. A house now serves as a residence, office, as well as school. This study aims to determine the influences of physical attributes, neighborhood preferences, financial concerns, financial risk preferences, health risk preferences, and COVID anxiety towards house purchase intention.

Design/methodology/approach – This associative study was carried out from February to May 2021 in the residents of Surabaya aged 20–34 years old as prospective first-home buyers, with relatives at risk of contracting COVID-19 (belong in the susceptible group or live with a family member who is prone to the COVID-19 virus, including having a comorbidity, elderly (= 60 years old), having a low immune system or autoimmune disease, obese). Data were gathered using online questionnaires from which 226 respondents were acquired. Data were analyzed using the PLS-SEM 3.0 technique.

Findings – The results showed that physical attributes, neighborhood preferences, financial concerns, financial risk preferences, and COVID anxiety significantly influence house purchase intention. Furthermore, neighborhood preferences, financial risk preferences, and COVID anxiety as moderating variables also significantly influence house purchase intention.

Practical implications – This study was carried out in Surabaya as the second-largest city after Jakarta with the highest COVID-19 mortality rate, which is useful for exploring the lifestyle changes and property demand as a result of the pandemic; Developers gain a business opportunity by offering properties that are multifunction and health-oriented.

Originality/value – The COVID-19 pandemic becomes a trigger for a change in the property market that needs to be studied further.

Keywords House purchase intention, Physical attributes, Neighborhood preferences, Financial concerns, Financial risk preferences, Health risk preferences, COVID anxiety

Paper type Research paper

Introduction

During the COVID-19 pandemic, work and school activities are carried out at home. Studying at home (online learning) and working from home (WFH) are alternative learning and working activities to recognize the risk of COVID-19 infection. The announcement published in March 11, 2020 (WHO, 2020d) also encourages people to carry out various activities with family members at home. These activities or tasks can be completed using technology in flexible workspaces, especially at home, which is known as telecommuting or telework (Vyas and Butakhieo, 2021). These events trigger changes in the needs or lifestyle (Jansen *et al.*, 2011) in housing products. House purchase intention is the possibility of a plan or willingness of consumers to buy a house (Wu *et al.*, 2011) that is influenced by physical attributes, neighborhood preferences, financial concerns (Chia *et al.*, 2016; Hoxha and Zeqiraj, 2020) and risk preferences (Letkiewicz and Heckman, 2018). However, during the pandemic the needs of the function of a house shift to a more versatile use, covering the psychological factor and the health aspect regarding COVID anxiety. Individuals with high COVID anxiety will try to

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carry out their activities at home to avoid the possibility of contracting the virus during the pandemic (Asmundson and Taylor, 2020), thus the house intended to be purchased ought to be adjusted to the needs.

The health aspect in the physical attributes is more highlighted to try to eliminate any possibility of contracting the virus (Asmundson and Taylor, 2020). Anxiety encourages them to choose to stay at home. Home office (Megahed and Ghoneim, 2020), kitchen (Nielsen, 2020), and sports space (Akbari et al., 2021) at home become more important as they cannot do it outside. There is a change in perception related to physical factors due to the pandemic (Kocur-Bera, 2022). Individuals with high COVID anxiety tend to socially withdraw (Asmundson and Taylor, 2020) so they are not concerned about neighborhood preferences such as the distance from their house to school or office, as all activities are carried out online. Commercial facilities are viewed as the source of the spread of the virus, so they prefer locations far from the crowd for their houses regarding health risk preferences (Mastroianni, 2021). On the other hand, the declining economic condition during the pandemic reduces the buying power of the public, which resulted in the government issuing a policy of reducing the reference interest rate (Santia, 2021), 0% down payment incentive, and free Value-Added Tax (Pajak Pertambahan Nilai) for house purchases (Putri, 2021) in hopes of increasing the house purchase intention of the public. The decrease in income affects financial risk preferences, where the higher the financial risk preferences (risk-seeking), the higher the house purchase intention will be as the individual will be able to bear the financial risk (Letkiewicz and Heckman, 2018), and vice-versa.

The first aim of this study is to determine the influences of physical attributes, neighborhood preferences, financial concerns, risk preferences, and COVID anxiety towards house purchase intention during the pandemic. The second is to test the influences of the factors towards house purchase intention with COVID anxiety as the moderating variable. The usage of COVID anxiety in the study is due to the anxiety of contracting the virus not only from outside but also from within the household. The stages of the study include first, outlining the background and supporting theories of the study. Second, explaining the research methodology on latent and moderating variables. The third is to explain the results. The last stage will show the conclusion and suggestions of the study results.

This study is carried out in Surabaya on residents aged 20–34 years old in the susceptible group or had a relative in the COVID-19 susceptible group. This age range has the highest house purchase intention (Lindblad et al., 2017). Surabaya is the second-largest city after Jakarta, and during the pandemic places second in the area with the highest risk of contracting the virus (black zone) (Sidik, 2020). Therefore, this study is expected to contribute to participants in the property market such as developers or property brokers to help prospective buyers build or offer a house that fulfills the changing needs and lifestyle due to the pandemic. Furthermore, this study can be used as a reference on the behavior changes in buyers or other market participants in regards to the health aspect and risk preference in house purchase in the events of other pandemics other than COVID-19.

Literature review
Housing attributes preferences and risk preferences
In the theory of planned behavior (TPB), intention is interpreted as a willingness of an individual to do something or make a certain decision (Ajzen, 1991). Han and Kim (2010) state that consumers will gather information, evaluate every alternative option based on personal preference, experience, and external environment which are aimed at purchase intention. Purchase intention is the willingness of an individual to plan or purchase a product in the future (Wu et al., 2011), among which is housing purchase intention. Purchase intention can predict purchase behavior (Ajzen, 2008). Generally, a house purchase is triggered by the

transition in a person's life cycle, and the mismatch of the current house with the current need (Jansen *et al.*, 2011). During the pandemic, the need for an additional room or a particular workspace increases as a result of the work-from-home system (WFH).

Chia *et al.* (2016) and Hoxha and Zeqiraj (2020) state that house purchase intention is influenced by physical attributes, neighborhood preferences, and financial concerns. Physical attributes are the physical characteristics of the house such as size, layout, quality, and design (Wyatt, 2007; Kocur-Bera, 2022). Gibler and Nelson (2003) state that a shift in lifestyle can change the function and value of physical attributes. During the COVID-19 pandemic, there is a surge in online shopping, webinar, distance learning, and online entertainment so that people are more comfortable at home (Megahed and Ghoneim, 2020). Hence, a home office, workout space, and a secluded layout become in-demand physical attributes (Alati, 2020; Megahed and Ghoneim, 2020). As is the case for the people in Tehran, during the pandemic they prioritize physical attributes that support mental health, such as gardens, and large windows for sun exposure and ventilation over other physical attributes (Akbari *et al.*, 2021; Zarrabi *et al.*, 2021). Akbari *et al.* (2021) also state the increase of use frequency of kitchen, living room, and bedroom.

H1. Physical attributes significantly influence house purchase intention.

Neighborhood preferences are the preference of the area surrounding the house that consists of location and neighborhood security (Tan, 2011). Location is the distance of the house from public places or frequently visited places such as schools, workplaces, hospitals, and relatives' residences (Opoku and Abdul-Muhmin, 2010; Rahadi *et al.*, 2015; Tan, 2011). Location is also one of the deciding factors in house purchase (Daly *et al.*, 2003), especially for consumers who live in the city (Vasanen, 2012). Tan (2011) also states that consumers are willing to pay a premium for locations that are close to schools and workplaces, but it will decrease if they are also close to shopping centers and hospitals, as it will reduce the quality of living. However, the close distance to hospitals might prove to be a benefit due to the pandemic.

The preferred neighborhood security model is the gated communities or clusters (Tan, 2011), 24-hour patrols, and CCTV cameras (Sundrani, 2019), but consumers widen it by considering the health aspect of the neighborhood during the pandemic. The survey of JLL (2020) found that consumers have a high interest in the cluster system and outdoor area facilities for exercise and other activities during the pandemic. Exercising is an activity that supports mental and physical health during the pandemic (Akbari *et al.*, 2021). However, pay attention to the population density in the surrounding area, as a too closely-knit neighborhood layout will increase the risk of virus transmission (CNN Indonesia, 2020).

H2. Neighborhood preferences significantly influence house purchase intention

Financial concerns are the financial consideration when purchasing a house. Financial concerns consist of income, price, down payment, installments, and credit interest rates for those who utilize Home-Ownership Credit (Kredit Kepemilikan Rumah, KPR) (Adair *et al.*, 1996; Saw and Tan, 2014). Previous studies state that financial concerns significantly influence house purchase (Gupta and Malhotra, 2016; Kaynak and Stevenson, 1982; Mohanna and Alqahtany, 2020; Saw and Tan, 2014; Thaker and Sakaran, 2016). Gupta and Malhotra (2016) state that income is the only factor that significantly influences house purchase as the people in India want to buy a house only when their income allows it. The higher the income, the higher the house purchase intention will be (Cohen *et al.*, 2009; Lindblad *et al.*, 2017). However, during the pandemic, most people experience a reduced income (Hidayati *et al.*, 2020), which might influence house purchase intention. Reduced income will reduce demand, which will also reduce house prices (Sugianto, 2021). To rectify this, the government reduced the reference interest rates (Santia, 2021) and gave incentives in the form of 0% DP (down payment), and waived taxes for house purchases (Putri, 2021). The reduced interest rates

might help prospective buyers to pay less interest. The government incentive might have a significant influence on house purchase intention (Zhang *et al.*, 2018) as it creates an opportunity by alleviating the financial burdens in house purchase, encouraging the house purchase intention in prospective buyers.

H3. Financial concerns significantly influence house purchase intention.

Other than the factors mentioned above, Letkiewicz and Heckman (2018) state that risk preferences influence house purchase intention. Risk preferences are the tendencies or the willingness of an individual to be involved in a certain activity or make a risky decision (Hertwig *et al.*, 2019). Simply put, risk preferences can be interpreted as the extent to which an individual is willing to take a risk (Charness *et al.*, 2013). Understanding risk preferences holds the key to understanding and predicting a person's action (Dohmen *et al.*, 2011). Based on the DOSPERT scale, risk preferences are divided into 5 domains which are financial, ethical, health/safety, social, and recreational (Blais and Weber, 2006). Risk preferences are domain-specific, meaning that it is not equal in every field (Weber, 2009). An individual who shows a high-risk preference in making an investment decision (financial) might not always have the same risk preference level when doing an extreme sport (adventure recreational). The risk preferences in this study are in the financial and health domain.

Financial risk preference is the willingness of an individual to bear financial risk. Dohmen *et al.* (2011) state that financial risk preference can be influenced by the opinion of others and the economic condition. Various studies have been conducted worldwide on the shift in risk preferences caused by the pandemic, which is one of the worst crises this generation has faced (Drichoutis and Nayga, 2022). The study in London (Angrisani *et al.*, 2020), Beijing (Lohmann *et al.*, 2020), and Greece (Drichoutis and Nayga, 2022) found that there was no significant shift in the financial risk preference even when the number of infection cases was on the rise. Conversely, the study in Wuhan by Bu *et al.* (2020) and Shachat *et al.* (2020) found that the people in Wuhan felt more at risk of contracting the virus and more anxious about the pandemic compared to other provinces (COVID anxiety tends to be higher), which lead to a significant decrease in financial risk preferences. This finding corresponds to the phenomenon in Indonesia in the early stages of the pandemic. The property market experienced a steep decline due to the widespread panic caused by the pandemic, which resulted in the decline of financial risk preferences of the public, represented by the withholding of cash and delaying house purchase (Bosnia, 2020). The shift in financial risk preferences affects house purchase intention as purchasing a house comes with great financial risk. The higher the financial risk preferences (risk-seeking), the higher the house purchase intention will be (Letkiewicz and Heckman, 2018).

H4. Financial risk preferences significantly influence house purchase intention.

Health risk preferences are the willingness of an individual to bear health risks. Health risks have been the main concern of many during the pandemic, regarding the risk of virus transmission. Virus transmission can happen anywhere, including at home. The risk can be minimalized by following the guidelines of WHO, such as preparing sufficient bedrooms and bathrooms for self-isolation. If not possible, having a room with ample ventilation and keeping a distance between family members might reduce the risk of transmission (WHO, 2020c). The study of Ikeda *et al.* (2020) in Japan showed an increase in the health risk preferences of the public (risk-seeking) as the virus spreads, as a result of reduced sensitivity to losses, akin to the risk of cancer from smoking, and global warming risks, the risk of contracting the COVID-19 virus in public places are considered common. Studies on health risk preferences during the pandemic are still limited in Indonesia, but interest in health insurance shows an increase (Safitri, 2020). Anderson and Mellor (2008) state that

health risk preferences affect insurance purchases as a sign of the risk aversion nature in people. Health risk preferences significantly influence risky health behavior, such as smoking and not wearing a seatbelt (Anderson and Mellor, 2008). During the pandemic, various activities, mainly the ones outside, are considered risky health behavior (IDSA, 2020). Individuals with a low health risk preference will tend to avoid those activities and carry out most of their activity indoors. The lower the health risk preferences (risk-averse), the higher the house purchase intention will be, especially for houses that are compliant with the WHO guidelines to reduce the risk of contracting the virus (WHO, 2020a).

H5. Health risk preferences significantly influence house purchase intention.

The COVID-19 pandemic creates a change in lifestyle and the economy. Fear, anxiety, and stress are normal responses to the COVID-19 pandemic (Mastroianni, 2021). COVID anxiety which is the anxiety of contracting the COVID-19 virus (Taylor *et al.*, 2020) is a deciding factor of an individual's behavior. If the COVID anxiety is low, said individuals will be less likely to wash their hands or follow physical distancing protocols. Conversely, high COVID anxiety will encourage the individual to excessively wash their hands, socially withdraw, and panic buy health products (Asmundson and Taylor, 2020). Individuals with high COVID anxiety will tend to misinterpret changes in their body to be a symptom of COVID, while also reluctant to go to the hospital as they consider it to be the source of transmission, or relentlessly consult health workers. These behaviors are in line with the health guidelines, but when over-done are harmful both personally and for others (WHO, 2020c). This condition shows that COVID anxiety influences house purchase intention as high anxiety influences the behavior that minimalizes the risk of contracting the virus (Asmundson and Taylor, 2020). An adequate house is one of the methods to minimalize said risk. The higher the COVID anxiety, the higher the house purchase intention will be to minimalize the probability of contracting the virus at home.

H6. COVID anxiety significantly influences house purchase intention.

Individuals with high COVID anxiety will pay more attention to physical attributes as they will try with all their power to avoid contracting the virus (Asmundson and Taylor, 2020), thus choosing to stay at home to carry out all their activities. Home office, kitchen, and workout space are becoming a necessity as they might not do any activity outside before the pandemic subsides. Moreover, individuals with high COVID anxiety will tend to withdraw socially (Asmundson and Taylor, 2020), pay little to no mind to the neighborhood preferences such as the distance from the house to relatives, schools, or even the workplace, as all their activities are done online. The proximity to health facilities is considered a risk of contracting the virus, hence they will choose a location far from the center of crowds. Furthermore, a high financial risk preference that shows an individual's ability to bear financial risks also encourages the house purchase intention (Letkiewicz and Heckman, 2018) to solve the problem of transmission among family members.

H7. COVID anxiety moderates the effect of physical attributes towards house purchase intention.

H8. COVID anxiety moderates the effect of neighborhood preferences towards house purchase intention.

H9. COVID anxiety moderates the effect of financial risk preferences towards house purchase intention.
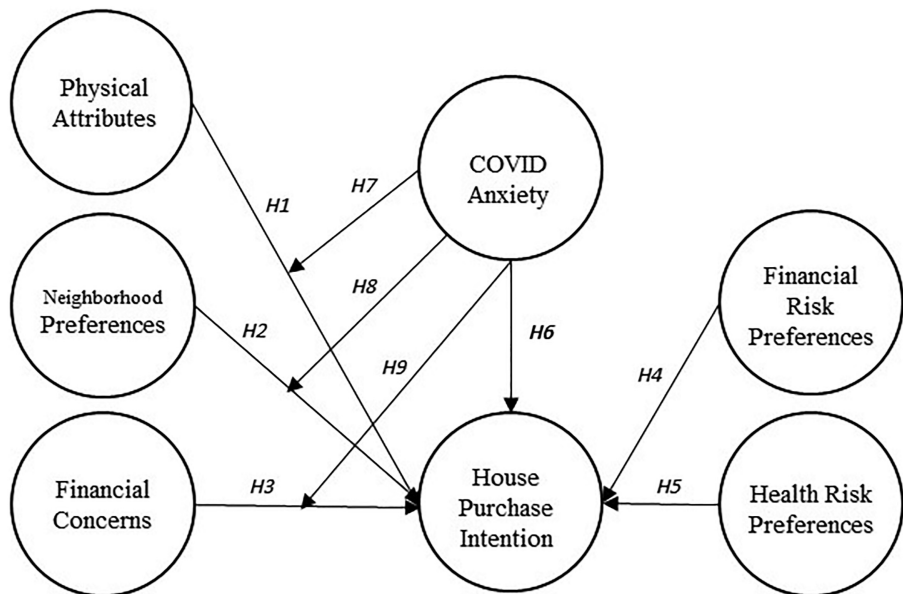
The research model can be seen in Figure 1.

Figure 1.
Development concept

Methodology

The associative study is used to explain the relationship between two or more variables, which is the relationship between exogenous variables of physical attributes, neighborhood preferences, financial concerns, financial risk preferences, health risk preferences, COVID anxiety towards house purchase intention as the endogenous variable. The population of this study is the residents of Surabaya who have been selected using purposive sampling technique, aged 20–34 years old as many as 818,135 residents (28.17% of the total population of Surabaya) with a position of 80% had prepared savings to buy a house (AllProperty Media, 2020) and the highest house purchase intention (Lindblad *et al.*, 2017). Furthermore, the age group is selected whether it is a group that has family member in the same house susceptible to the COVID-19 virus, (1) having a comorbidity (diabetes, asthma, coronary diseases, hypertension, or other chronic illnesses), or (2) elderly (60 years old and above), or (3) having a low immune system or autoimmune disease, obese (BMI above 27 kg/m^2) (Satuan Tugas Penanganan COVID-19, 2020).

The data was gathered from February to May 2021 through Google Forms questionnaire that is distributed through social media of Instagram, WhatsApp, and Line. The total questionnaire submitted was 263, of which 226 were eligible and can be analyzed further. During this period, the government implemented Micro-Scale Community Activity Restrictions in 7 (seven) provinces in Java and Bali, one of the provinces being East Java. The city of Surabaya is located in the province of East Java. The restrictions include offices, restaurants, and places of worship operating at 50% capacity. Shopping centers or malls, and construction sites operate at 100% capacity with health protocols implemented. Teaching and learning activities are still carried out online. Public facilities are temporarily suspended (Menteri Dalam Negeri, 2021).

The questionnaire is compiled in a closed question with the first part containing the respondent screening and respondent's demographic data, and the second is the 1 (one) endogenous variable (5 items), 5 (five) exogenous variables (30 items), and 1 (one) moderating variable (9 items) measured using the five-point Likert scale to avoid ambiguous results, with 1

showing strongly disagree/highly unimportant/highly unlikely, to 5 showing highly agree/highly important/highly likely. Demographic data processing was done through coding and descriptive analysis. The data is described in general without making any conclusion.

Next, the hypothesis test was done using the Partial Least Square Structural Equation Modeling (PLS-SEM) using the SmartPLS3 software to maximize the variance of the endogenous variables or R-square and minimize error in the prediction. The benefit of using this technique is the ability to predict to a great accuracy when there is an anomaly in small-sized samples, missing data, data with abnormal distribution, or when using latent variables. PLS-SEM focuses on the difference between the observed (in the case of manifest variables) or approximated (in the case of latent variables), the dependent variable values, and the predicted value of the model in question. The PLS-SEM analysis used two analysis models, which are the inner model and the outer model. The outer model or outer relation or measurement model is a specification of the relationship between variables and indicators. The outer model defines the characteristics of the latent constructs with the manifest variables. The inner model or inner relation or structural model is the specification of the relationship of latent variables, which are exogenous variables towards endogenous variables (Hair *et al.*, 2017).

The outer model is a valuation model of validity and reliability of the variables of the study, which is used to define the relationship of each indicator block towards the construct or latent variables. The instrument is considered valid if it is able to measure the expected data and disclose the variable in question accurately. The principle of validity contains two elements, thoroughness, and accuracy. A valid measurement tool will be able to disclose the data accurately and give a thorough description of said data. Evaluation for the outer model can be done through Convergent Validity (CV) and Discriminant Validity (DV). CV is the measurement of the correlation between the score of the indicator and of the latent variable, where individual reflective measurements (loading factor) are considered high if the correlation value > 0.70. Indicators with a loading factor between 0.40 and 0.70 are considered to be eliminated if they can increase Composite Reliability (CR) and Average Variance Extracted (AVE) above the suggested value. Next, DV is the measurement of indicators with latent variables by comparing the AVE value of each construct towards the correlation of constructs in the model, which is AVE > 0.50. CR shows the degree to which common latent reliability (unobserved) indicates the consistency of the internal measurement and a construct-forming indicator, interpreted as Alpha Cronbach with a composite reliability value of 0.60–0.70 (Hair *et al.*, 2017).

The inner model testing is the testing of the relationship between constructs or latent variables of the study model through bootstrapping to find the Estimate for Path Coefficients through the *t*-statistic test. The T-statistic test serves as a test for the endogenous and endogenous variables by looking at the *p*-value or confidence interval. This study uses 5,000 bootstrap subsamples and 226 respondents. The use of a bootstrap subsample in large numbers is crucial to ensure the stability of the result. The t-value for the test of both sides is 1.65 (confidence interval 90%), 1.96 (confidence interval 95%) and 2.58 (confidence interval 99%). The next stage is to predict the model in PLS-SEM, starting with the selection of the path weighting while paying attention to the highest R^2 value for endogenous latent variables and applies broadly to every type of specification and PLS-SEM path model estimation. R^2 for the latent variables has the same interpretation as regression, showing the diversity of the endogenous construct that can be explained exogenous construct simultaneously. The effect of the R^2 value is divided into three categories, which are 0.25 (weak), 0.50 (moderate), and 0.75 (substantial). Meanwhile, Q-square (Q^2) is used for the predictive relevance of the endogenous variable that is considered towards the exogenous variable. If $Q^2 > 0$, then the model has predictive relevance, while $Q^2 < 0$ means that the model lacks predictive relevance (Hair *et al.*, 2017).

Results

In Table 1, the proportion of the respondents is shown, female (54%) and male (46%), mainly aged 20–24 years old (72%), provided that the population of Surabaya aged 20–24 years old is 292.414 people. The highest education of 53% of the respondents is undergraduate (S1%). Most respondents earn under Rp 50,000,000 per year (45%) and between Rp 50,000,000-Rp 250,000,000 per year (38%). In terms of residence status, 88% live in a house owned by their parents and 95% have not purchased their first house. Moreover, 70% of respondents will live with an extended family member in the house they will purchase, and 72% of them will live with a family member in the susceptible group. 97% of the respondents want to purchase a house in East Java, where 77% have prepared the funds, among which 83% prepared them in the form of savings. 41% of the respondents want to purchase the house in the next 1–3 years, while 43% others in the next 4–6 years.

Information		Frequency	Percentage
Gender	Male	103	45.58%
	Female	123	54.42%
Age	20–24	163	72.12%
	25–30	48	21.24%
	31–34	15	6.64%
Highest education	High school	88	38.94%
	Diploma	11	4.87%
	Undergraduate (S1)	120	53.10%
	Graduate and above	7	3.10%
Occupation	Student	105	46.46%
	Businessman	49	21.68%
	Private employee	45	19.91%
	Freelancer	27	11.95%
Yearly income	< Rp 50,000,000	99	43.81%
	Rp 50,000,000-Rp 250,000,000	88	38.94%
	Rp 250,000,001-Rp 500,000,000	29	12.83%
	> Rp 500,000,000	10	4.42%
Residence status	Parents-owned	200	88.50%
	Personally owned	10	4.42%
	Relative-owned/rent	4	7.08%
Upcoming house purchase	First purchase	216	95.58%
	Second purchase or above	10	4.42%
Family members excluding core family members that will be staying	None	69	30.53%
	1 person	57	25.22%
	2 persons	69	30.53%
	3 persons	31	13.72%
Family members in the susceptible group	Will be staying together	162	71.68%
	Will not be staying together	64	28.32%
Preferred house location	Surabaya and surrounding, East Java	214	97.33%
	Jakarta and surrounding, West Java	3	1.33%
	BAli, Kalimantan, Sulawesi	1	1.32%
House fund availability	Yes	173	76.55%
	No	53	23.45%
House purchase period	1–3 years	93	41.15%
	4–6 years	96	42.48%
	7–9 years	13	5.75%
	10 or more years	24	10.62%

Table 1.
Respondents profile

Annual income below Rp. 50,000,000 is a bracket that is not subject to income tax by the government and is the general average of minimum wage set by the government. Respondents in the low-income group will take longer to plan their first home purchase. Table 2 shows that 76.5% of respondents have set aside funds to buy a house within 1–3 years (38.5%) and 4–6 years (29.6%), while 23.5% have not provided funds. Respondents who have not yet the ability to buy a house are more likely to choose to live with their parents, according to the prevailing culture in Indonesia (the Sandwich generation) (Velrahga, 2021).

Table 3 shows the mean and standard deviation values on study variables. Respondents consider the physical attributes regarding the availability of bedrooms and bathrooms for self-isolation (μ = 4.73, SD = 0.635) and kitchen for cooking (μ = 4.70, SD = 0.545). For neighborhood preferences, respondents prioritize a house with a cluster system (μ = 4.57, SD = 0.739) and open green space for recreation and exercise (μ = 4.56, SD = 0.616), while the proximity to public transport is not very sought after (μ = 3.12, SD = 1.329) as there is fear of contracting the virus from crowd centers and the general interaction in public transports.

Financial concerns in respondents are focused on the reduced prices of houses during the pandemic (μ = 4.44, SD = 0.797), as well as the waived taxes for certain types of houses (μ = 4.38, SD = 0.850) and the reduced property interest rates (μ = 4.36, SD = 0.771). Financial risk preferences tend to be in mixed mutual funds and money markets (μ = 4.36, SD = 0.936 dan μ = 4.31, SD = 0.977) as those products are considered to be able to help respondents have enough funds to plan a house purchase. The health risk preferences of choice are not shopping in malls to avoid contamination (μ = 4.07, SD = 1.105). COVID anxiety in respondents is mainly wearing a mask at home as a preventive measure when feeling unwell (μ = 4.39, SD = 1.017). These considerations show that there is a change of preferences in consumers during the pandemic, so respondents have a house purchase intention on houses that have a green open area (μ = 4.70, SD = 0.553) to reduce the risk of infection.

In Table 4, a validity test was done while paying attention to the convergent validity if the loading value is > 0.7, so during the process indicators of PA2, PA4, PA6, PA7, NP1, NP3, NP4, NP5, FC2, FC3, HRP2, HRP4, HRP6, COV7 are discarded one by one from the model with a loading factor value limit of >0.6 and still meeting the validity requirement. The value of the Cronbach alpha coefficient and a composite reliability score of >0.60. The AVE value of greater than 0.50 shows that the construct is able to explain more than 50% of the variance in the measurement items. Cronbach Alpha and composite reliability have a value of >0.6, meaning that the outer model is done and every variable is considered valid and reliable.

Discriminant validity through the Fornell-Larcker criterion and cross-loadings shows that each variable and its indicators have met the requirement that is a value of >0.7, although a value of above 0.6 is still used (Table 5). The inner model evaluation is for testing the relationship between latent variables in the model, using the determination coefficient R^2 that functions as a measurement of the prediction capability of the model of the study.

| Fund availability | Income | House purchase period | | | | |
		1–3 y	4–6 y	7–9 y	≥10 y	Total
Yes	< Rp 50,000,000	14	30	4	9	57
	Rp 50,000,000-Rp 250,000,000	43	29	1	4	77
	Rp 250,000,001-Rp 500,000,000	23	5	1	0	29
	> Rp 500,000,000	7	3	0	0	10
No	< Rp 50,000,000	4	23	7	8	42
	Rp 50,000,000-Rp 250,000,000	2	6	0	3	11

Table 2.
Comparison Income vs House Purchase Period

Variable	Code	Indicator	Mean	SD
Physical Attributes (Akbari *et al.*, 2021; Megahed and Ghoneim, 2020; Opoku and Abdul-Muhmin, 2010)	PA1	Sufficient bedroom and bathroom for self-isolation	4.726	0.635
	PA2	Sufficient kitchen for daily cooking	4.704	0.545
	PA3	Sufficient space for exercise	4.341	0.859
	PA4	Sufficient garden for natural lighting and air circulation	4.584	0.634
	PA5	Sufficient home-office or separate spaces for office, study, and attend seminars virtually	4.531	0.711
	PA6	House design with technological features such as touchless (no need for direct touch) or smart home (activated using gestures or voice)	4.053	1.042
	PA7	Sufficient space for parents or multi-generation family members to live together	4.513	0.748
Neighborhood Preferences (Akbari *et al.*, 2021; Tan, 2011)	NP1	House in a cluster area, considering the safety factor	4.571	0.739
	NP2	House in a complex with ample open green space for recreation and exercise	4.558	0.616
	NP3	Low population density in the surrounding area	4.221	0.900
	NP4	House located near commercial areas (shops, markets, shopping centers) to fulfill daily needs	4.473	0.777
	NP5	House located near public transport	3.115	1.329
	NP6	House located near schools	4.128	1.029
	NP7	House located near the place of work	4.261	0.949
	NP8	House located near health facilities (hospital, clinics, labs)	4.416	0.823
Financial Concerns (Adair *et al.*, 1996; Saw and Tan, 2014; Zhang *et al.*, 2018)	FC1	Reduced house prices during the pandemic increases my purchase interest	4.438	0.797
	FC2	Reduced income during the pandemic reduces my house purchase intention	3.407	1.195
	FC3	0% DP incentive during the pandemic increases my house purchase interest	3.686	1.228
	FC4	Waived taxes for certain houses during the pandemic increase my house purchase interest	4.381	0.850
	FC5	Reduced interest rates during the pandemic increases my house purchase interest	4.363	0.771
Financial Risk Preferences (Blais and Weber, 2006)	FRP1	Investing 5% of yearly income into speculative stocks during the pandemic in preparation of buying a house	4.292	1.045
	FRP2	Investing 10% of yearly income into mixed mutual funds during the pandemic in preparation for buying a house	4.358	0.936
	FRP3	Investing 10% of yearly income into the market during the pandemic in preparation of buying a house	4.305	0.977
	FRP4	Investing 10% of yearly income into new business during the pandemic in preparation of buying a house	4.058	1.114

Table 3.
Variable descriptive

(continued)

Variable	Code	Indicator	Mean	SD
Health Risk Preferences (Blais and Weber, 2006; IDSA, 2020)	HRP1	Eating in indoor restaurants during the pandemic	3.934	1.290
	HRP2	Going to the gym during the pandemic	2.372	1.422
	HRP3	Shopping in malls during the pandemic	4.066	1.105
	HRP4	Attending an event with more than 30 other participants during the pandemic	2.872	1.419
	HRP5	Going on work-related trips out of town during the pandemic	3.978	1.232
	HRP6	Traveling by plane during the pandemic	2.748	1.464
COVID Anxiety (Taylor *et al.*, 2020; WHO, 2020a, c)	COV1	I am concerned about contracting the COVID-19 virus from family members in the house	4.190	1.177
	COV2	I am afraid that contracting the COVID-19 virus from family members is inevitable due to my current living situation	4.066	1.237
	COV3	I am concerned that my healthcare at home is incapable of protecting my loved ones	4.146	1.220
	COV4	I am concerned that my healthcare at home is incapable of protecting myself	4.142	1.207
	COV5	I am concerned about contracting the COVID-19 virus due to the current neighborhood situation	3.889	1.370
	COV6	I am concerned about contracting the virus after touching door handles, deliveries, or mail at home	4.142	1.226
	COV7	I often clean the house using disinfectant	3.987	1.195
	COV8	I wear a mask at home when I am feeling unwell	4.394	1.017
	COV9	I look for information on the Internet on how to avoid virus transmission at home	4.345	1.071
House Purchase Intention (Al-Nahdi, 2014; Armitage and Conner, 2001)	HP!1	I intend to purchase a house in a cluster that provides an open green area	4.704	0.553
	HP!2	I will not be hesitant to recommend a cluster that adheres to the COVID-19 health protocols	4.637	0.639
	HP!3	I am likely to do a transaction with a developer that provides a house that adheres to the COVID-19 health protocols	4.580	0.695
	HP!4	I am hoping to buy a house that is designed to adapt to the lifestyle changes due to the pandemic, such as having a home office, and workout space	4.611	0.664
	HP!5	I plan to buy a house that is designed to adapt to the lifestyle changes due to the pandemic	4.597	0.692

Table 3.

The result of the test of R^2 of house purchase intention is 52.4% with an adjusted R^2 of 50.4%, meaning that the research model is able to explain house purchase intention by 52.4%.

In Table 6 and Figure 2, this study proves that physical attributes, neighborhood preferences, financial concerns, financial risk preferences, and COVID anxiety significantly influence house purchase intention. Moreover, COVID anxiety moderates the relationship between neighborhood preferences and financial risk preferences towards house purchase intention. Conversely, health risk preferences do not significantly influence house purchase

Variable	Factor loading	Cronbach's alpha	Composite reliability	AVE
PA 1 ← PA	0.742	0.603	0.790	0.559
PA 3 ← PA	0.830			
PA 5 ← PA	0.662			
NP 2 ← NP	0.628	0.713	0.824	0.541
NP 6 ← NP	0.800			
NP 7 ← NP	0.777			
NP 8 ← NP	0.725			
FC 1 ← FC	0.732	0.795	0.878	0.707
FC 4 ← FC	0.910			
FC 5 ← FC	0.870			
FRP 1 ← FRP	0.868	0.881	0.918	0.737
FRP 2 ← FRP	0.899			
FRP 3 ← FRP	0.891			
FRP 4 ← FRP	0.770			
HRP 1 ← HRP	0.837	0.798	0.882	0.713
HRP 3 ← HRP	0.900			
HRP 5 ← HRP	0.793			
COV 1 ← COV	0.825	0.927	0.942	0.673
COV 2 ← COV	0.897			
COV 3 ← COV	0.899			
COV 4 ← COV	0.900			
COV 5 ← COV	0.899			
COV 6 ← COV	0.774			
COV 8 ← COV	0.655			
COV 9 ← COV	0.665			
HPI 1 ← HPI	0.791	0.898	0.925	0.711
HPI 2 ← HPI	0.868			
HPI 3 ← HPI	0.852			
HPI 4 ← HPI	0.822			
HPI 5 ← HPI	0.880			

Table 4.
AVE, Cronbach's alpha, and composite reliability value

and COVID anxiety does not moderate the relationship between physical attributes and house purchase intention. Ajzen (2016) states that preferences can predict intention. Moreover, the homeownership theory states that physical attributes, neighborhood preferences, and financial concerns need to be considered when planning to buy a house (Kiplinger's Personal Finance, 2002) juga Chia *et al.* (2016) dan Hoxha and Zeqiraj (2020).

Physical attributes such as the availability bedrooms and bathrooms that can be isolated independently, space to carry out activities such as sports at home, home office, as well as separated space that can be used for work, studying, and virtual seminars are physical attributes that significantly influence house purchase intention. The need for those spaces arises as a result of the change in lifestyle due to the pandemic, where a house is a place to do all the activities that can no longer be done outside. Workout space (Akbari *et al.*, 2021) as well as the availability of garden and ventilation (Akbari *et al.*, 2021; Zarrabi *et al.*, 2021) is considered to be the physical attributes that developers need to pay attention to after the pandemic so that exercise and other activities can still be done at home.

Neighborhood preferences that are measured by the proximity of the house to schools, workplaces, and health facilities influence house purchase intention to give time efficiency. The proximity to health facilities enables people to easily access the ever-increasing need for health services since the pandemic, although it might create a fear of contracting the virus. Neighborhoods with a green area become an alternative recreation spot as numerous

	PA	NP	FC	FRP	HRP	COV	HPI	PA*COV	NP*COV	FRP*COV
PA	0.748									
NP	0.501	0.735								
FC	0.080	0.094	0.841							
FRP	0.399	0.544	0.139	0.859						
HRP	0.342	0.404	0.088	0.493	0.845					
COV	0.466	0.504	0.129	0.676	0.465	0.820				
HPI	0.526	0.566	0.222	0.562	0.318	0.544	0.843			
PA*COV	−0.393	−0.264	−0.086	−0.157	−0.186	−0.286	−0.303	1.000		
NP*COV	−0.252	−0.405	−0.112	−0.252	−0.114	−0.269	−0.388	0.469	1.000	
FRP*COV	−0.144	−0.242	−0.063	−0.609	−0.156	−0.422	−0.271	0.189	0.396	1.000

Table 5.
Fornell-Larcker
criterion

Effects	Original sample	t-statistic	p-values
Direct Effects			
Physical Attributes → House Purchase Intention	0.217	3.227	0.001[*]
Neighborhood Preferences → House Purchase Intention	0.171	2.765	0.006[*]
Financial Concerns → House Purchase Intention	0.115	2.007	0.045[*]
Financial Risk Pref → House Purchase Intention	0.339	3.543	0.000[*]
Health Risk Pref → House Purchase Intention	−0.077	1.332	0.184
COVID Anxiety → House Purchase Intention	0.155	2.007	0.045[*]
Moderating Effects			
PA*COV → House Purchase Intention	−0.021	0.306	0.760
NP*COV → House Purchase Intention	−0.160	1.774	0.077[**]
FRP*COV → House Purchase Intention	0.123	1.805	0.072[**]
Note(s): Information: [*]Significant α = 5%; [**]Significant α = 10%			

Table 6.
Hypothesis testing
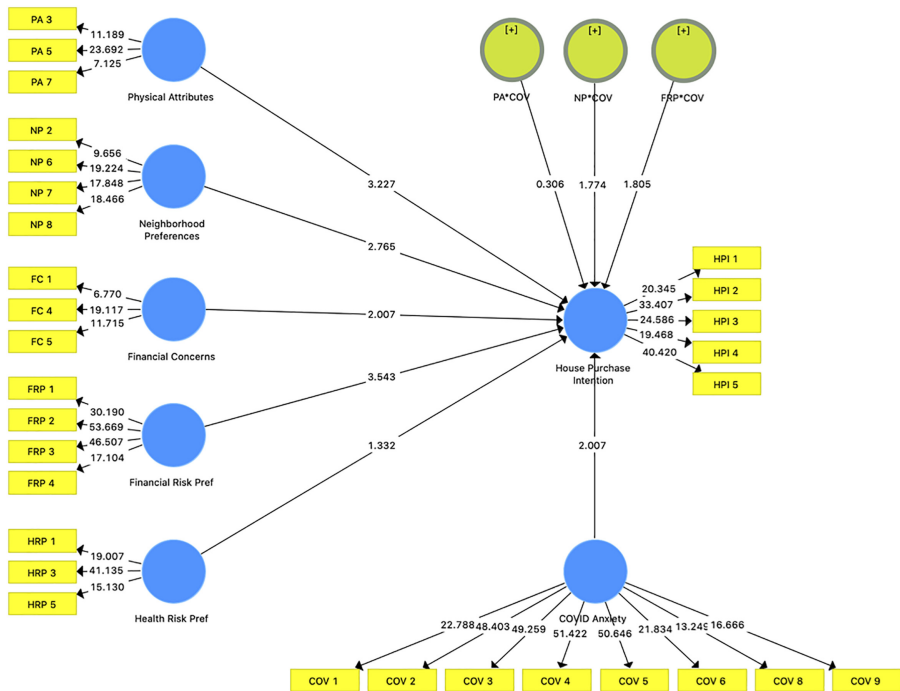
Figure 2.
Bootstrapping results

activities are no longer safe to be done in a closed space. Akbari *et al.* (2021) and Kocur-Bera (2022) state that sports both indoor and outdoor are activities that are needed during the pandemic, so ample space is needed.

Financial concerns regarding the reduction in price and tax incentive given by the government during the pandemic create an opportunity for the public to acquire a house with a low price so that they can be more lenient in allocating the budget for the house without compromising too much of the physical attributes and neighborhood preferences they want. On top of that, there is also a reduction in the interest rates, further reducing the financial burden on Home-Ownership Credit. These changes also reduce the fee that future

homeowners have to expend if they apply for a Home-Ownership Credit, further increasing the house purchase intention. Zhang *et al.* (2018) state that government incentives significantly influence house purchase intention.

The higher the financial risk preferences (risk-seeking), the higher the house purchase intention will be, and given the economic uncertainty during the pandemic, house purchase intention will be hard to be acted upon by individuals with a low financial risk preference (risk-averse). Risk-averse individuals will try to fulfill other needs or postpone their house purchase intention. Meanwhile, a risk-seeking respondent will try to use products from the mixed mutual funds and stocks during the pandemic to achieve their financial goal, namely to fulfill the need for funds in the long term which is 4–6 years. Purchasing a house is a risky decision (Kiplinger's Personal Finance, 2002; Le, 2018; Letkiewicz and Heckman, 2018) making the mutual funds, savings, and deposits the investment products of choice for conservative respondents who plan to purchase a house in the period of the next 1–3 years.

Health risk preferences do not significantly influence house purchase intention, as there is a diminishing sensitivity to risk, showing that people are more insensitive to health risks (comparing the risk of contracting COVID-19 in public spaces to the risk of getting cancer from smoking), especially now that the pandemic has been going on for quite some time (Ikeda *et al.*, 2020). The possibility of diminishing sensitivity to risk is for individuals no longer avoid risky health behaviors and disregard health risks at home. Therefore, house purchase intention is not influenced by health risk preferences. Anderson and Mellor (2008) state that health risk preferences significantly influence risky health behavior.

COVID anxiety significantly influences house purchase intention. However, COVID anxiety does not influence a moderating variable on physical attributes towards house purchase intention. This is because COVID anxiety is one of the main variables that influence house purchase intention, not as a variable that boosts or hinders house purchase intention. The higher the COVID anxiety or the fear of transmitting the virus between family members, the higher the house purchase intention will be. COVID anxiety is the individual's anxiety of contracting the virus from and transmitting it to other family members. Respondents with a susceptible family member who live together are exposed to risk if they contract the virus. Therefore, respondents are interested in buying a house that adheres to the guidelines from WHO to avoid transmitting the virus (WHO, 2020c). Asmundson and Taylor (2020) state that individuals with COVID anxiety adjust their behavior to minimize the risk of contracting the virus that can happen anywhere, including at home. Family is the main thing in terms of togetherness and health priority. The change in lifestyle during the pandemic has created the need for new physical attributes, such as working, attending school, and exercising at home with space for self-isolation (Akbari *et al.*, 2021; Megahed and Ghoneim, 2020; Sheth, 2020) when living with other family members and keep living together with a member that is susceptible to the virus.

COVID anxiety moderates the influence of neighborhood preferences and financial risk preferences towards house purchase intention. The higher an individual's COVID anxiety, the lesser the effect of neighborhood preferences towards house purchase intention will be. Everyone tries to avoid social interaction or contact in public places, wanting to carry out their activities at home instead (Asmundson and Taylor, 2020). Encounters with others in green areas in the neighborhood and indoor areas such as schools, workplaces, and health facilities will increase the likelihood of contracting the virus (WHO, 2020b). Moreover, COVID anxiety increases the influence of financial risk preferences towards house purchase intention. High financial risk preferences mean that the individual dares to bear financial risks, resulting in a strong urge to acquire a house that is sufficient to minimalize the risk of transmission at home, thus increasing their house purchase intention. The findings of this study are in contrast to Bu *et al.* (2020) who showed that a high COVID anxiety results in a low financial risk preference. This might be due to the fact that said study was conducted in

Wuhan which is the ground zero of COVID-19 and in the early stage of the pandemic, so the people in Wuhan are still in the adjustment phase.

Conclusion

This study is one of the early studies to consider the effect of the change in lifestyle and health awareness of the public during the pandemic towards factors of house purchase intention and involving COVID anxiety. The results of this study showed that physical attributes, neighborhood preferences, and financial concerns significantly influence house purchase intention. Financial risk preferences and COVID anxiety also have a significant influence on house purchase intention. COVID anxiety is able to moderate the effects of neighborhood preferences and financial risk preferences towards house purchase intention.

This study has several limitations. First, the respondents are the residents of Surabaya who are 20–34 years of age, meaning that the measurement period of intention towards the true purchase decision is in the medium period. Moreover, if the intention is carried out on a larger scale, it might be possible to measure intention in a more stable manner, increasing the prediction of the true purchase decision. On the bright side, young respondents who have experienced a pandemic will be more careful in making the decision of buying their first house due to the health aspect, while the number of family members and age of each member will be a main point of consideration. Second, house purchase intention is the true prediction of the purchase decision. There is no way of knowing the accuracy of the prediction of this study, as there is no measurement for the span of the time period to the purchase decision. This study is a situational study during the COVID-19 pandemic period of February to June 2021. There is no guarantee that the results of this study can be applied to other periods of the pandemic or normal conditions after the pandemic. Therefore, further studies on purchase decisions and analyzing the effects of the pandemic towards house purchases are required.

This study introduces the vision of developing an antivirus neighborhood that can be updated to stop the spread of the virus or to lessen the impact. Developers are expected to be able to follow the change in house design and environment design according to the changes in taste, lifestyle, and the pandemic for future projects. Therefore, physical attributes, neighborhood preferences, and health risk preferences can be applied in building a house to minimalize the risk of contracting other viruses in future pandemics. The need for houses now is not just for residence, but also as a home office, study room, a place to live together with parents as well as green area in the surrounding area.

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Appendix

Sample introduction to the questionnaire
Dear respondents
    We require your assistance in answering this questionnaire on house purchase intention during the COVID-19 pandemic. Thank you in advance for your willingness to participate.

Before completing the questionnaire, please check the criteria below:

(1) Are you between 20 and 34 years old and currently residing in Surabaya? Yes or no

(2) Are you or your family member(s) who lives in the same house possess one or more of this trait? Please fill according to you and your family's condition:
Belonging in the susceptible group towards COVID-19

(1) Having a comorbidity (diabetes, asthma, heart diseases, hypertension, or other chonic illness)

(2) Elderly (60 years old and above)

(3) Having a low immune system or autoimmune disease

(4) Obese (BMI exceeding 27 kg/m^2)

[Should any of the answer is no, then there is no need to advance with the questionnaire]

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