

# Millennial Generation (Gen-Y) Preferences Towards Landed House Ownership in Yogyakarta Urban Agglomeration Using Logistic Regression

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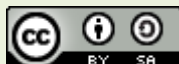
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## Abstract

The city of Yogyakarta has become a magnet for the millennial generation (Gen-Y), leading to increased urbanization as residents flock to the city. This surge has resulted in a growing demand for land to accommodate public facilities, social amenities, and housing for workers. Despite soaring land prices, driven by high demand, land stocks have not diminished. Over the last 16 years, land prices have escalated by 30 times. However, the wages of Gen-Y formal workers in the DIY region stand at IDR 2,361,434, with an annual increase of only 8.51%. This rapid growth in property prices has not kept pace with the income growth of the millennial generation, raising concerns about their ability to access landed house ownership. This study aims to identify the preferences of the millennial generation regarding landed house ownership in the Yogyakarta Urban Agglomeration. The analytical method employed is Logistic Regression, involving 125 respondents of Gen-Y workers aged 27 to 41 years in the Yogyakarta Urban Agglomeration. Seven variables, encompassing 25 categorical predictors, were considered. The significant indicators influencing Gen-Y preferences in landed house ownership include the cost of building a house, building materials, and the nominal installment of the house. The findings of this research can be instrumental for relevant stakeholders in formulating policies in the housing sector, particularly in the regulation of subsidized housing for the Gen-Y. The contribution of this study lies in providing essential information for informed decision-making and effective policy implementation to tackle the housing challenges faced by the millennial generation in the Yogyakarta Urban Agglomeration.

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## **Introduction**

The phenomenon of urbanization causes the need for land for housing to increase, triggering urban agglomeration. In the future, urban agglomeration will play a major role in socio-economic development in various regions Fang & Yu (2017). Tripathi & Mahey's (2017) observations of the correlation between urbanization and economic growth indicate that there is a significant impact of population growth on economic development in agglomeration cities. Variables that are often used to measure the level of city agglomeration are GRDP, number of workers, level of household consumption, level of investment financing, and housing infrastructure (Burriel, 2016; Haque & Patel, 2018; Sotoca, 2016; Tripathi & Mahey, 2017).

Since the start of the reform era in 1998, Indonesia has advanced towards an era of openness Khoirudin et.al. (2022). Along with city agglomeration, the development of the need for land for housing for urban residents is increasing, this is followed by an increase in land prices because landowners know that there will be development in the area (Burriel, 2016). Research on land prices often finds that increases in land prices are significantly influenced by location factors (Bateman, 2009; Gottlieb, 2009; Hin Li, 2009; Liang et al, 2018; Meyfroidt, 2017; Schulza, Wersinga, & Werwatz, 2014), so a proper land assessment is needed to estimated sales price of housing units in line with market conditions. Indonesian people, including those in the city of Yogyakarta and its surroundings, tend to prefer to live in landed houses rather than vertical housing such as flats, so that housing development in Indonesia tends to expand horizontally in urban agglomeration. The latest issue related to city agglomeration is that there is an increase in the population of the millennial generation or gen Y or residents born in 1981 to 1995, who live in urban areas and are feared to experience difficulties in accessing home ownership (Lee et al, 2019 and Yi & Li, 2015).

The city of Yogyakarta is a magnet for the millennial generation (Gen-Y) and triggers the urbanization of residents to the city. This triggers an increase in the need for land for public facilities, social facilities, and houses for workers. Land prices have soared due to high demand but land stocks remain, for example in the last 16 years land prices have increased 30 times. On the other hand, the wages of the Gen-Y of formal workers in DIY are IDR 2,361,434, with an annual increase of only 8.51%. The rapid growth in property prices is not proportional to the income growth of the millennial generation and it is feared that will have difficulty accessing ownership landed house. This research will focus on the preferences of the gen-Y in purchasing landed houses in the Yogyakarta Urban Agglomerations using 7 (seven) variables and the contribution of this paper is giving advice to the government of Yogyakarta Urban Agglomeration for housing policy decisions, especially providing

house for millennials generation. Most of the studies describe the preferences for selecting site and vertical housing in large metropolitan cities using a questionnaire technique (Rahadi et al., 2015; Azharya and Aritejo, 2021; and Firmanila and Rijanta, 2019) there is no research that discusses residential preferences for landed houses especially in urban agglomerations.

### **Literature Review**

The concept frequently employed to estimate housing unit prices is hedonic pricing, as highlighted by Rave, Morales, and Echavarría (2019). In their modeling of house selling prices (Grobel, 2019; Dubea and Legros, 2014) utilize the Spatial Autoregressive Conditional Heteroscedasticity (SARCH) method, which accounts for the factor of location dependency. Conversely, a separate study conducted in 2016 employs multiple methods to determine the value of house properties. This approach involves comparing the outcomes of the Ordinary Least Squares (OLS) model with the Maximum Likelihood estimation of the Spatial Error Model (SEM). Subsequently, spatiotemporal testing is performed using SARCH (Nasea, Berryb, & Adair, 2016).

External factors that commonly influence housing unit prices encompass the quantity of housing stocks, population density, macroeconomic conditions, permits and construction costs, and mortgage interest rates, as highlighted by Egner and Grabietz (2018), Haque, Rana, and Patel (2020), Lerbs (2014), and Meulen, Micheli, and Schmidt (2014). When examining consumer needs, variables often taken into account include building characteristics, legal aspects of land and buildings, physical aspects, building area, proximity to public transportation, and the availability of social-public facilities in the vicinity of buildings, as noted by Lyons (2015), Meyfroidt (2017), Schulza, Wersinga, and Werwatz (2014), and Yunus (2016). However, it is crucial to acknowledge that these variables may not fully capture consumer preferences concerning property ownership. This consideration is essential to prevent the creation of a housing stock void, potentially leading to issues such as empty urbanism.

A Research found that the reputation of apartment developers, apartment accessibility, attitudes towards purchasing apartments and subjective norms had an effect on the intention to buy apartments by millennials (Rahadi et al., 2015). It also found that physical quality, residential concept, and the location of the property affects the perception of consumer buying prices. Within the scope of the same study, the method of principal component analysis, Wilcoxon t-test, and pairwise correlation was used to determine consumer preferences with the results of determining house

prices influenced by physical quality, product image, financial condition, quality of life, accessibility, and location uniqueness (Rahadi et al., 2015).

Research in 2015 focused on the demand for housing for gen X and gen Y in Hong Kong using interview and questionnaire techniques on 1,300 respondents (Yi & Li, 2015), while this research focused on preferences for gen Y (population aged 27 to 41 years) in the Yogyakarta Urban Agglomeration (Yogyakarta City, Sleman Regency, and Bantul Regency) using a questionnaire technique on 125 respondents. A similar study was conducted by Firmanila and Rijanta (2019) who examined the preferences of UGM millennial educators in choosing housing using qualitative methods in 45 respondents to educators at UGM. A similar study was also conducted by Kaya, Ozdemir, & Dal (2019) who observed home buying behavior by gene Y at two universities using the Cronbach Alpha test analysis method; The Mann-Whitney U test; and the Kruskal Walls test, while this study will observe the preferences of Gen Y who are already working (having the ability to pay) in 3 districts/cities using the Cronbach Alpha test quantitative analysis method, and Python software-based Logistic Regression. A recent study conducted by Lee et al. (2019) using the Latent-class Choice Model resulted in findings that there are three groups of residential voter preferences in the X and Y genes, namely the younger - choosing to live in urban facilities, the affluent - pursuing economic status with home ownership luxury and higher education facilities, and middle-class-preferring a traditional lifestyle in the suburbs.

Most of the studies describe the preferences for selecting site and vertical housing in large metropolitan cities using a questionnaire technique. In contrast to the research conducted, which specifically investigates the preferences of Gen-Y individuals in purchasing landed houses within the Yogyakarta Urban Agglomeration, previous studies have primarily focused on site and vertical housing choices in larger metropolitan areas using survey methods. This distinction underscores the need to address the unique housing preferences of Gen-Y in the context of landed houses, offering a more targeted understanding for stakeholders and policymakers in the housing sector. This research also will focus on the preferences of the gen-Y in purchasing landed houses in the Yogyakarta Urban Agglomerations using seven variables such as the concept of housing, location accessibility, physical quality of buildings, financing schemes, price affordability, household income, and consumption levels. These seven variables are the result of elaboration of variables found in previous research compiled by Rahadi et al., (2015), Kaya, Ozemir, & Dal (2015), Firmanila and Rijanta (2019), and Azharya & Aritejo (2021).

**Method**

This study uses primary data sourced from 125 Generation-Y respondents who work in the Yogyakarta Urban Agglomeration. The approach used is a quantitative approach with logistic regression analysis method, the method is used to describe and examine the relationship between categorical outcome variables and categorical predictor variables.

Table 1. List of Categorical Predictor Indicators

| <b>Variables</b>              | <b>Categorical Predictor Indicators</b>   |   |
|-------------------------------|---|---|
| Concept of Housing            | 1. Architectural design<br>2. Housing type and size<br>3. Sights around   | 4. Surrounding Environment<br>5. Housing Site<br>6. Position facing the house   |
| Location Accessibility        | 1. Location of the house<br>2. The width of the road in front of the house<br>3. Pavement in front of the house<br>4. Distance from the house to the main road or collector road<br>5. Distance from the house to public facilities<br>6. Distance from the house to the nearest bus stop | 7. Distance from the house to the nearest station<br>8. Distance from the house to the nearest airport<br>9. Distance from the house to the place of work |
| Physical Quality of Buildings | 1. Type of building materials   | 2. Cost of constructing a physical building per square meter  |
| Financing Scheme              | 1. Method of financing<br>Amount of KPR down payment  | 3. Installment amount per month<br>Installment duration   |
| Price Affordability           | 1. Housing unit prices  |   |
| Household Income              | 1. Type of work of the respondent   | 2. Nominal income of the respondent   |
| Consumption Levels            | 1. Number of family members to be financed  | 2. Monthly installment obligations, if any  |

This method is suitable for models covering decision-making issues, which is why it is often used in statistical analyzes appearing in the economics and finance literature (Strzelecka et al, 2020). Logistic regression model coefficients are sought for by the method of maximum likelihood and by the generalized method of least squares. The calculation algorithm of the maximum likelihood

method is based on multiple estimation of all regression coefficients so as to maximize the probability of obtaining such results.

The categorical outcome variables in question are the physical and non-physical preferences of Gen-Y in the Yogyakarta Urban Agglomeration in owning landed houses, while the categorical predictor variables are attached in Table 1. The seven variables are variables that are predict to be consumer preferences in buying landed houses and 25 categorical predictor indicators are the indicator used to analyze what components influence consumer to buy landed house. The results of the reliability test using the Cornbach Alpha Test are showed in Figure 1. The test results are 0.894, if the test results are  $\geq 0.7$  then the data from the research variables are feasible for analysis to the next stage.

### Result and Discussion

The research data obtained shows that 62.2% of the Millennial Generation in APY do not have their own place to live, currently Gen-Y lives in a house owned by their parents or rents a house. As many as 32% of Gen-Y in APY who do not have their own place of residence have an undergraduate education background, 21% have a masters education background, and the rest have a doctoral, diploma, high school education background as can be seen in figure 2 below. This fact is in accordance with the phenomenon stated by Lee et al. (2019) and Yi & Li (2015) that agglomeration triggers an increase in Gen-Y living in urban areas and is feared to experience difficulties in accessing home ownership.

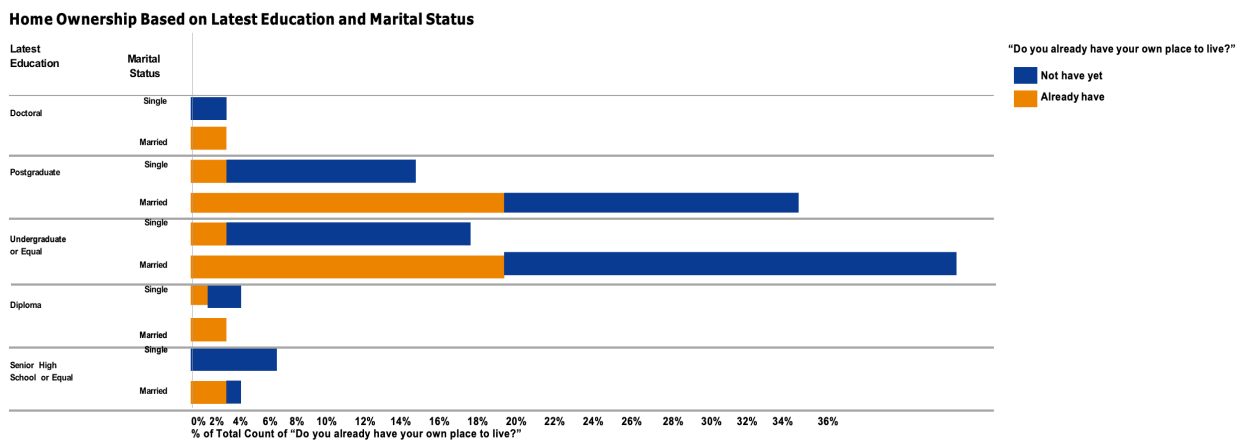


Fig. 1. Home Ownership Status based on Last Education and Marital Status

The categorical predictor indicators in this study were measured through 25 statements on the likert scale, the benchmarks on the Likert scale (1) strongly disagree; (2) disagree; (3) normal; (4) agree; (5) totally agree. Figure 2 below shows the correlation between the 25 statements. The value of the correlation coefficient ranges from -1 to 1. If the correlation coefficient is -1, it means that the correlation has a perfectly negative linear relationship. Meanwhile, if the correlation coefficient is +1, it means that the correlation coefficient has a positive perfect linear relationship. For example, the repayment duration variable has a positive linear correlation with the nominal variable of house installments (0.92) and also has a positive linear correlation with the variable amount of initial mortgage down payment (0.83). While the income variable has a negative linear correlation with the house-facing position variable. Another example is the installment payment obligation variable that has a negative linear correlation with the house-facing position (-0.14).

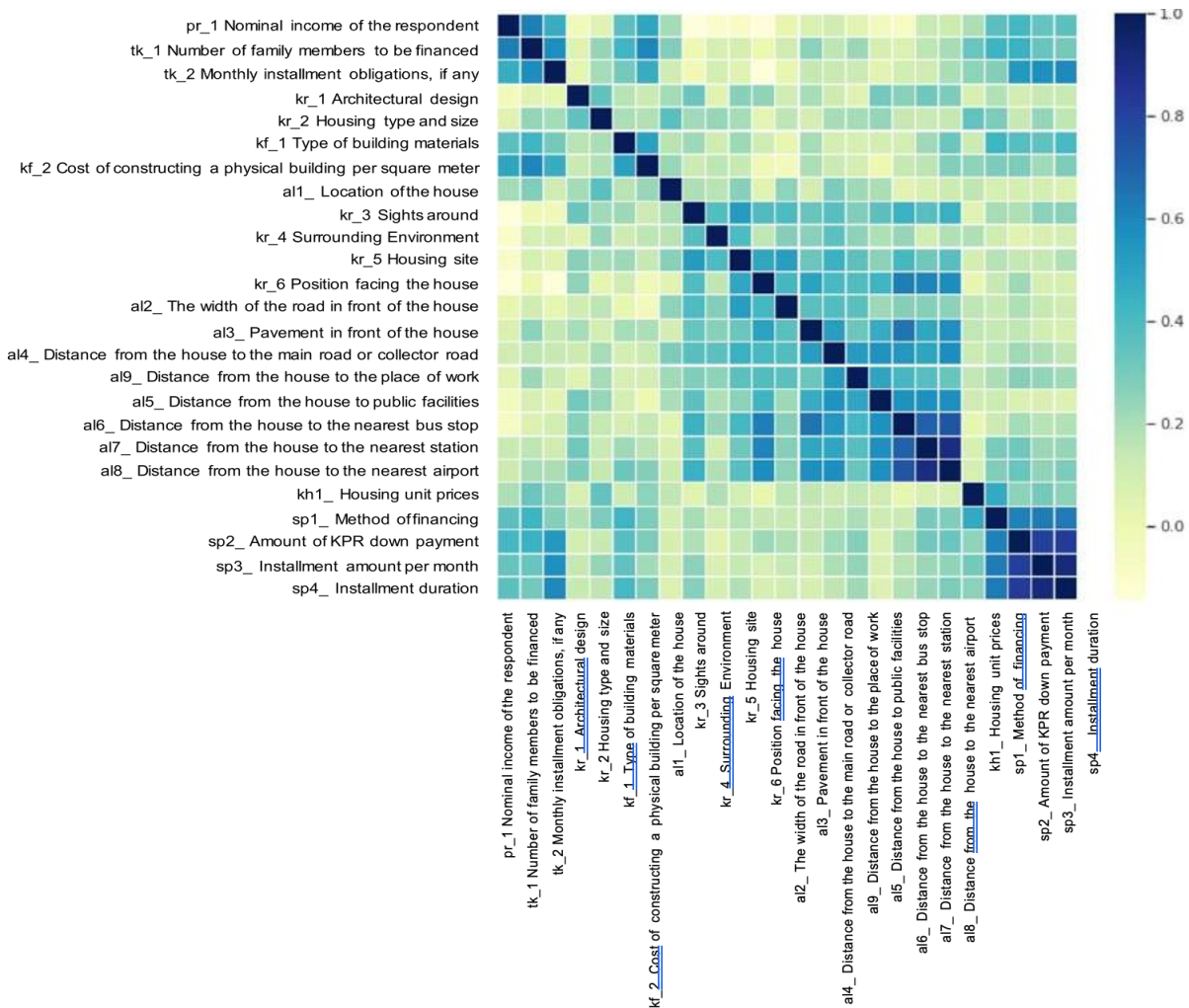


Fig. 2. Correlation Between Categorical Predictor Indicators

The results of statistical tests using the logistic regression method in table 2 show that there are several significant categorical predictor indicators for determining millennial generation preferences in the Yogyakarta Urban Agglomeration in owning a landed house (P value <0.05) namely the cost of building a house (0.014), materials buildings (0.021), and house installments (0.043). These findings are in accordance with what was stated by Rahadi, et al. (2019) and Yi & Li (2015) that physical quality, residential concepts, and financing schemes are important factors for consumers when choosing a place to live. According to the results of Table 2, categorical predictor indicators that have a P value of less than 0.05 are considered to have no significant effect on determining Gen-Y preferences in owning landed houses in APY. Indicators that did not significantly influence Gen-Y's preferences in owning a landed house are (1) the distance from the house to the airport, (2) the distance from the house to the bus stop, and (3) the distance from the house to the nearest station.

The results of the research based on Table 2 are in accordance with the real conditions that occurred in the Yogyakarta Urban Agglomeration that the cost of building houses, building materials, and nominal installments play an important role for consumers in deciding to buy a house, considering the trend of property prices in Yogyakarta increasing by 64.40% during the period the last 16 years (Bank Indonesia, 2022). As many as 47.2% of respondents were able to finance the construction of houses costing 3 million to 4 million rupiah per square meter, 29.9% of respondents were able to finance the construction of houses costing less than 3 million rupiah per square meter, and the rest were able to build houses costing more than 4 million rupiah per square meter. The building materials most in demand by the respondents were the category of brick/adobe, a combination of wood, and a combination of natural stone (48.8%); brick and/or adobe category (30.7%); and brick/adobe and wood combination (20.5%).

According to a survey by Bank Indonesia in 2023, the residential property price index in Yogyakarta in 2022 will be in the range of 111.61 with property price growth of 3.41 while the average minimum wage for workers in the Yogyakarta Urban Agglomeration is IDR 2,023,939.00. Some of the reasons for Gen-Y not having their own place to live are that they still collect minimum savings/money for down payment for house installments, considering that the salary they receive is not comparable to the high property prices in APY. Respondents' income per month varies greatly, namely 2 million to 4 million rupiah (39.4%), 4 million to 6 million rupiah (19.7%), 6 million to 8 million rupiah (18.1%), more than 8 million rupiah (17.3%). %), and less than 2 million rupiah (3.9%). Three variables that do not significantly influence Gen-Y preferences in owning landed houses in accordance with the real conditions in APY are that public transportation in APY is still very limited



and has not been integrated with remote settlement clusters (different from Jabodetabek), so that respondents completely ignore the distance factor houses to stations and shelters for daily activities. The distance from the house to the airport is also not considered because the airport is far from the city center (> 60 km).

Table 2. Logistic Regression Test Results

| Variables   | coef.   | Std.Err. | z       | P> z   | [0.025] | [0.975] |
|---|---------|----------|---------|--------|---------|---------|
| Pr_1 Nominal Income of the respondent                           | -1.0141 | 0.6258   | -1.6206 | 0.1051 | -2.2406 | 0.2124  |
| tk_1 Number of family members to be financed                    | 1.0187  | 0.6594   | 1.5449  | 0.1224 | -0.2737 | 2.3111  |
| tk_2 Monthly installment obligations, if any                    | 0.0394  | 0.4816   | 0.0817  | 0.9349 | -0.9047 | 0.9834  |
| kr_1 Architectural design                                       | 0.1643  | 0.4456   | 0.3687  | 0.7123 | -0.7090 | 1.0376  |
| kr_2 Housing type and size                                      | -0.2140 | 0.5761   | -0.3714 | 0.7104 | -1.3431 | 0.9152  |
| kf_1 Type of building materials                                 | 1.5668  | 0.6280   | 2.2973  | 0.0216 | 0.2301  | 2.9036  |
| kf_2 Cost of constructing a physical building per square meter  | -1.6006 | 0.6576   | -2.4341 | 0.0149 | -2.8895 | -0.3118 |
| al1_ Location of the house                                      | -0.7188 | 0.7125   | -1.0088 | 0.3130 | -2.1151 | 0.6776  |
| kr_3 Sights around  | 0.3857  | 0.5342   | 0.7221  | 0.4702 | -0.6612 | 1.4327  |
| kr_4 Surrounding Environment                                    | 0.7546  | 0.6921   | 1.0902  | 0.2756 | -0.6020 | 2.1111  |
| kr_5 Housing site   | -0.0748 | 0.5125   | -0.1460 | 0.8839 | -1.0793 | 0.9296  |
| kr_6 Position facing the house                                  | -0.0765 | 0.4003   | -0.1911 | 0.8484 | -0.8611 | 0.7080  |
| al2_ The width of the road in front of the house                | 0.4297  | 0.5582   | 0.7698  | 0.4414 | -0.6643 | 1.5236  |
| al3_ Pavement in front of the house                             | -0.0578 | 0.4556   | -0.1268 | 0.8991 | -0.9507 | 0.8352  |
| al4_ Distance from the house to the main road or collector road | 0.5362  | 0.6172   | 0.8687  | 0.3850 | -0.6735 | 1.7458  |
| al9_ Distance from the house to the place of work               | -0.0859 | 0.5398   | -0.1591 | 0.8736 | -1.1439 | 0.9721  |
| al5_ Distance from the house to public facilities               | 0.0988  | 0.5616   | 0.1760  | 0.8603 | -1.0018 | 1.1995  |
| al6_ Distance from the house to the nearest bus stop            | -0.2085 | 0.3782   | -0.5511 | 0.5815 | -0.9498 | 0.5329  |
| al7_ Distance from the house to the nearest station             | -0.5908 | 0.9144   | -0.6461 | 0.5182 | -2.3830 | 1.2013  |
| al8_ Distance from the house to the nearest airport             | 1.0326  | 0.9538   | 1.0826  | 0.2790 | -0.8368 | 2.9020  |

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| Variables                         | coef.   | Std.Err. | z       | P> z   | [0.025] | [0.975] |
|-----------------------------------|---------|----------|---------|--------|---------|---------|
| kh1_ Housing unit prices          | -0.3760 | 0.6649   | -0.5655 | 0.5717 | -1.6791 | 0.9271  |
| sp1_ Method of financing          | -0.7909 | 0.5707   | -1.3857 | 0.1658 | -1.9095 | 0.3278  |
| sp2_ Amount of KPR down payment   | 0.3010  | 0.5701   | 0.5279  | 0.5976 | -0.8164 | 1.4183  |
| sp3_ Installment amount per month | -1.9680 | 0.9757   | -2.0171 | 0.0437 | -3.8803 | -0.0557 |
| sp4_ Installment duration         | 1.2786  | 1.0040   | 1.2735  | 0.2028 | -0.6892 | 3.2464  |

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The results of the research below are in accordance with the real conditions that occurred in the Yogyakarta Urban Agglomeration that the cost of building houses, building materials, and nominal installments play an important role for consumers in deciding to buy a house, considering the trend of property prices in Yogyakarta increasing by 64.40% during the period the last 16 years (Bank Indonesia, 2022). As many as 47.2% of respondents were able to finance the construction of houses costing 3 million to 4 million rupiah per square meter, 29.9% of respondents were able to finance the construction of houses costing less than 3 million rupiah per square meter, and the rest were able to build houses costing more than 4 million rupiah per square meter. The building materials most in demand by the respondents were the category of brick/adobe, a combination of wood, and a combination of natural stone (48.8%); brick and/or adobe category (30.7%); and brick/adobe and wood combination (20.5%).

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respondents completely ignore the distance factor houses to stations and shelters for daily activities. The distance from the house to the airport is also not considered because the airport is far from the city center (> 60 km).

### **Conclusion**

In conclusion, this research aimed to investigate housing preferences among Gen-Y residents in the APY region of Yogyakarta. Utilizing Logistic Regression with 125 respondents aged 27 to 41, the study identified significant factors influencing Gen-Y's preferences for homeownership, including construction costs, building materials, and mortgage installment amounts. The research emphasizes its contribution in providing insights for housing policy formulation, especially in the context of subsidized housing regulations for Gen-Y, considering challenges such as rising residential property prices, relatively low City/District Minimum Wage (UMK), and inadequate public transportation in Yogyakarta. Further research opportunities may involve exploring property practitioners' preferences in providing suitable housing options and identifying appropriate locations for Gen-Y within the Yogyakarta urban agglomeration, thus laying the groundwork for more in-depth studies on Gen-Y housing needs and effective housing strategies in the region.

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