Behind the Rising Costs: Project-Level Factors Shaping the Affordability of Housing in Kartasura

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ABSTRAK

The continuous increase in housing demand has pressured developers to maintain a balance between project feasibility and market affordability. In Kartasura District near Surakarta, the selling prices of residential projects, including housing, have risen sharply and now exceed the purchasing capacity of households earning around the regional minimum wage. This situation underscores the importance of effective project management strategies to control costs while sustaining competitiveness in the housing market. The aim of this study is to examine the project-related factors that influence the selling prices of housing and to identify which of these factors have the greatest impact on developers' pricing decisions. A mixed-method approach was applied, involving 60 housing developers selected through purposive sampling. The data were analyzed using multiple linear regression with SPSS version 27. The results show that land area, house type, location, supporting facilities, physical quality, accessibility, design concept, marketing strategy, transportation convenience, and land price significantly affect selling prices. Among these, design concept, marketing strategy, and transportation convenience emerged as the most influential factors. The findings reveal that the success of affordable housing projects depends not only on construction efficiency but also on managerial decisions and strategic planning throughout the project cycle. This study contributes to the field of project management by providing practical insights that can guide developers and policymakers in creating housing projects that are both financially feasible and affordable for the target market.

Keywords : Housing Price, Housing, Multiple Linear Regression, Kartasura District

1. INTRODUCTION

Housing is one of the most essential human needs and plays a vital role in determining social welfare and economic stability (Bentley et al., 2025). As Indonesia's population continues to grow, the demand for housing has increased significantly, creating both opportunities and challenges for the property sector (Gamal et al., 2023). According to Law No. 4 of 1992 on Housing and Settlements, housing is part of a residential environment equipped with infrastructure and facilities that support a decent standard of living (Agustini et al., 2024).

In recent years, Indonesia's property sector has shown strong growth potential, supported by national economic expansion projected between 4.7% and 5.5% in 2024 (International Monetary Fund. Asia and Pacific Dept, 2024). This growth is driven by several factors: the increasing population, rising household income, and persistent housing supply shortages (backlog), especially among low-income groups (James, 2018). Data from the Ministry of Public Works and Public Housing (PUPR) shows that Indonesia's housing ownership backlog reached 12.7 million units in 2023, with 93% of the deficit coming from low-income households, most of whom work in the informal sector (Kementerian PUPR, 2025).

The Kartasura District, located near the city of Surakarta, reflects this national trend. Despite being a suburban area, the prices of houses, particularly housing, have increased significantly and now exceed the minimum wage level in Surakarta. Based on survey, Surakarta's housing prices increased by 16–18% across various property sizes, marking one of the highest growth rates in Central Java. This situation raises concerns about affordability for low-income residents and challenges the government's housing subsidy objectives. Developers often justify higher prices based on factors such as land costs, construction expenses, design concepts, marketing strategies, and accessibility (Brysch & Czischke, 2022; Guan & Cheung, 2023).

Previous studies have examined factors influencing house prices in several regions. For instance, Nandista et al. (2014) analyzed housing prices in Sukoharjo and Karanganyar using factor analysis and OLS regression, identifying land area, number of rooms, supporting facilities, and house type as significant positive factors. Sarjana et al. (2019) studied Buleleng Regency and found that cost, physical quality, and location uniqueness significantly affected price levels.

Suudiah (2023) analyzed housing prices in Batam but did not specifically address price disparities related to income levels.

Despite the valuable insights from previous studies, none have specifically addressed the disparity between housing prices and regional minimum wages, particularly in smaller urban areas like Kartasura. This represents the novelty of the present research. Unlike previous studies that only identified price determinants, this study focuses on understanding how economic affordability, proxied by the minimum wage, relates to the pricing of housing, and which factors most significantly drive this disparity. Therefore, this research aims to analyze the key determinants influencing the selling price of housing in Kartasura District and identify the most dominant factors contributing to the widening gap between housing prices and minimum wages. The findings are expected to contribute to housing policy formulation and guide developers in designing more affordable and sustainable housing solutions aligned with local income levels.

2. METHODOLOGY

This study adopts a mixed-method approach, integrating qualitative and quantitative strategies to achieve a comprehensive understanding of the disparity between housing prices and the minimum wage in Kartasura Sub-district (Dawadi et al., 2021). The combination of both methods allows for a balance between numerical generalization and contextual interpretation, which is essential in socio-economic studies related to housing affordability (Hollweck, 2015).
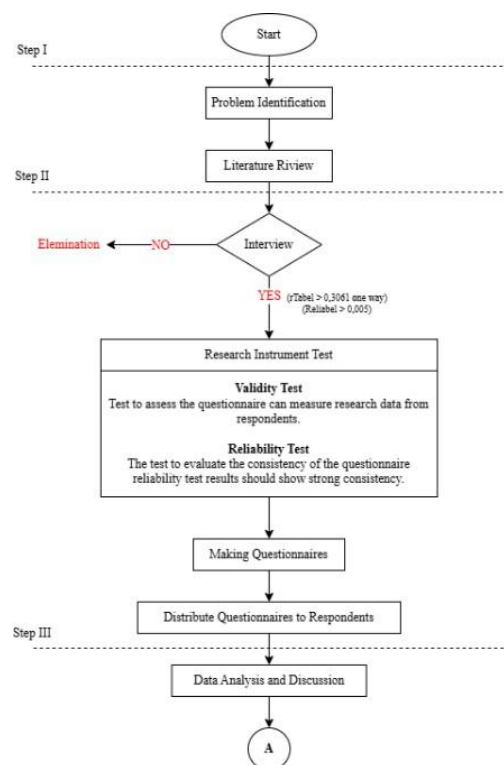
Figure 1. Research Flowchart: Housing Price Determinants Study

The stages of this research are systematically illustrated in the research flowchart shown in Figure 1. The flowchart describes the step-by-step process starting from problem identification to the final interpretation of regression results and policy implications.

Research data

The research was conducted in Kartasura Sub-district, Sukoharjo Regency, a suburban area of Surakarta that has experienced rapid urbanization over the past decade (BPS Sukoharjo, 2023). Data collection took place over one month and focused on developers managing housing projects. These developers were selected because they represent diverse operational scales and market experiences in managing government housing schemes. The population in this study includes all housing developers involved in Kartasura. Since there is no complete list of active developers, purposive sampling was applied to ensure that respondents had relevant experience and decision-making authority

(Sugiyono, 2017). A total of 60 respondents participated in this study, all of whom were owners or top-level managers of developer companies. The sample size followed the guideline from Hair (2011), recommending at least five respondents per variable in multivariate analysis.

Data were collected using literature review, semi-structured interviews, and questionnaire surveys (Sekaran & Bougie, 2009). The literature review established theoretical grounding, while interviews explored the rationale behind pricing decisions and government policy implications. Quantitative data were gathered through structured questionnaires using a five-point Likert scale to measure the degree of influence for each factor. The research instrument operationalized 10 independent variables—land area, house type, location, supporting facilities, physical quality, accessibility, design concept, marketing strategy, demand and supply conditions, and transportation ease—based on previous studies in housing price modeling (Nandista et al., 2014; Bagus et al., 2018; Chandraderia et al., 2022). The dependent variable was the selling price of housing in Kartasura.

Integrated data analysis

All quantitative data were processed using SPSS version 27, following the standard procedure for regression-based modeling in social science research (Ghozali, 2013). Prior to the quantitative phase, a qualitative verification process was carried out to ensure the validity and contextual relevance of the variables adopted from previous studies. This process involved semi-structured interviews with five experienced housing developers who have managed housing projects for more than fifteen years in Kartasura and its surrounding areas.

The qualitative insights confirmed that all ten variables derived from prior research remained relevant in the current housing market context. Moreover, participants consistently emphasized an additional factor—land price—as a decisive determinant of housing affordability in suburban areas. Consequently, this variable was incorporated into the study framework, expanding the number of independent variables to eleven. Following this qualitative validation, the research instrument was refined and pre-tested to ensure its accuracy and consistency. The validity of each item was confirmed using Pearson's Product-Moment correlation, while reliability was established through Cronbach's Alpha values exceeding 0.70 (Bernardi, 1994). To maintain the robustness of the regression model, classical assumption tests—including normality, multicollinearity, and heteroscedasticity—were conducted prior to running the multiple linear regression analysis. The model was formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_{11} X_{11} + \varepsilon$$

The results were analyzed using t-tests and F-tests to determine the significance of individual and simultaneous effects. The coefficient of determination (R^2) was used to evaluate how much variance in housing price could be explained by the independent variables (Gujarati et al., 2013). This methodological approach not only ensures statistical rigor but also contextual depth. By combining qualitative insights with quantitative validation, the study provides a nuanced understanding of how structural and market factors interact to shape the affordability of housing in suburban Indonesia.

3.   RESULTS AND DISCUSSION

This chapter presents the findings and analysis of the research conducted. The discussion includes the results of instrument testing, classical assumption testing, multiple regression analysis, and hypothesis testing. Each section aims to explain whether the data collected meet the required standards for statistical analysis and how the results support or reject the proposed hypotheses. The purpose of this chapter is to interpret the findings based on the data obtained through the research instruments and to link them with relevant theories and previous studies. Therefore, this chapter is expected to provide a comprehensive understanding of the relationship between variables examined in the study.

Instrument testing

The validity test was conducted to assess whether each item in the questionnaire accurately measures the intended construct related to the factors influencing high house selling prices in the Kartasura sub-district. Using SPSS version 27 (2020), each item score was correlated with the total score of its respective variable. The validity of each item was determined by comparing the calculated r value (r count) with the critical r table value of 0.330 at a significance level of 0.05 and a sample size of 60. Based on the results presented in Table 1, all variables had r count values greater than r table, indicating that all items were valid (Sugiyono, 2017). This demonstrates that the questionnaire items were appropriately designed and could accurately capture the respondents' perceptions regarding the factors affecting house prices. Therefore, the validity results confirm that the instrument items are statistically valid and can be used for further data analysis. After confirming the validity, a reliability test was performed to evaluate the internal consistency of the instrument using Cronbach's Alpha.

Tabel 1. Validity and reliability results

Variable	R count	Reliability coefficients	Description
Land Area (X1)	0.810	0.746	Valid & Reliable
House Type (X2)	0.755	0.646	Valid & Reliable
Location (X3)	0.822	0.757	Valid & Reliable
Supporting Facilities (X4)	0.776	0.668	Valid & Reliable
Physical Quality of the House (X5)	0.794	0.715	Valid & Reliable
Location Access (X6)	0.623	0.723	Valid & Reliable
Design Concept (X7)	0.821	0.759	Valid & Reliable
Marketing Concept (X8)	0.841	0.782	Valid & Reliable
Demand and Supply (X9)	0.775	0.687	Valid & Reliable
Ease of Transportation (X10)	0.785	0.689	Valid & Reliable
Land Price (X11)	0.834	0.781	Valid & Reliable

The reliability values for all variables ranged between 0.60 and 0.80, as shown in Table 1, indicating that each variable met the reliability standard and could be considered dependable (Sugiyono, 2017). Variables such as "Marketing Concept" (0.782) and "Land Price" (0.781) had relatively high reliability coefficients, suggesting that respondents answered consistently across items in these variables. This consistency ensures that if the same questionnaire were administered repeatedly, similar results would be obtained. In conclusion, both validity and reliability tests demonstrate that the research instrument used in this study is statistically sound, allowing subsequent analyses to be performed with confidence in the data's accuracy and consistency.

Classical assumption test

The results of the classical assumption test indicate that the regression model used in this study fulfills the requirements for producing an unbiased, consistent, and efficient estimator. The results of the Kolmogorov–Smirnov normality test show a significance value greater than 0.05, indicating that the residuals are normally distributed. In addition, the visual inspection through the Histogram of Residuals and the Normal P–P Plot also supports this finding. As presented in Figure 2, the histogram forms a bell-shaped curve, and the points in the P–P Plot lie close to the diagonal line, confirming that the data are normally distributed. This means that the regression residuals follow a normal distribution pattern, ensuring that the data can accurately represent the characteristics of the population and minimize potential bias in the estimation process (Rani, 2016). Consequently, the regression model satisfies the normality assumption and is suitable for further analysis.
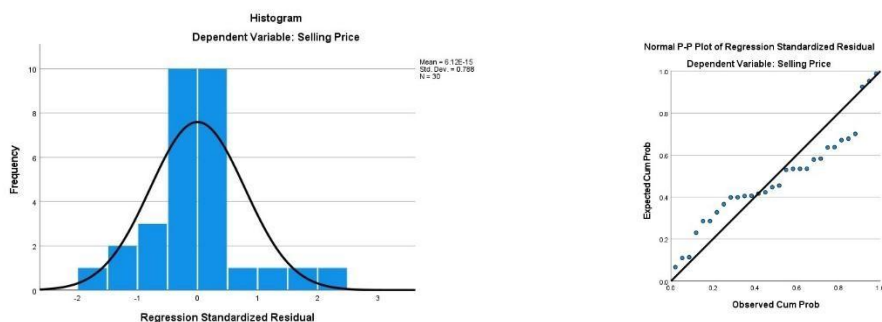

Figure 2. Histogram of residual normality (left) and normal p–p plot of regression standardized residual (right)

Furthermore, the results of the multicollinearity test and heteroscedasticity test indicate that the model also meets other classical assumption criteria. The results of the multicollinearity test, as shown in Figure 3, indicate that all independent variables have tolerance values greater than 0.10 and VIF values less than 10. This implies that there is no strong correlation among the independent variables, meaning each variable contributes unique information to the model without overlapping effects (Miles, 2005).
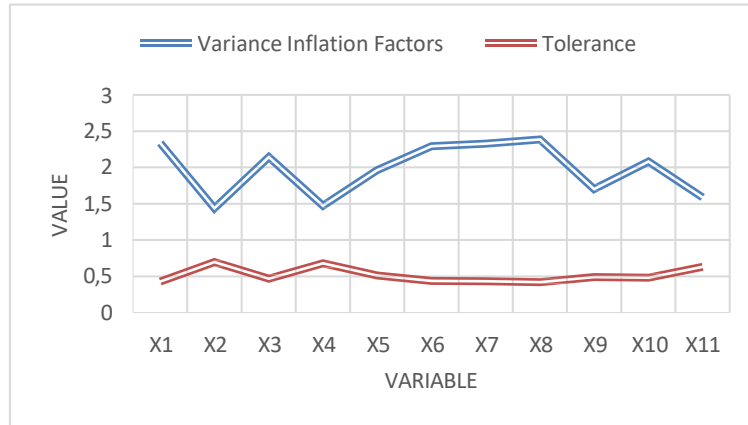
Figure 3. Multicollinearity test results showing tolerance and VIF values

Similarly, the heteroscedasticity test results, displayed in Figure 4, show significance values greater than 0.05 for all variables. The scatterplot in figure exhibits a random distribution of points without any specific pattern, indicating that the data meet the assumption of homoscedasticity.
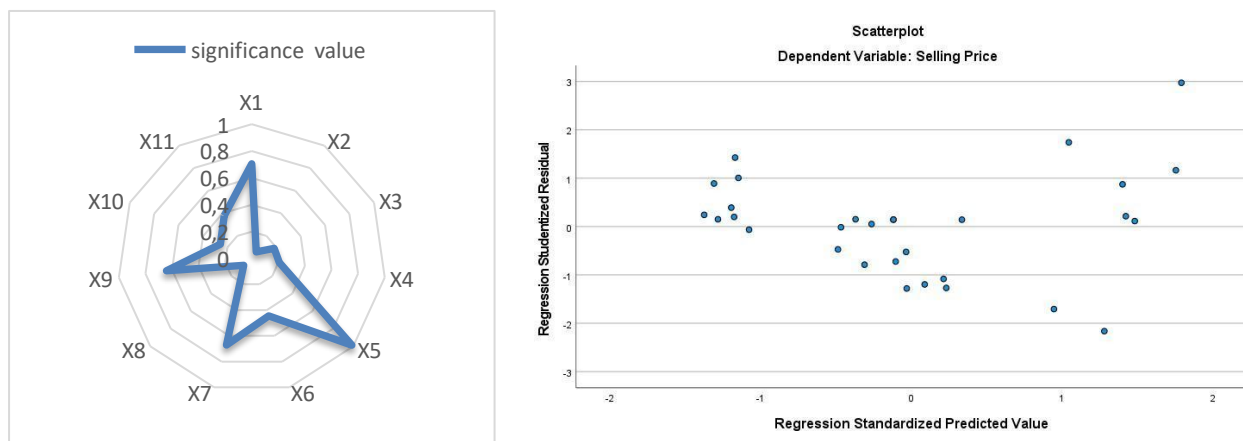

Figure 4. Scatterplot (right) and significance values (left) of glejser test indicating homoscedasticity

Therefore, it can be concluded that the regression model used in this study has met all the classical assumption requirements—normality, no multicollinearity, and no heteroscedasticity—making it statistically reliable and appropriate for hypothesis testing.

Determination of dominant factors

This sub-chapter aims to determine which variables have the most dominant influence on the selling price of houses in Kartasura Sub-district. The determination process is carried out through several analytical stages, beginning with the multiple linear regression test to identify the relationship between independent and dependent variables. Subsequently, the results of the simultaneous (F) and partial (t) significance tests are examined to evaluate which factors significantly affect the selling price. The analysis then continues by comparing the standardized regression coefficients or *t*-count values to determine the relative strength of each variable's influence. Through this step-by-step analytical approach, the study identifies the dominant factors that play a crucial role in determining housing prices, providing deeper insights into the key aspects that drive price variations in the residential property market.

The multiple linear regression analysis aims to determine the influence of two or more independent variables (X) on the dependent variable (Y). Through this analysis, the behavior of the dependent variable can be predicted based on the independent variables. The results of the regression analysis in this study are presented as follows.

a. Simultaneous significance test (F-test)

The F-test was conducted to determine the simultaneous effect of all independent variables in the regression model on the dependent variable at a 95% confidence level ($\alpha = 0.05$). The F-table value, based on the degrees of freedom (k; n−k) = (11; 49), is 2.03 (Ghozali, 2013). The ANOVA results demonstrate that the calculated F-value is 67.643,

which is greater than the F-table value (2.03), and the significance value is $0.000 < 0.05$ (Ghozali, 2013). Therefore, H_0 is rejected and H_a is accepted, indicating that all independent variables collectively have a significant influence on the selling price of houses in Kartasura sub-district. This finding confirms that the regression model can be effectively used as a predictive tool for estimating housing prices based on the selected factors.

b. Individual parameter significance test (T-test)

The t-test aims to determine the partial (individual) influence of each independent variable on the dependent variable. The t-table value at $\alpha = 0.05$ with degrees of freedom $(n-k-1) = (60-11-1) = 48$ is 2.01. The results of the partial t-test are presented in Figure 5, which show that out of eleven independent variables, ten variables significantly affect the selling price, while one variable (demand and supply) does not show a significant relationship.
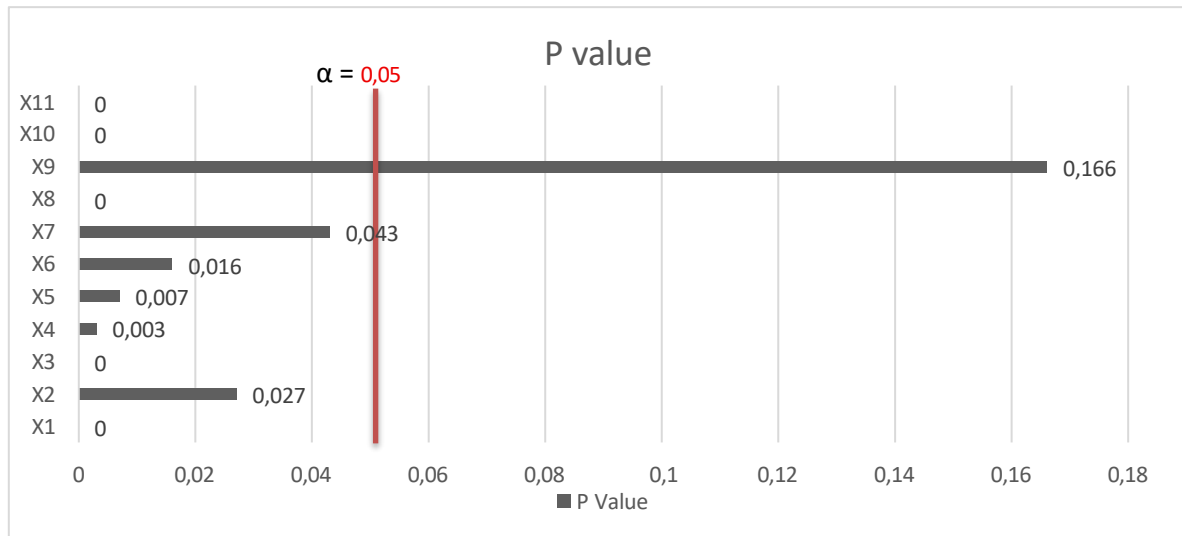

Figure 5. Results of partial t-test analysis

Specifically, variables such as land area (X1), house type (X2), location (X3), supporting facilities (X4), physical quality of the house (X5), location access (X6), design concept (X7), marketing concept (X8), ease of transportation (X10), and land price (X11) significantly influence selling price. Meanwhile, demand and supply (X9) have no significant effect (p-value = $0.166 > 0.05$), suggesting that market dynamics in Kartasura do not directly influence price formation compared to internal housing attributes.

c. Coefficient of determination (R^2 test)

The coefficient of determination test aims to measure how well the independent variables explain variations in the dependent variable. Based on result, the adjusted R^2 value is 0.976 (97.6%), meaning that 97.6% of the variation in housing selling price can be explained by the eleven independent variables in the model, while the remaining 2.4% is influenced by other factors outside the study. This indicates a very strong relationship between the studied factors and the selling price, confirming that the regression model has high explanatory power.

d. Multiple Linear Regression Equation

From the regression output (SPSS 27), the equation for the house selling price factors is as follows:

$$Y = 20.576 - 0.536X_1 - 0.100X_2 - 0.299X_3 - 0.131X_4 - 0.158X_5 - 0.123X_6 + 0.093X_7 + 0.430X_8 - 0.066X_9 + 0.512X_{10} - 0.205X_{11}$$

The constant value of 20.576 indicates that if all independent variables are equal to zero, the baseline value of the selling price will be 20.576. The sign (+/−) of each regression coefficient shows the direction of influence of each variable on the selling price.

e. Discussion of Regression Equation Results

The interpretation of each regression coefficient reveals the relative influence of each variable on the housing price. Negative coefficients (X_1, X_2, X_3, X_4, X_5, X_6, X_9, X_{11}) indicate that an increase in these factors leads to a decrease in selling price, suggesting possible overvaluation or saturation effects in those aspects. On the other hand, positive coefficients (X_7, X_8, X_{10}) indicate that better design concept, more effective marketing, and ease of transportation contribute to a higher selling price. Among these, the design concept (X_7), marketing concept (X_8), and ease of transportation (X_{10}) emerge as the dominant factors affecting the high selling price of houses in Kartasura. This finding

aligns with developers' perspectives that aesthetic appeal, promotional strategy, and accessibility play a crucial role in market valuation.

These results also gain deeper meaning when juxtaposed with real economic conditions. The UMR (regional minimum wage) in Sukoharjo Regency, which includes Kartasura, is only around Rp 2,359,488 in 2025, while the average price of housing in Kartasura reaches Rp 5,640,000 per m². Consequently, even a modest 100 m² house can cost approximately Rp 564 million, far beyond the purchasing capacity of a worker earning the minimum wage. This stark contrast becomes even more evident when compared to government-subsidized housing (rumah subsidi) programs, which typically target prices below Rp 180 million with smaller land sizes (around 36–45 m²).

Despite the intent of such programs to provide affordable housing for low- to middle-income groups, the market dynamics in Kartasura show that most housing developments are shifting toward non-subsidized segments driven by design, marketing, and location advantages. The widening gap between the actual market price and the affordable housing threshold indicates that the determinants of housing prices are increasingly shaped by lifestyle-oriented and speculative factors, rather than affordability or basic construction value. In this sense, the regression model not only captures statistical relationships but also reflects a growing structural inequality in housing accessibility, where the aspirations for modern, well-designed housing inadvertently distance low-income earners from homeownership opportunities—even within regions like Kartasura that were once considered affordable.

4. CONCLUSION

The results of this study reveal a significant imbalance between the selling prices of houses and the income levels of residents in Kartasura District. Although housing programs are intended to bridge this affordability gap, market dynamics continue to push prices far beyond the reach of low- and middle-income earners. The regression analysis shows that design quality, marketing strategy, and transportation accessibility are the most influential factors driving housing prices upward. These factors, while enhancing lifestyle appeal, tend to overshadow the fundamental goal of affordability. Consequently, housing in Kartasura increasingly reflects consumer aspiration rather than economic capability, creating a structural divide between developers' pricing strategies and the community's purchasing power.

This research contributes to the understanding of housing affordability by highlighting the relationship between market-oriented factors and local wage realities. The findings emphasize the importance of reorienting housing development policies toward more inclusive planning through cost regulation, targeted subsidies, and accessibility focused infrastructure to ensure that housing growth aligns with actual community needs. Moreover, the study provides valuable insights for both policymakers and urban planners in developing strategies that balance economic growth with social equity. In a broader sense, these findings reinforce the idea that sustainable urban development must prioritize fairness and inclusivity over market competitiveness.

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