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Housing Supply Model for Affordable Homes in Malaysia

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Abstract
The provision of affordable housing for the low and middle-income class may enhance the quality of life of this social group. In addition, cooperation from stakeholders must be greater in promoting affordable houses in the market. However, the low-profit margin and other constraints reduced the supply of affordable homes by housing developers. Therefore, this research examines the factors and attributes that may affect housing developers in supplying affordable houses. Total 120 responses from housing developers were gathered via questionnaires and analysed by using Partial Least Square Modelling (PLS-SEM) for the development of an affordable housing supply model. The result displays three factors with 11 attributes that affect housing suppliers.

Keywords: housing supply; affordable houses; housing mismatch;

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1.0 Introduction

These days, the solution from the affordable housing supply can be used to gauge the community's quality of life. Failure to address "housing degradation" leads to social problems. These issues have worsened severely since Malaysia was hit by the COVID-19 pandemic and the global economic recession. Affordable housing becomes the vital issue for the people to owned houses and those developers to supply the units. According to The Economic Times (2022) affordable housing refers to housing for the society whose income is below median household income with specific type of houses and market prices. In Malaysia, concerns over affordable housing have been less prevalent until recently, when Kuala Lumpur recorded negative changes in the home index at 7.3 % in 2015 and decreased to a negative 3.6% in 2021 (NAPIC, 2021). This indicated that property prices declined in 2021. About 67,944 units of affordable housing have been approved for construction this year (Joseph, 2022). Despite this, Kuala Lumpur recorded 11,129 transactions worth RM 9.69 billion in 2021, inclusive of the government funding for affordable cost housing for low and middle-income families with at least 14,000 units of low-cost housing under Program Perumahan Rakyat and 3,000 units of Rumah Mesra Rakyat by Syarikat Perumahan Negara Berhad (SPNB) in 2020. However, the residential overhang in Kuala Lumpur reached 6,095 units in 2021. In general, Malaysia recorded the highest residential overhang at 36,863 units in 2021 compared with previous years, which only recorded 29, 565 units. Ironically, about 11, 610 units (31.5%) experienced residential overhang under the affordable price range at RM 300,000, followed by overhang prices at RM

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300,001 to RM 500,000 at 25.7% with 9,461 units (NAPIC, 2021). From these statistics, the sales of affordable houses in the year 2021 show signs of weakening. With unsold units of houses below RM 300,000, it is obvious that the affordable housing market is not resilient. According to Thaker (2021), housing demand is recorded at 48% higher than supply, which is only 28%. This result shows that private developers abandoned numerous projects for affordable housing. Unaffordable houses in housing markets where supply is either significantly below demand or is overly inelastic to changes in demand. These measures signify actions by housing providers to build more economical and affordable home prices which are inclusive with better quality and strategic location, while at the same time, developers are not enthralled in developing with such market prices. KRI (2021) highlights that housing supply is driven by market price, planning policy, land and construction cost. However, housing costs and housing prices are only among the most issues that are caused by less contribution from housing suppliers.

Studies have shown that the existence of imbalance supply on affordable housing could lead to vulnerability to crimes (Daud et al., 2022), housing bubbles (Pitros and Arayici, 2016;), and insufficient supply of affordable houses (Rahim et al., 2019; Faizul et al., 2019). Some projects of housing developers have been forced to move to the suburbs because the monotonous cost has gotten expensive, especially in urban areas where economic opportunities are abundant. On the other hand, housing developers' necessity is to develop private houses that produce much more profit margin for their business instead of developing affordable houses.

Past scholars have made focused research on housing supply (Olanrewaju et al., 2017; Rahim et al., 2019; Mustapha and Ali, 2021; and Daud et al., 2022). However, past researchers always make a general preference that needs to be more varied for the local context. Due to that, the fundamental issues in housing supply could not be ascertained in proper places. According to Thaker (2021), numerous studies that examine the primary variables influencing housing costs and affordability in Malaysia tend to focus more on demand-side and macroeconomic factors than supply-side factors. Due to the complexity of the affordable housing supply situation and the strong correlations between government intervention, a very thorough and up-to-date framework model is required for compiling and assessing the mechanism from the supply side.

Concerning the setting of urban areas in Malaysia, this study aims to identify the significant factors that affected the housing supply to build affordable houses. First, the identification of factors and attributes affecting housing suppliers has to be established through partial least square equation modeling (PLS-SEM). This analysis is used to validate the attributes and develop the model for affordable housing supply purposely for the policymakers to involve and promote affordable houses to housing developers.

The literature review, research methods, findings, discussion, and conclusion are covered in the following sections.

2.0 Literature Review

2.1 Factor affecting housing supply

There are five factors that significantly affect the housing supply. Namely: product-related considerations, private financial requirements, government regulations, and requirements, geographic location, and hire regulatory costs (Saleh et al., 2016, 2017; Masri et al., 2018) and it is also prominent to understand housing supply by looking at their housing profiles.

The lack of supply of affordable houses could be due to the mismatch of product type and location (Thean, 2017). Product factor is one of the factors that have an impact on how stakeholders decide on their product qualities (Masri et al., 2017, 2018). Meanwhile, Housing developers have limited ability to provide social housing due to profit-oriented (Zainul & Idris, 2017). According to Bajunid and Ghazali (2012), there are few distinctions in quality between low-cost, low-medium-cost, and medium-cost housing finishes and designs. This is a part of their inexpensive program; the federal or state government has already decided on the house's design, layout, and finishes. Past researchers have provided product-related factors affecting housing supply is house design (Ali et al., 2018) and followed by tenure, built-up areas, number of rooms, allocation of site plan and layout plan, allowable density; external view, topography; open spaces, etc. (Saleh et al., 2017; Masri et al., 2017, 2018).

Secondly, according to previous research, massive salutation on attributes under spatial location must be specified to measure factors that affect the housing supply (Saleh et al., 2017). Poor location approvals by housing developers may create undesirable development of affordable housing. According to the World Economic Forum (2019), the government often allocated and approved proposed affordable houses far away from the amenities and facilities. However, In Malaysian context, the government often approved affordable housing nearby to the city center to accommodate those who work in the areas. According to recent data, 1.38 million people registered with PR1MA affordable houses would be allocated to the Kuala Lumpur area (Yeap, 2017). Due to that, the assessment of location should frequently be done in terms of accessibility, such as proximity to major business districts and access to resources for education and entertainment, etc. (McCluskey et al., 2000).

The financial requirements and regulations are set up by financial institutions for bridging finance. Several financial institutions do not lend and serve private developers due to the uncertainty of the current economy and the incapability of private developers. According to research conducted by the Real Estate and Housing Developers Association Malaysia (REHDA), 75% of developers are experiencing a decline in work efficiency due to the COVID-19 pandemic, which influences their ability to complete existing developments. 81% of developers reported having cash flow issues, and most of them (82%) reported having trouble empowering their management and human resources costs (Edge Property, 2021). BNM (2018) revealed that the private bank has approved an amount of RM 516 billion for residential end-financing and only RM 88 billion for bridging finance. This approved amount for housing supply compared to end-financing shows less attention by the bank to promote development of affordable housing.

Fourth, government requirements and regulation factors also play a major part in the proportion affecting housing supply. According to Jamalludin et al. (2016), the procedure of housing developers had to endure to get approval from the authorities took up until two

months. In addition, assessment for development approval takes a maximum of 10 months, which shows that it more or less prevents the housing developers from developing affordable houses. Next, the last factor is hiring regulatory costs required by housing developers. For regulatory costs, some local authorities have increased development charges which may impact the total cost of development (Rahman et al., 2021). However, government and financial institutions should not entirely be blamed and in fact, attention should be given to those housing developers that make an effort to promote and build affordable houses (Saleh et al. 2017). Finally, these factors and specific attributes mentioned in Fig. 1 shows the paramount reason to established the model that could identify their significant effect lead to ignorance on development of affordable housing.

2.2 Conceptual framework of housing supply model for affordable homes

In essence, this conceptual framework is an expansion and adaption from the preliminary framework given by Saleh et al. (2016; 2017) and supported by Mustapha and Ali (2021). The authors have focused on the perspectives of housing supply for affordable homes that fit with the local context. 35 attributes that give an effect on the affordable housing supply.

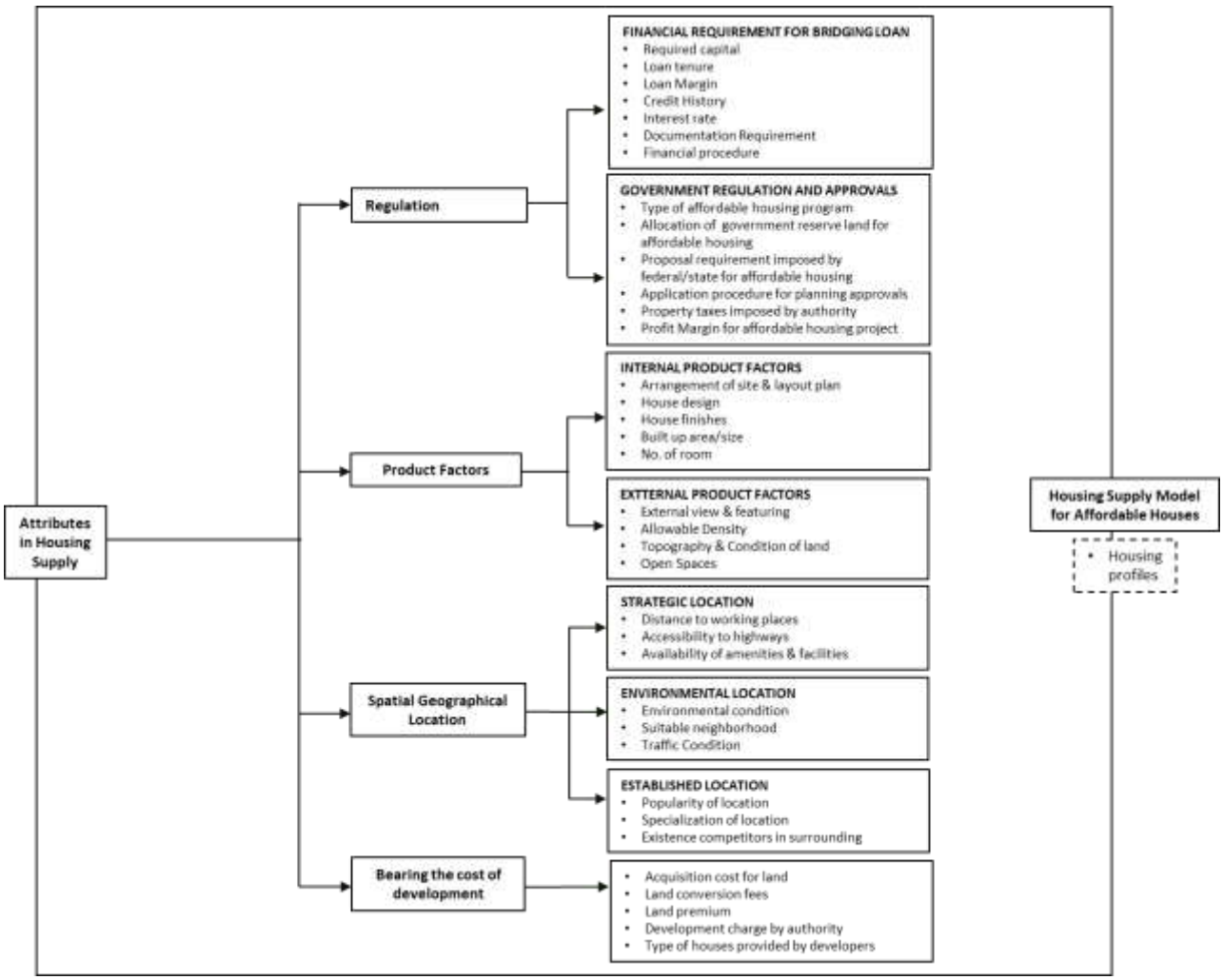

Fig. 1: Conceptual framework for affordable housing supply
(Source: Saleh et al., 2016; 2017 and Mustapha and Ali, 2021)

3.0 Research Methodology

Firstly, the literature review was conducted to assess the five aforementioned factors involved in housing supply. Subsequently, the questionnaire survey was distributed to 120 developers. Using a five-point Likert scale (1-Strongly disagree, 2- Disagree, 3-Neutral, 4-Agreed, 5-Strongly Agree), they were asked to evaluate every attribute that influences affordable housing supply in Malaysia. Then, the data obtained were analysed using the Statistical Package for Social Science (SPSS) and Structural Equation Modelling (PLS-SEM) (Hair et al., 2011; Sarstedt et al., 2019). The composite and convergent validity was done to eliminate and validate some attributes in the conceptual framework. Then, from the final attributes, further validity was performed to develop the structural model for housing supply. Development of the structural model was performed using coefficient determination, path coefficient, effect size, and predictive relevance.

3.1 Measurement model evaluation

This research is made for high-order constructs under the reflective-formative model, as suggested by Sarstedt et al. (2019). The authors highlight reflective model has to be analysed with composite reliability, Average Variance Extracted (AVE) for convergent validity and the measurement model's development. Then, using formative analysis, the structural model has been analysed in order to interpret each attribute for outer loading; Coefficient of determination (R^2); Path coefficient (β); Effect size (f^2), and Predictive relevance (Q^2) for the development of the structural model.

Outer loading of the attribute with 0.7 or higher is considered as satisfactory, while 0.5 is acceptable, and a loading value of less than 0.5 should be eliminated (Memon & Rahman, 2014). Meanwhile, according to Hair et al. (2011), The significant relationship used to identify the variables should be greater than 0.26; 0.33 is regarded as moderate, and 0.19 is weak (Cohen, 2013). Moreover, for Path coefficient analysis, the route coefficient value needs to be at least 0.1 and observed from the result of the t-statistic and P-Value for rejection of the non-significant path to form a structural model. According to earlier studies, t-statistics values under 1.65 are insignificant, and the path should be abandoned.

4.0 Result and Findings

4.1 Evaluation of measurement model

Table 1. Composite and Convergent Validity

Indicator	Composite Validity	Convergent Validity
	CR	AVE
Product Factors HS	0.907	0.583
Financial Requirement For Bridging Loan HS	0.920	0.659
Government Approvals & Regulation HS	0.858	0.605
Location Factors HS	0.900	0.693
Hire Regulatory Cost HS	1.000	1.000
Housing Supply	0.815	0.688

*CR: 0.6 ≤ CR & α ≤ 0.7: Acceptable *0.7 ≤ CR & α ≤ 0.9 : Satisfactory
*AVE: AVE > 0.5: Satisfied * AVE0 ≤ 0.5 : Consider to remove

The CR values explain that all of the constructs are under the satisfying range of 0.70. The analysis then proceeds with convergent validity determinacies by interpreting the AVE value result. From Table 1, all constructs provide an AVE value greater than 0.5. In this context, the construct validity is met and accepted. After eliminating some attributes to finalise a firm result for validity, the final 22 attributes are found significant for housing developers and have been selected for the next development of the structural model.

4.2 Evaluation of structural model

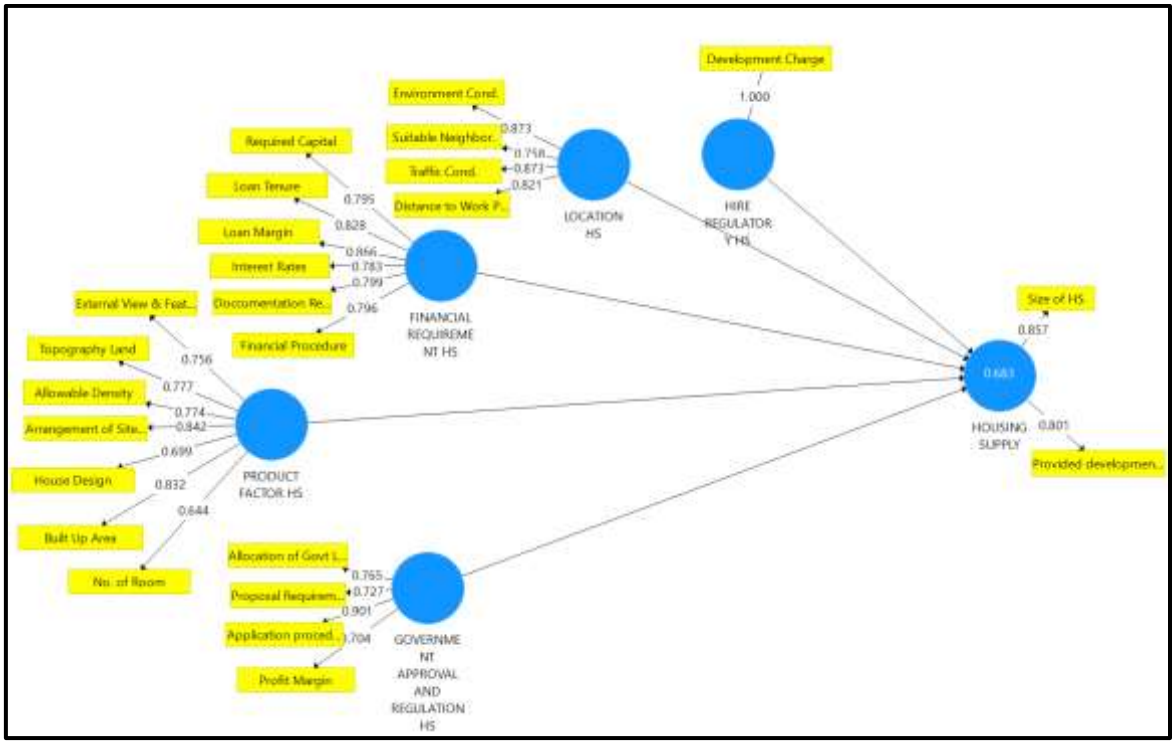

Fig. 2: Outer Loadings and Coefficient Determination (R^2)

Figure 2 represents dual results after the previous analysis. Firstly, the outer loading result in which it clearly shows the acceptable range of each attribute with a satisfactory value of 0.7. Secondly, the relationship of all five factors associated with the housing supply shows to be R^2 of 0.683. Accordingly, this suggests that 68% of the positive variation for the housing supply component has explained all the features. To conclude, the housing supply pathway observes that all attributes above significantly affect the decision of housing developers in the development of affordable housing and it clearly indicates a high relationship.

Table 2. Summary of Effect Size and Path Coefficient

Relationship: Exogenous > Endogenous construct	Effect size (f^2)	Path coefficient (β)	*t*-statistic	P-Value	Significance	Result
Product Factor HS > Housing Supply	0.226	0.325	4.111	0.000	P< 0.01	Significant & Medium effect
Financial Requirement For Bridging Loan HS > Housing Supply	0.018	-0.093	1.257	0.209	P <0.10	Not Significant
Government Approvals & Regulation HS > Housing Supply	0.000	-0.008	0.086	0.932	P <0.10	Not Significant
Location Factors HS > Housing Supply	0.062	0.162	2.169	0.031	P < 0.01	Significant & Small effect
Hire Regulatory Cost HS > Housing Supply	0.753	0.582	6.544	0.000	P < 0.01	Significant & Large effect

*f^2 = 0.02: Small effect * = 0.15: Medium effect *0.35: Large effect: * P ≤ 0.01 and P ≤ 0.05 : Significant * P ≤ 0.10 : Not significance

According to Table 2, the hire regulatory cost side stated the f^2 value with 0.753 with substantial effect size towards their endogenous construct. Meanwhile, product factors (f^2 = 0.226) show a medium effect size on the housing supply construct. This followed by location factors (f^2 = 0.062) show a small impact on the development of affordable homes. Finally, the components from the financial requirement for bridging loans (f^2 =0.018), and government approvals and regulation (f^2 =0.000) have no impact and insignificant results on their endogenous construct of housing supply.

Meanwhile, based on the result, three paths and relationships with endogenous variables are significant, whereas another two can be considered non-significant relationships. With a path coefficient value larger than 0.1 (β = 0.582) and a t-statistic value greater than 1.65 (t-statistic= 6.544), the first high relationship indicates a significant association between higher regulatory cost towards housing supply.

Secondly, the route coefficient value of 0.325 and the t-statistic of 4.111 indicate a substantial correlation between the product factors parameters and the housing supply construct. This is followed by location factors with an acceptable range of path coefficient (β = 0.162) and t-statistic values of 0.162. However, both factors of financial requirement and regulation (β =0.093; t-statistic= 1.257) and government approval factors (β =-0.008; t-statistic= 0.086) are not significant with a path coefficient below than acceptable range of 0.1 and t-statistic values below than 1.65. Therefore, both routes are rejected.

Table 3. Summary of Predictive Relevance

Relationship: Exogenous > Endogenous construct	Q^2	Degree of predictive relevance
Attributes in Housing Supply > Housing Supply	0.433	Strong

*Q^2 = 0.02: Week * = 0.15; Moderate *= 0.35; Strong predictive relevance

Table 3 shows a substantial relevance between attributes and the endogenous construct of housing supply. This relationship shows a strong degree of predictive relevance of Q^2 with a value of 0.433. Predictive significance was established because the Q^2 value for all endogenous constructs overall was greater than 0.35.

5.0 Discussion

This study makes single noteworthy points, i.e., three main factors with 11 attributes did give a significant effect on housing supply. Figure 3 shows that hire regulatory cost gives the highest impact on housing supply which recorded the highest effect size value towards housing developers. The attribute involved was the development charge regulated by the government for the development of affordable houses. Most of the respondents agreed that the hiring regulatory cost enforced by the government is quite strict. According to Rahman et al. (2021), the development charge rate should be standardised, and the local authority should review to lower the rate. Followed by product factors, attributes like external view and features; topography; allowable density; house design; standardised built-up area, and the regulated number of rooms have affected the housing supply. In addition, with the enforcement of quality standards imposed by the government for affordable houses, developers may fail to work within the budget. Mukhtar and Amirudin (2016) highlight four elements for measuring the success of public housing: quality standards, time completed, absence of disputes, and completion within the budget.

Thirdly, the spatial geographical location. Adzhar et al. (2021) highlight factors that could lead to an overhang of affordable houses are social stigma on affordable houses due to unsuitable locations and accessibility. This means that housing developers anticipate developing a low marginal profit for affordable housing, and the location to develop affordable housing should be more attractive for buyers.

Surprisingly, private financial requirements for bridging loans and government requirements have been recorded as insignificant toward the housing supply. It indirectly concludes that financial and government regulation has positively provided a clear form of affordable housing model. In addition, the current COVID-19 pandemic makes housing developers more careful with arranging short-term bridge loans. Most possibly, financial institutions and the government have already given a faultless process in borrowing bridging loans and a

decent standard of approval for developing affordable houses; it is just a matter of regulatory cost, product factors, and location that affect them. Overall, three factors with 11 attributes were found to be significant in the affordable housing supply.

5.1 Housing Supply Model

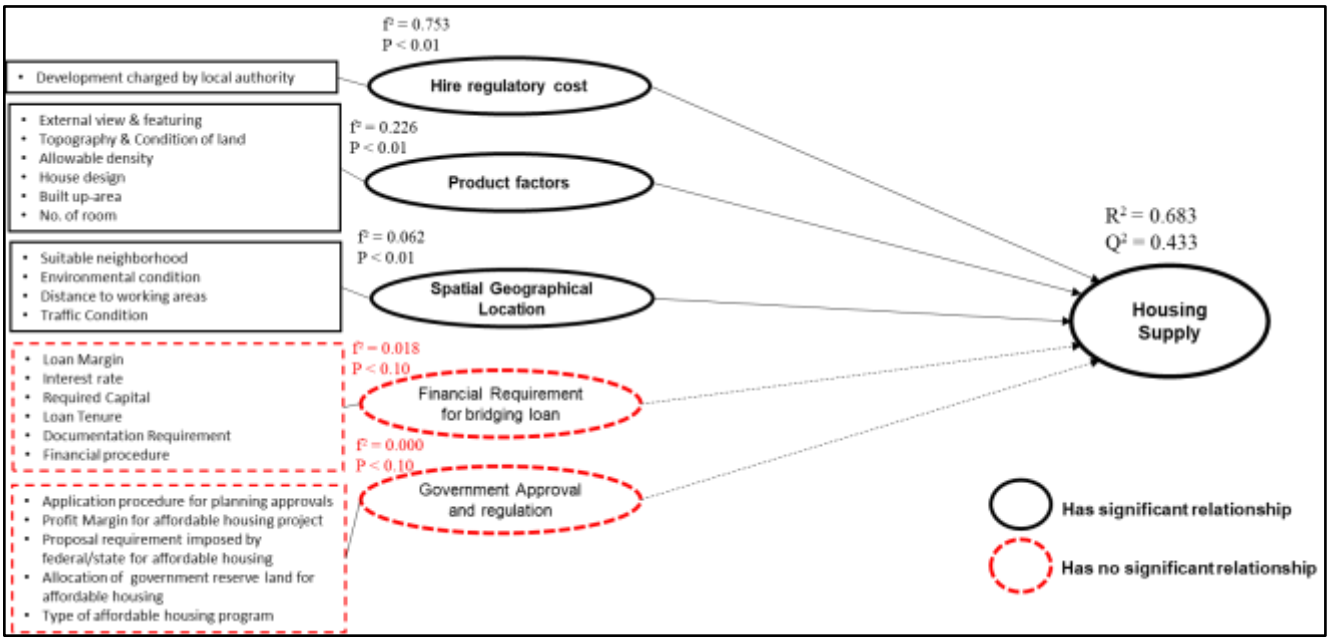

Fig. 3: Housing Supply Model for affordable homes in Malaysia

5.0 Conclusion & Recommendation

In conclusion, examined factors that significantly impact the housing supply indirectly aids the stakeholder in better understanding towards central grounds on the development of affordable houses in cities. Recognising the elements makes the ideal path for scaling the solution for the development of affordable housing into realities in urban areas (World Economic Forum, 2019). This will support stakeholders in concentrating on issues and promote the development of affordable homes to housing suppliers. The model also helps to influence frameworks relating to housing provisions and, thus, helps the condition of the development of affordable houses to be parallel with its qualities.

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Paper Contribution to Related Field of Study

The study generates new theoretical and practical implications for the stakeholders, such as the government, housing providers, and financial institutions. These findings pave the ways for the government to re-assess the real estate policies for affordable homes and enhance the attractiveness of housing developers in making the supply.

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