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## **MODELLING HOUSING MISMATCH FOR AFFORDABLE HOUSING DEMAND AND SUPPLY IN MALAYSIA**

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### **Abstract**

The housing mismatch between housing demand and supply in recent years has become a crucial agenda for enhancing the availability of affordable housing in Malaysia. This research paper presents a study on the factors that affect individuals and housing developers that keep them from owning and supplying affordable housing. This cross-sectional study validates the existence of a housing mismatch in Malaysia from a view of housing demand and supply. This study employed 400 respondents on housing demand and 120 respondents from housing developers who represented housing suppliers. The Partial Least Square Equation Modelling (PLS-SEM) method was used to develop the model and validate the data. By performing the composite reliability and convergent validity through PLS-SEM, 25 attributes from housing demand and 22 attributes from housing supply were found significant for the development of the structural housing mismatch model. The final output was established by findings their coefficients determination, path coefficient, effect size and predictive relevance towards variables of housing mismatch. The result indicates five factors with nine attributes in housing demand and 11 attributes from housing supply contributed to the existence of a housing mismatch at 12%. Finally, by incorporating an analysis of the significant findings, it becomes clear that identifying the features of housing mismatch from both sides enables the government to have strategic interventions. This underlines the importance of recognising the key features in guiding authorities aimed at minimising housing disparities.

**Keywords:** Housing mismatch, affordable housing, product factors, spatial geographical location, regulation and requirement, and hire regulatory cost

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## **INTRODUCTION**

These days, the affordable housing mismatch can be used to gauge a community's quality of life. The term “housing mismatch” is used for the imbalanced market between housing demand and housing supply. This issue is frequently studied from various perspectives by past academics (Bangura & Lee, 2024; Geh, 2016; Bloxham et al., 2011). Most past scholars are highly concerned with housing prices, particularly the existence of affordable housing mismatch, especially in urban areas. Since, the largest investment for households in Malaysia was property. This study highlighted significant research into its findings. For instance, in another country like Australia, households contributed over 60% of their financial resources to own residential properties (Lee, 2017). This raised questions about the affordability of housing in Malaysia. In Malaysia, concerns over affordable housing have been less prevalent until lately, when the value of transactions rose by 23.6% between 2021 and 2022, which was almost double times faster than the average growth rate between 2020 to 2021 (Henry Butcher, 2024). By the end of 2022, Peninsular Malaysia had over 110 delayed projects, 435 sick projects, and 112 abandoned projects recorded under the Ministry of Housing and Local Government, and most of these developers had declared bankruptcy or liquidated (Bernama, 2023). The government's updated policies, which commit to providing more affordable housing with quality on par with high-end houses, have exacerbated the situation (Majid R. et al., 2023). According to NAPIC (2022), the average price in Malaysia has increased to RM 434,758. This result was followed by an increment over residential overhang until a 24.7% change from 2020 to 2021, with 38,863 units unsold. The government repeatedly assures the populace to meet the rising demand for reasonably priced homes under RM 300,000. Thaker (2021) has found that housing demand is recorded at 48% more than the supply, which is only 28%, explaining the reason why private developers abandoned numerous projects for affordable housing. However, housing prices are only among the most common issues that cause the imbalance of housing demand and housing supply. Studies have shown that the existence of housing mismatch, especially an imbalance development on affordable housing, could be affected by housing bubbles (Pitros and Arayici, 2016;), credit risk to banks (Lee et al., 2021), vulnerable to crime (Daud et al., 2022), an insufficient supply of affordable houses (Ismail et al., 2023; Rahim et al., 2019), etc.

Thaker (2021) explained that 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. There are not any in-depth studies that support the view from both perspectives concurrently. Due to the variance and complexity of the housing mismatch situation and the strong correlations between many of its attributes, a thorough framework model is required for assessing the mechanism of housing mismatch

from both sides. With reference to the setting of urban areas in Malaysia, this study aims to understand the relationship and significant effect from both perspectives of housing demand and supply together that contributed to the existing proportion of housing mismatch to bridge the gap above. Individuals and housing developers are the respondents. The literature review, research methods, research findings, discussion and conclusion are roofed in the sections.

### **FACTOR AFFECTING HOUSING MISMATCH**

Five factors have a significant effect towards housing mismatch from both housing demand and housing supply. They are the following: product-related considerations, private financial requirements, government regulations and requirements, spatial geographic location, and other bearing costs (Majid et al., 2023; Saleh et al., 2022). These factors are prominent in understanding housing mismatch based on their demographical profiles.

The lack of demand for affordable house units could be due to a mismatch of product type and location (Thean, 2017). From here, product factors have an impact towards the selection of stakeholders to decide the quality of the product. Individuals are highly connected in their ability to recognise housing products (Ariff et al. 2016). Meanwhile, housing developers have limited ability to provide social housing due to profit-oriented (Zainul & Idris, 2017). Other than that, past researchers have provided that product-related factors that affected demand and housing supply were tenure, house design, built-up areas, no of rooms, allocation of site plan and layout plan, restriction of interest, allowable density, external view, topography; and open spaces (Majid et al., 2023; Saleh et al., 2017; Matel, 2020).

Another point to look at was spatial geographical location. Rosli et al. (2024) suggest the local government should organise a plan to achieve a balanced equilibrium between housing development and the proximity of the working places, commercial areas and city centre. The authors believe that allocating proper planning locations for housing development could enhance the quality of life, particularly for low-income people. Thus, assessment of location should be frequently assessed in terms of accessibility, such as proximity to a major business district, the neighbourhood, and the access to resources for education and entertainment (McCluskey et al., 2000).

Next, another factor that affects housing mismatch is the financial requirement set up by bank institutions for end-finance and bridging finance. Several financial institutions do not lend and serve low-income customers because they have no proper documentation of income (Gopalan and Venkataraman, 2015). Moreover, the difficulty of providing a downpayment of 10% and cash for another hidden charge, such as legal fees, is challenging for low-middle-income communities (Khoo, 2020). In addition, housing developers also have their requirements to follow in order to apply for bridging loans. BNM

(2018) revealed that the bank has approved RM 516 billion for residential end-financing and only RM 88 billion for bridging finance. This amount shows a huge gap in the housing supply to develop affordable housing.

Other than that, government requirement and regulation factors also play the main roles in the proportion, either from federal or state government made in-charge with all the policy and procedure. Jamalludin et al. (2016) explained that the procedure housing developers must endure to get approval from the board takes up to two months. Then, to get development approval from the local authority, it takes 10 months maximum. It actually more or less prevents the housing developers from developing affordable houses. Finally, other bearing costs and hire regulatory costs are borne by the people and housing developers, as mentioned in the conceptual framework below. For housing developers, some local authorities have increased development charges, which may impact the total cost of development (Rahman et al., 2021).

## **CONCEPTUAL FRAMEWORK OF AFFORDABLE HOUSING MISMATCH**

In essence, this conceptual framework is an expansion and adaption from the preliminary framework given by Saleh et al. (2016) and Saleh et al. (2017) and supported by Majid et al. (2023). The framework has 38 attributes for housing demand and 35 attributes that come under housing supply, and they can analyse the existence of housing mismatch.

In the light of the above figure 1, the following research hypotheses are proposed:

- $H^1$  – Attributes of housing demand have a significant impact on the people's perspectives for purchasing affordable houses.
- $H^2$  – Attributes of housing supply have a significant impact on the housing developers' perspectives' for developing affordable houses.
- $H^3$  – Both housing demand and housing supply have a significant impact on the existence of housing mismatch in a country.

Figure below show the conceptual framework that compiled all the attributes indicated by the expertise and literature.

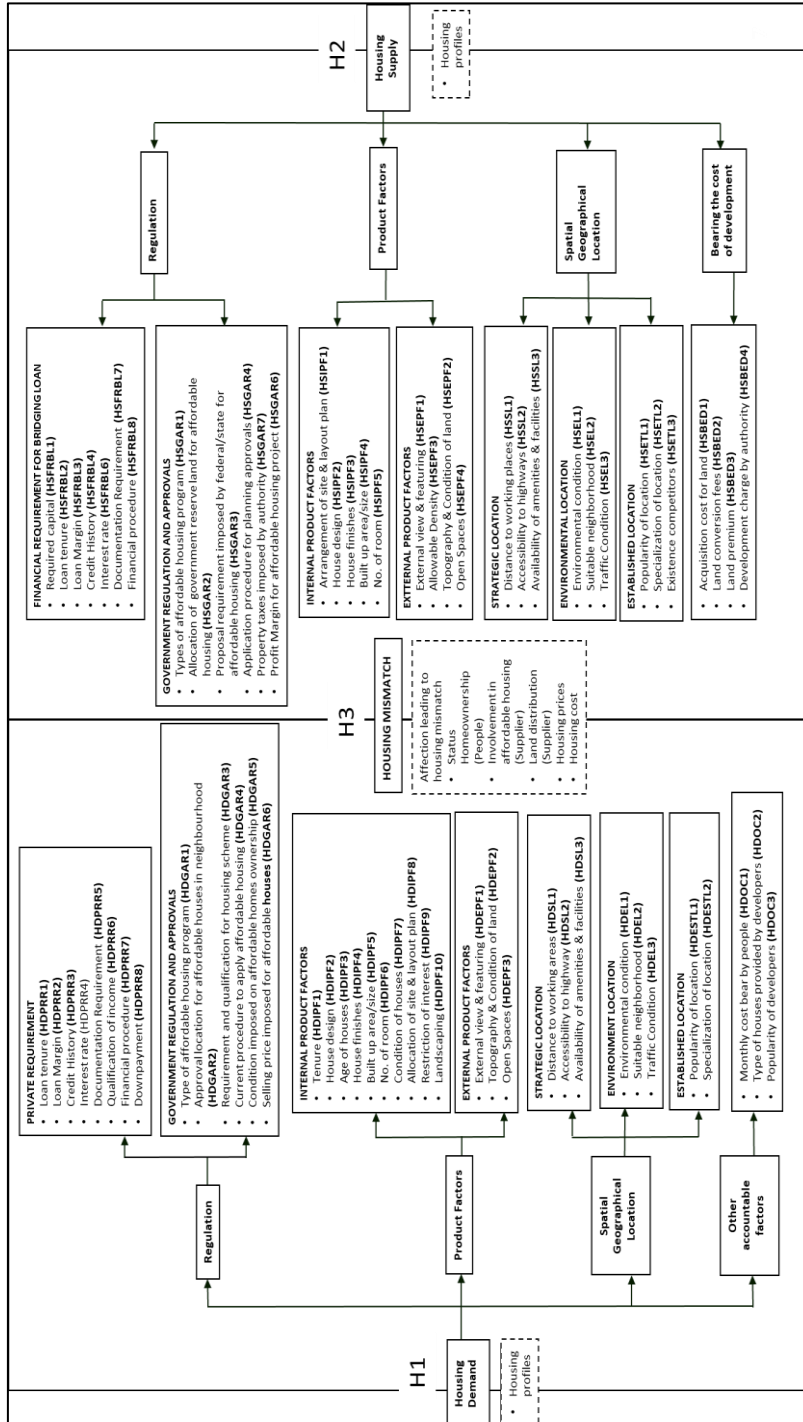


Figure 1: Proposed Conceptual Framework (Author self-compilation)

Firstly, a questionnaire survey was distributed to 400 people who rented houses in a few urban areas in Kuala Lumpur and Selangor, Malaysia, to identify the significant effect on housing demand, followed by 120 developers who have been involved with affordable housing projects in Malaysia. Using a five-point Likert scale (1-Strongly disagree, 2- Disagree, 3-Neutral, 4-Agreed, 5-Stongly Agree), They were asked to evaluate every attribute that impacts purchasing (housing demand) and developing (housing supply) affordable housing in Malaysia. Then, the data were analysed using a statistical package for social science (SPSS) and validated through Structural Equation Modelling (PLS-SEM). PLS-SEM will create a connection between the measurement items and their associated construct within the analysis (Hair et al., 2011; Sartsedt et al., 2019). The analysis is made for order construction under the reflective-formative model, as suggested by Sarstedt et al. (2019). The authors suggest reflective model should be analysed using composite reliability for composite validity. Average Variance Extracted (AVE) for convergent validity in order to eliminate and finalise the established of each construct as for measurement model. Then, using formative analysis, the structural model was analysed to interpret their Coefficient of determination (R<sup>2</sup>), Path coefficient ( $\beta$ ), Effect size ( $f^2$ ) and Predictive relevance ( $Q^2$ ).

## RESULT AND DISCUSSION

### a) Evaluation of Measurement Model

**Table 1:** Composite and Convergent Validity

No.	Indicators	Composite Validity	Convergent Validity
		CR	AVE
1	PRODUCT FACTORS HD	0.945	0.657
2	PRIVATE FINANCIAL REQUIREMENT & REGULATION HD	0.896	0.554
3	GOVERNMENT APPROVAL & REGULATION HD	0.923	0.751
4	LOCATION FACTORS HD	0.834	0.511
5	PRODUC FACTOR HS	0.907	0.583
6	FINANCIAL REQUIREMENT FOR BRIDGING LOAN HS	0.920	0.659
7	GOVERNMENT APPROVALS & REGULATION HS	0.858	0.605
8	LOCATION FACTORS HS	0.900	0.693
9	HIRE REGULATORY COST HS	1.000	1.000
10	HOUSING DEMAND	<b>0.810</b>	<b>0.592</b>
11	HOUSING SUPPLY	<b>0.815</b>	<b>0.688</b>
12	HOUSING MISMATCH	<b>0.275</b>	<b>0.659</b>

\*CR:  $0.6 \leq CR$  &  $\alpha \leq 0.7$ : Acceptable \* $0.7 \leq CR$  &  $\alpha \leq 0.9$ : Satisfactory

\*AVE: AVE > 0.5: Satisfied \*AVE  $\leq 0.5$ : Consider to remove

Subsequently, after some elimination of attributes, Table 1 shows the final composite and convergent validity. The CR values explain that all the constructs are under a satisfied range of 0.700 except construct factors of housing mismatch (0.275). The analysis then proceeded with determining convergent validity by interpreting the result from the AVE value. From Table 1, all constructs provide AVE values greater than 0.5 except hire regulatory cost by housing supply since it has only one attribute left after the elimination process. In this context, the construct validity is met and accepted. From here, after the elimination of some attributes to finalise its validity, 25 attributes from housing demand and 22 attributes from housing supply were selected to be analysed for the next level of the structural model.

**b) Evaluation of Structural Model**

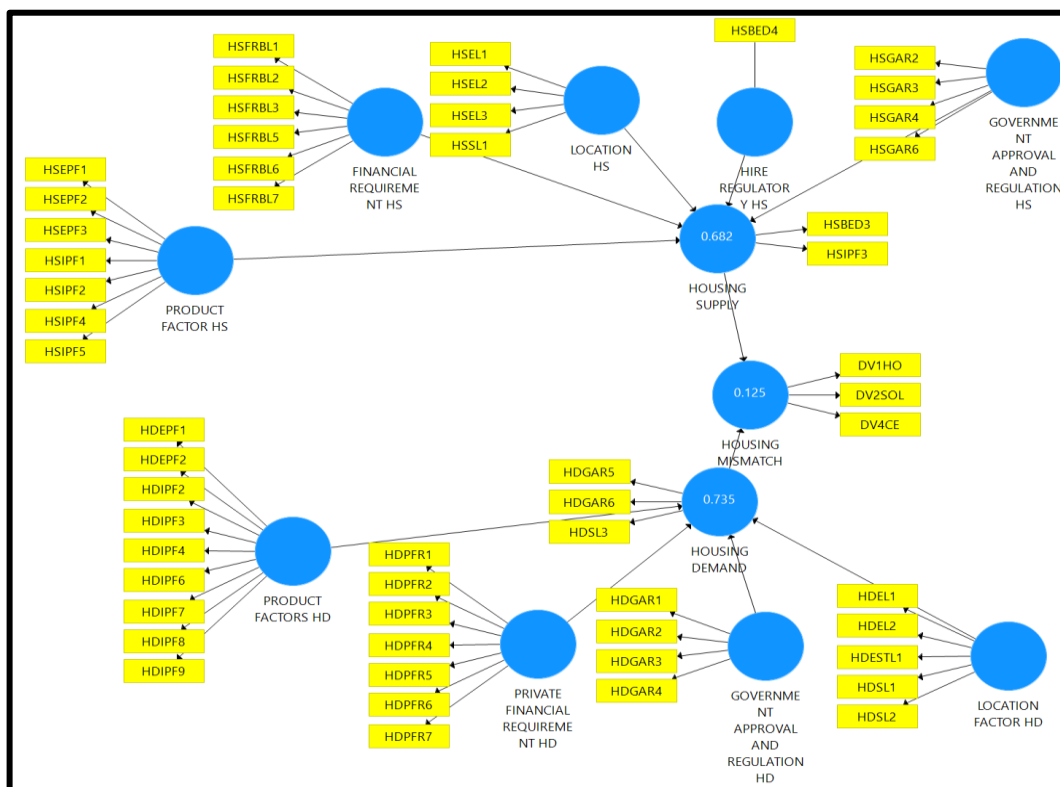


Figure 2: Coefficient determination (R<sup>2</sup>)

Figure 2 portrays all factors and attributes associated with housing profiles after analysis from convergent validity. The contribution of the Product Factor HD, Private Financial Requirement HD, Government Approval and Regulation HD, and Location Factors HD associated with housing demand and housing profiles as a dependent variable are shown to be  $R^2$  of 0.735. Accordingly, this would suggest that 73% of the positive variation for the housing demand component can explain all the features, followed by housing supply responded by housing developers, which recorded  $R^2$  of 0.682. However, after grouping both constructs from housing demand and housing supply for measuring the proportion of housing mismatch, it contributed to a low relationship of  $R^2$  of 0.125. Thus, 12% of positive variation from housing demand and housing supply contributed to the existence proportion of housing mismatch in such areas. According to Hair et al. (2011), a high number of  $R^2$  will indicate a high level of association and accuracy. The significant indicator used to identify the variables was greater than 0.26 (Cohen 1998); 0.33 is regarded as moderate, and 0.19 is weak (Chin 1998).

**Table 2: Summary of Effect and Path Coefficient**

Relationship: Exogenous > Endogenous construct	Effect size $f^2$	Path coefficient ( $\beta$ )	t-statistic	P-Value	Significance	Result
GOVERNMENT APPROVAL & REGULATION HD > HOUSING DEMAND	1.434	0.693	9.633	0.000	$P < 0.01$	Significant & large effect
LOCATION FACTORS HD > HOUSING DEMAND	0.268	0.319	3.099	0.000	$P < 0.01$	Significant & medium effect
PRODUCT FACTORS HD > HOUSING DEMAND	0.001	0.016	0.254	0.799	$P < 0.10$	Not Significant
PRIVATE FINANCIAL REQUIREMENT & REGULATION HD > HOUSING DEMAND	0.000	-0.009	0.150	0.881	$P < 0.10$	Not Significant
PRODUC 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



HOUSING DEMAND > HOUSING MISMATCH	0.051	0.211	1.955	0.05	P < 0.05	Significant & small effect
HOUSING SUPPLY > HOUSING MISMATCH	0.090	-0.280	2.763	0.00	P < 0.01	Significant & small effect

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

According to the effect size result in Table 2, Government Approvals and Regulation from the Housing Demand Side ( $f^2 = 1.434$ ) and Hire Regulatory Cost from the Housing Supply Side ( $f^2 = 0.753$ ) have a substantial effect size towards their endogenous construct. Both Location Factor HD ( $f^2 = 0.268$ ) and Product Factor HS ( $f^2 = 0.226$ ) show a medium effect size on their endogenous construct. Other than that, the location factors HS ( $f^2 = 0.062$ ) component has a negligible impact on the availability of homes. Housing supply and demand, for the second-order construct, have negligible effects on housing mismatch ( $f^2 = 0.090$  and  $0.051$ , respectively). Lastly, the components of Product Factor HD ( $f^2 = 0.001$ ), Private Financial Requirement HD ( $f^2 = 0.000$ ), Financial Requirement for Bridging Loan HS ( $f^2 = 0.018$ ), and Government Approvals and Regulation HS ( $f^2 = 0.000$ ) have no impact at all on their endogenous construct of housing demand and housing supply. According to Hair et al. (2011), the route coefficient value needs to be at least 0.1 to consider the effect in a structural model. However, the observation should also be determined using the t-statistic and P-value for deleted non-significant construct variables. T-statistics values under 1.65 are not significant, according to earlier studies, and the road should be discarded. Meanwhile, seven (7) paths have significant relationships toward endogenous variables, while another four (4) do not have significant relationships. The highest relationship indicates a significant association between government approval regulation HD and housing demand, with a path coefficient value larger than 0.1 (= 0.693) and a t-statistic value greater than 1.65 (t-statistic= 9.633). Secondly, the route coefficient value of 0.319 and the t-statistic of 3.099 indicate a substantial correlation between the geographic location parameters HD and housing demand. Thirdly, the path coefficient for housing supply showed a substantial and accepted association between the components of product factors, location factors, and hire regulatory cost, with path coefficient values of 0.325, 0.162, and 0.582 and t-statistic values of 4.111, 2.169, and 6.544. Housing supply and the housing mismatch are accepted with the path coefficient values of 0.211 and -0.280 and t-statistic values of 1.955 and 2.763, respectively. The link between the private financial requirement and regulation HD with housing demand is not significant, as shown by a different route that has a path coefficient value below 0.1 (=0.016 and -0.009) and a t-statistic value below 1.65 (t-statistic= 0.254 and 0.150). Therefore, this route is rejected. The relationship between factors of financial requirement for bridging loans and the government approvals and regulation associated with housing supply are both taken into account as non-

significant results due to path coefficient values of -0.093 and 0.008, and t-statistic values of 1.257 and 0.086, respectively.

**Table 3:** Summary of Predictive Relevance

<b>Relationship: Exogenous &gt; Endogenous construct</b>	<b>Q<sup>2</sup></b>	<b>Degree of predictive relevance</b>
HOUSING DEMAND > HOUSING MISMATCH	0.405	Strong
HOUSING SUPPLY > HOUSING MISMATCH	0.433	Strong
HOUSING SUPPLY AND HOUSING DEMAND > HOUSING MISMATCH	0.064	Weak

Table 3 shows a substantial correlation between housing demand, housing supply, and endogenous housing mismatch. From housing demand to housing mismatch construct has contributed a strong degree of predictive relevance of Q<sup>2</sup> with the value of 0.405. Similarly, with housing supply to housing mismatch construct recorded a strong degree of predictive relevance with Q<sup>2</sup> of 0.433. Finally, a combination of both housing demand and housing supply with the constructed variable of housing mismatch has observed a weak effect of predictive relevance with Q<sup>2</sup> at 0.064.

Predictive significance was established because the Q<sup>2</sup> value for all endogenous constructs overall was greater than 0. The past scholars suggest 0.02 is considered a weak form, 0.15 is moderate, and 0.35 and above have strong degrees of predictive relevance.

## **DISCUSSION AND CONCLUSION**

The study makes three noteworthy points: (1) the attributes that show a significant impact on the people (housing demand) for purchasing affordable houses; (2) the attributes that show a significant impact on the housing developers in developing affordable houses; and (3) the existence of housing mismatch in sampled areas are low.

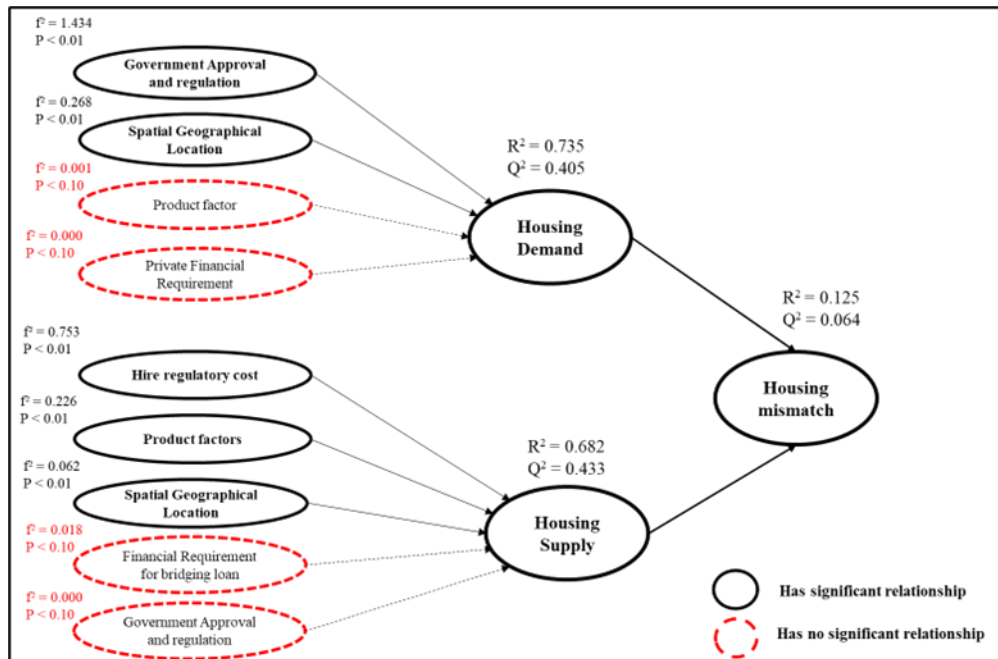


Figure 3: Housing Mismatch Model for Affordable Housing

The result from PLS-SEM was summarised using the above figure. After eliminating some constructs and analysing the results from relationship and effect size, the result has shown that two factors out of four factors with an overall of nine attributes were found to be significant with housing demand, three factors with 11 attributes were found to be significant with a structural model in housing supply.

Meanwhile, another factor that shows significance in the current situation is the financial requirement for bridging loans. Nowadays, the COVID-19 pandemic forces housing developers to be careful with any agreement on the short-term bridge loan and their capital expenditure. Zulkarnain et al. (2023), COVID-19 does affect property development and its value. The rational reason for the non-significant result from these factors is probably because financial institutions and the government have already given the faultless process in borrowing bridging loans and a good standard of approval for developing affordable houses; it is just a matter of hire regulatory cost; product factors, and location that affect them.

One can see the existence proportion of housing mismatch in such areas is low. However, the stakeholders cannot ignore the factors that affect housing demand and housing supply.

Additionally, by explaining the factors that contributed to housing mismatch, it indirectly aids communities in understanding the fundamental problems with sustainable development and their interrelationship. Recognising the elements makes it the ideal path for scaling the solution needed and helps stakeholders define and focus on the attributes that highly affect housing mismatch. The model also helps to influence frameworks relating to housing provisions and eventually supports the condition of lack of homeownership and deficiency of building affordable houses that should be parallel with its qualities. For example, governments are recommended to perform adequate feasibility studies for their intended customers to address this problem, especially in regard to understanding the purchasing power of the populace. The Housing Ownership Campaign (HOC), launched in 2019, was one previous attempt to increase overhang unit sales. According to previous Housing and Local Government Minister Zuraida Kamarrudin, 31,415 housing units worth RM23.3 billion were sold as a result of this campaign (Thean, 2020). The continuation of similar governmental measures this year may boost sales of the remaining overhang units. However, the stakeholders should be aware that numerous things have changed since the pandemic, including the reality of housing demand and housing supply. Models for financing could also need to be changed, especially after the world crisis of COVID-19. This was supported by Khan et al. (2024), who highlighted the significant improvement in handling financial capability during a crisis. For instance, when remote employment becomes more prevalent, potential purchasers might be inclined to purchase affordable houses in suburban areas. The Malaysian housing market could be improved, and more affordable homes could be provided for everyone through government initiatives and more targeted real estate development projects.

All of these factors and attributes increase the likelihood of housing mismatch. Inequality in certain locations and differences in demographic profiles will have a detrimental effect on the housing industry. Most people have personal concerns that prevent them from purchasing a home. Similarly, housing developers also have their limitations, such as labour force and capital, leaving most areas to end up with various housing disparity characteristics due to the differences in people's tastes and developers' profiles. However, the question is not only whether these imbalances exist but rather what factors and to what extent they contribute to the imbalance. From that result, the government can arbitrate which areas are more important to be rescued in order to reduce the gaps.

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This work should pave the way for further investigations in the future, especially when it comes to the specification of each main factor. I hope that the knowledge gathered from this study will open doors for additional research and validate the framework we have developed.

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