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SUSTAINABLE AFFORDABLE STRUCTURAL MODEL IN HOME OWNERSHIP

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Abstract

Home is a basic human need. Every year, the government is responsible for enacting a more sustainable and inclusive housing policy to ensure the adequate provision, quality and affordable housing to meet the needs of the growing sustainable communities. The aim of the current research is to analyse affordability as a mediator in the relationship between economic, social and environmental factors towards the need for home ownership among civil servants in Klang Valley. Path Analysis and Boostrapping through Structural Equation Modelling (SEM) are used to see the relationship and influence between sustainability and affordability variables. There is a significant relationship between all elements of affordability with economic, social and environmental factors. Mediation effect (mediator) for the element of affordability that is tested in the construct relationship between economic, social and environmental factors on the need for home ownership. Finally, this study succeeded in forming a sustainable affordable structural model in home ownership.

***Keyword**:* Affordable, home ownership, sustainable

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INTRODUCTION

The human need for housing is a basic need regardless of the economic situation. Therefore, providing adequate and affordable houses for the people including those in the lower income group, which has been a priority of the Malaysian government.

The government launched the National Housing Policy (NHP) 2.0 (2018-2025) in 2019 to serve as a comprehensive guide to Malaysia's housing development involving the collaboration of both the public and private sectors, through the Ministry of Housing and Local Government (KPKT).

Although, the government faced various issues to provide affordable housing and achieve sustainable development for the housing market, the government stipulated various measures under the NHP to improve housing affordability for the low-income group, which subsequently increases the home ownership rate in Malaysia. Some of the main issues include the high prices of houses and the shortage of supply for affordable homes. Owning the desired properties in prime locations is beyond the reach of many. This is a fact, especially for first time homebuyers who face the issue of high prices of houses that are beyond their means (Rosli and Rohayu, 2022).

In relation of the issues stated above, the government took action to curb the issue of rising price of houses and helped to stabilise the property market by introducing various schemes, such as My First Home Scheme (MFHS), PR1MA and Transit Homes. These initiatives help the low-income group to own houses. Currently, there are no specific policies for the middle-income earners, who continue to face difficulty in buying houses. The high prices for houses are beyond their affordability level.

Housing affordability remains as a serious issue, with a wide range of considerations in measuring affordability. Sustainability of housing development is another major concern in the housing issues. Therefore, this study is to analyze affordability as a mediator in the relationship between economic, social and environmental factors towards the need for home ownership.

RESEARCH BACKGROUND

In recent years, Malaysia also faced with the issues of affordable housing and sustainable development like many other countries. The National Housing Policy (NHP) stipulates that everyone should own a house, either from high-income, medium-income and low-income groups regardless of social status and ethnicity. However, Malaysian finds it increasingly difficult to own a house. This is a fact especially for first time homebuyers who have been facing with high house prices that are beyond their affordable level.

People in this country are keeping a watchful eye with growing tension and anticipation on the next step that will be taken by the government and

corporation to minimise the impact of rising property price towards economic and social welfare in this country (Rosli and Rohayu, 2022).

However, current housing affordability problems are more inherent to the middle-income group of the household rather than low-income group of households because there are specific programmes directed to this low-income group by alleviating their buying power as one of the means of government initiatives, policies and measures. Housing affordability problems are alarmingly more serious and make it difficult to get home ownership specifically for the young people. A household will feel that they can afford to own a house with a level of income and spend a portion to housing expenditure, meanwhile, another household that has the same level of income may have a lower affordability level due to bigger size of household members and contribute to a high commitment for non-housing expenditure, thus, it may lead them to a shortage of income.

Housing affordability is mostly encountered within the ability of an individual or households to own and consequently implying, to pay for it. Affordability is frequently measured in terms of the ratio of housing costs to income. However, sustainability of housing development is another major concern in the housing issues. The criteria that have wide-ranging elements need to be tested in order to determine the preferred sustainable housing affordability elements. A wider measurement of housing affordability is needed by the people, instead of focusing only on the ratio between house prices and household incomes.

LITERATURE REVIEW

Housing Affordability

Housing affordability has become a main concern in major cities especially those in developing countries. While the yardstick of affordability varies by country, housing affordability is defined as the ability to own a residential property or house that fulfils basic living needs in terms of cost, quality, and location. Therefore, housing affordability is a complex issue that shall be entangled and assessed not only based on economic viability but shall include the people's wellbeing especially those in the middle and lower-income group. Regardless of any social status, citizens of any country shall be able to occupy a housing unit that meets the norm of social requirements.

Housing affordability deals with citizen's ability to pay a mortgage and use the balance of their income to purchase necessity goods or fulfil other commitments. The household members shall strike a balance between paying for housing and non-housing expenditure. According to the Central Bank of Malaysia, a house is considered affordable if its cost does not exceed 30% of an individual's gross income. The price-to-income ratio should not exceed 3.0, but from 2014 onwards, the range of the ratio is 4.0–4.4. Unsurprisingly, a 2019 report by Khazanah Research Institute asserted that houses in the country are

"seriously unaffordable". Furthermore, many households reportedly have debt levels of over 85%. Tied to their various financial commitments, most Malaysians are unable to own a home. Data from the Ministry of Finance, Malaysia showed that from 1981 to 2019, the growth of house price index is proportional to the growth of personal disposable income of the average Malaysian. However, personal disposable income grew slower than anticipated compared to house price index.

The continual increase of housing prices has dampened the housing sector and have an adverse impact on middle- and low-income earners. The Department of Statistics, Malaysia highlighted that the median monthly income of middle- and low-income earners, based on an average household size of four persons, are RM 6,275 and RM 3,000, respectively. The mean monthly income are RM 6,502 and RM 2,848, respectively. The Malaysian government consistently assures the public that it is trying to fulfil the growing demand for affordable homes that cost below RM 300,000. However, findings have shown this demand to be 48% whereas the supply only 28%. The disparity is a result of many affordable housing projects being abandoned by private developers. In analysing the main drivers of housing affordability in Malaysia, many studies are skewed towards the economic factors rather than the social and environmental factors.

Sustainability in Housing

As World Commission on Environment and Development (WCED) suggested, sustainable development concerns with 'satisfying the needs of the present without jeopardising the future generation ability to fill their needs. Recent research evidence points to the low level of awareness of the sustainable development concept (Olanrewaju, 2018). In affordable housing programs, sustainable development implies achieving a better quality of life via efficient use of resources, which ensures continued social progress while maintaining stable economic growth and environmental care (Vehbi, 2010).

Sustainable development in affordable housing sets to accomplish the following three major goals: social, environmental and economic goals. Integrating sustainability and affordability into housing often referred to as sustainable affordable housing, is housing that satisfies the demand and needs of the present generation without compromising future generations' ability to meet their housing demands and needs (Adabre, Ghazali & Chan, 2019). In general, sustainable affordable housing is housing that is designed and constructed in compliance with sustainability requirements (Ezennia, Adabre 2019) (Mulliner, 2015). Like any consumer, affordable housing buyers/renters suffer many challenges in making decisions on their choice. Affordable housing gap is widened as a result of income distribution/imbalance.

Table 1: Key Definitions of Housing Affordability

References	Focus	Definition
Howenstine E. J. (1983)	Economic	Households' ability to acquire decent accommodation by the payment of a reasonable amount of its income on shelter
Maclennan D, Williams R. (1990)	Economic	Affordability is about securing some prescribed housing standard (or different standards) at a cost (rent or price) which exerts no unreasonable burden on household incomes, according to any third party (mostly the government).
Bramley G. (1994)	Economic	The ability households to occupy housing that meets socially acceptable standards of adequacy, considering household composition (size and type) at a net cost which allows them sufficient income for survival without plunging them below some poverty standard.
Whitehead CM. (1991)	Economic	Focuses on the housing expenditure-household income relationship, and thus seek to design, a measure that can establish what amount of rent spent on the housing that is considered affordable.
Hancock KE. (1993)	Economic	Affordability is about the concept of opportunity cost of housing, what is forgone in order to secure housing and if that which is forgone is unreasonable or moderate in some sense.
Thalmann P. (2003)	Economic	Households are experiencing affordability burden, if the cost of housing displaces excessively other expenses.
Burke T., Ralston L. (2004)	Socio-economic	Affordability describes the ability of households to meet the costs of housing, while there is the possibility of maintaining other basic expenses.
Stone ME. (2006)	Socio-economic	Housing affordability is the articulation of the challenges that confront households in balancing the actual or potential housing cost, as well as the non-housing expenses, within the limits of their income.
Leishman C, Rowley S. (2012)	Socio-economic	Affordability is a broad concept that is concerned with housing appropriateness and standards, as well as social and neighbourhood issues, in addition to economic participation.
Mulliner E, Smallbone K, Maliene V. (2013) Mulliner E, Malys N, (2016)	Social, Economic & Environmental	Affordability is comprised of some broader and more sustainable perceptions of wide-ranging criteria such as economic, environmental and social aspects that affect households.
Minchenko MM, Nozdrina NN. (2017)	Social, Economic & Environmental	The housing affordability concept should receive both social and economic content, in addition to the ecological content.

Source: Ezennia, 2019

The Factors of Sustainable Affordable Housing

In this study, to identify key factors contributing to sustainable affordable housing choice, an extensive review of peer-reviewed articles in highly ranked journals was undertaken. As a result, a holistic set of factors relevant to sustainable affordable housing was identified (Table 2).

Table 2: Sustainable Housing Affordability Criteria

Sustainable Housing Affordability Criteria	**Literature Review**
House prices in relation to incomes	Local authority interviews; CLG (2007); Whitehead et al. (2009).
Rental costs in relation to incomes	Local authority interviews; CLG (2007); Whitehead et al. (2009).
Interest rates and mortgage availability	Local authority interviews; NHPAU (2010); Shelter (2006).
Availability of rented accommodation	Maliene and Malys (2009); ODPM (2005b); Winston (2010).
Availability of affordable home ownership products	Maliene and Malys (2009); ODPM (2005b); Winston (2010).
Quality of housing	Local authority interviews; CLG (2006a); Maliene and Malys (2009); Winston (2010).
Safety (low crime levels)	Fisher et al. (2009); ODPM (2005a; 2005b); Winston (2010).
Access to employment opportunities	Fisher et al. (2009); ODPM (2005a; 2005b); Winston (2010).
Access to and quality of transport services	CLG (2007); CTOD and CNT (2006); ODPM (2005a; 2005b); Winston (2010).
Access to and quality of schools	CLG (2007); Fisher et al. (2009); ODPM (2005a; 2005b); Samuels (2005); Zhu et al. (2005).
Access to shops (local shops, fresh produce, supermarket)	ODPM (2005a; 2005b); Samuels (2005); Zhu et al. (2005).
Access to health services (hospitals and GP's)	CLG (2007); ODPM (2005a; 2005b); Zhu et al. (2005).
Access to child care	ODPM (2005a; 2005b).
Access to leisure facilities	ODPM (2005a; 2005b).
Access to open green public space	CLG (2007); Maliene and Malys (2009); ODPM (2005a; 2005b); Winston (2010); Zhu et al. (2005).
Energy efficiency of housing	Local authority interviews; ACF and VCOSS (2008); Maliene and Malys (2009); Pullen et al. (2010); Winston (2010).
Availability of waste management facilities	Maliene and Malys (2009); ODPM (2005b); Winston (2010).

Source: Emma Mulliner et al. (2011), DRMM (2019)

Figure 1: Research framework

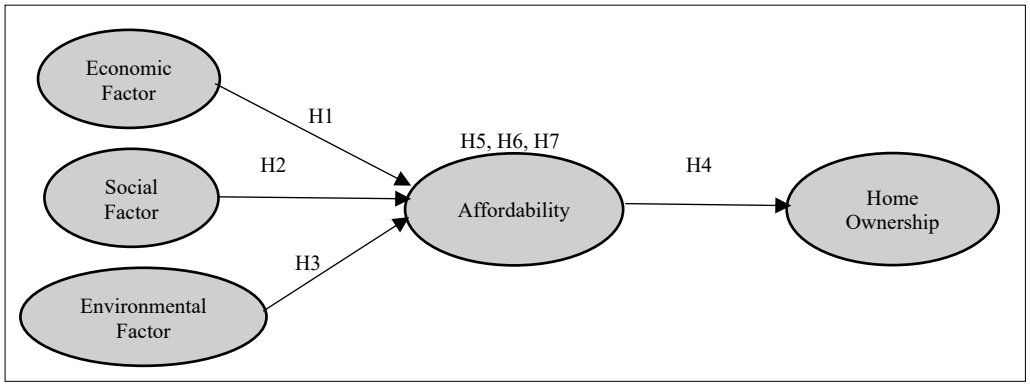


Figure 1 presents some hypothesis testing for this study involving the hypothesis of direct effects as well as the hypothesis of indirect effects or mediator effects between the constructs that will be carried out in this study. Statements for each hypothesis in Figure 1 have been made in Table 3. Each hypothesis statement in Table 3 is followed by statistical testing methods to test the hypothesis of direct effects and also indirect effects or mediators as well as the statistical methods that will be used to test each mediation hypothesis.

Table 3: Hypothesis Statement and Testing Method

	Hypothesis Statement	**Statistical Test**
H_1	**Economic Factors (E)** have a positive and significant influence on **Housing Affordability (A)** among civil servants	Path Analysis in SEM
H_2	**Social Factors (S)** have a positive and significant influence on **Housing Affordability (A)** among civil servants	Path Analysis in SEM
H_3	**Environmental Factors (ENV)** have a positive and significant influence on **Housing Affordability (A)** among civil servants	Path Analysis in SEM
H_4	**Housing Affordability (A)** has a positive and significant influence on **Home Ownership (HO)** among civil servants	Path Analysis in SEM
H_5	**Housing Affordability (A)** mediates the relationship between **Economic Factors (E)** and **Home Ownership (HO)** among civil servants	Path Analysis in SEM & Boostrapping
H_6	**Housing Affordability (A)** mediates the relationship between **Social Factors (S)** and **Home Ownership (HO)** among civil servants	Path Analysis in SEM & Boostrapping

	Hypothesis Statement	Statistical Test
H_7	**Housing Affordability (A)** mediates the relationship between **Environmental Factors (ENV)** and **Home Ownership (HO)** among civil servants	Path Analysis in SEM & Boostrapping

RESEARCH METHODOLOGY

This study is based on the quantitative method and the non-probability samples (purposive stratified sampling) approach is used for sampling. The respondents were selected based on a set of criteria: they should be civil servants, staying in the study area and working (having an income). Klang Valley was selected as the study area because it has many new housing schemes. This area is an urban conglomeration in Malaysia that is centered in the federal territories of Kuala Lumpur and Putrajaya, and includes its adjoining cities and towns in the state of Selangor. It is conterminous with Greater Kuala Lumpur, although there are variations between the two. As of year 2020, the Klang Valley is home to roughly 8 million people. The distribution of questionnaires was conducted online (using Google forms) between 1 March 2022 and 30 May 2022. Before the official distribution of the questionnaires, a pilot test was conducted with ten respondents.

Purposive sampling has been used in determining respondents who are suitable for the purpose of the study. According to Collis and Hussey (2009), if the total population is more than 75,000 and less than 1,000000, the researcher needs 382 subjects for analysis; this would be sufficient to describe the characteristics of the wider population. At the time of this study, the population of government servants in Klang Valley is unknown. Sample size for unknown population use the requirement of analysis tools. e.g., SEM need minimum 100 samples. Therefore, to avoid a very large error for small sample size estimation, the study required at least 382 respondents. the total number of responses was 380, equivalent to 99.48% of the population sample (N=382). This response rate was still acceptable since 30% was a reasonable response rate to a questionnaire survey conducted as part of a social science survey using email and mail (Sekaran, 2003). Statistical Package for Social Sciences (SPSS) and Analysis Moment of Structure (AMOS) software were used to analyze the data to model the causal relationship between several latent constructs simultaneously in a structured model. Path Analysis (Path Analysis) and Boostrapping through Structural Equation Modelling (SEM) are used to see the relationship and influence between variables.

DATA ANALYSIS AND FINDINGS

This section addresses the analysis of the survey outcomes and summarises the key findings based on the respondent profiles, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA).

Table 4: Background of Respondents

Variables	Percentage (%)
Gender	
Male	53.6%
Female	46.4%
Age	
21-30 years old	30.4%
31-40 years old	48.2%
41-50 years old	17.9%
> 50 years old	3.5%
Race	
Malay	92.9%
Chinese	1.7%
Indian	4.1%
Others	1.3%
Marital Status	
Single	16.1%
Married	82.1%
Divorce/Widow	1.8%
Number of Children	
No Children	16.1%
One Children	8.9%
Two Children	23.2%
Three Children	19.6%
Four Children	14.3%
Five Children and above	17.9%
Household Income	
RM1,500 and below	14.3%
RM1,501-RM3,500	35.7%
RM3,501-RM5,500	37.5%
RM5,501-RM7,500	5.4%
RM7,501 and above	7.1%
Current Homeownership	
Owner	19.6%
Rent	50%
Family home/shared	30.4%
Length of Stay	
< 1 year	4.9%
1-3 years	20%
4-6 years	36.7%
7-10 years	11.7%
>10 years	26.7%
Status of Employment	
Permanent	82.1%
Contract	16.1%

Variables	Percentage (%)
Others	1.8%
Education background	
SPM/STPM/ Certificate	
Diploma	14.3%
Degree	36.9%
Master	2.4%

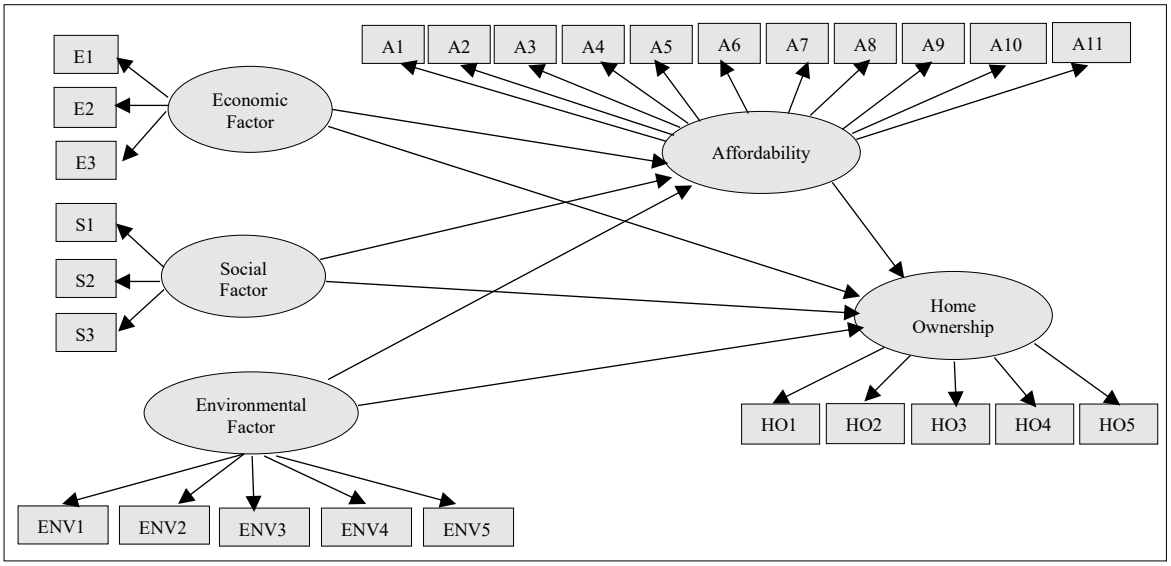
Before field data collection, researchers need to conduct a pilot study to re-explore instruments that have been adapted and modified to measure the constructs in this study (Bahkia et al., 2019: Rahlin et al., 2019; Muda et al., 2020; Raza & Awang, 2020, 2020a; Fitriana et al., 2022). By using data from the pilot study, the researcher has conducted an EFA (Exploratory Factor Analysis) procedure on each construct in the model. The construct and the name for each item as shown in Table 5. The findings of the EFA procedure, show that some constructs in this research model have components as presented in Figure 2. Constructs that are measured using components are called second order constructs.

Table 5: Construct and Item

Construct	Item	Name of Item
Economic Factor	E1	Household income
	E2	Household expenditure
	E3	Housing price
Social Factor	S1	Neighbourhood & social network
	S2	Lifestyle
	S3	Social Status
Environmental Factor	ENV1	Location
	ENV2	Safety (low crime levels)
	ENV3	Accessibility and transportation
	ENV4	Public facilities
	ENV5	Air and water quality
Affordability	A1	Access to employment opportunities
	A2	Access to transport services
	A3	Access to schools
	A4	Access to shops (local shops, supermarket)
	A5	Access to health services (hospital)
	A6	Access to child care
	A7	Access to leisure facilities
	A8	Access to open green public space
	A9	Energy efficiency of housing
	A10	Availability of waste management facilities

	A11	Quality of housing
Home Ownership	HO1	Physiological needs
	HO 2	Safety needs
	HO 3	Belongingness & love needs
	HO 4	Esteem needs
	HO 5	Self-actualisation needs

Figure 2: Research Framework shows the components of each construct



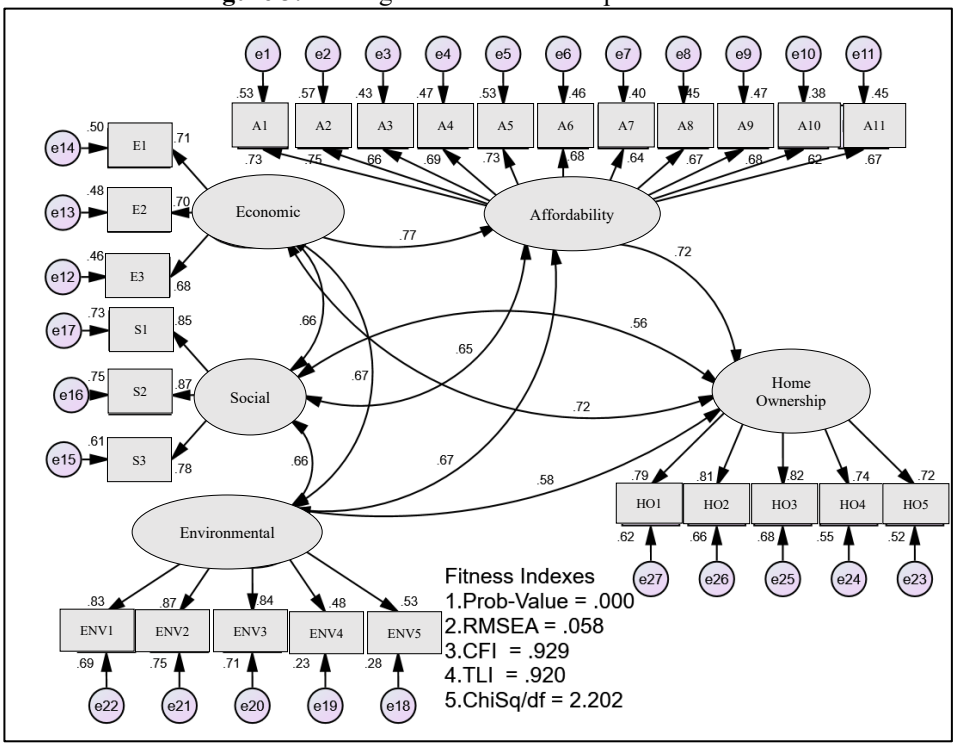
Findings from the EFA procedure show that there are several constructs in the model consisting of second order construct. According to Awang (2015), Awang et al. (2018) and Muda et al. (2018), if the research model consists of several second order constructs and the CFA procedure cannot be carried out simultaneously, then the researcher needs to conduct the CFA procedure for second order construct (Mohamad et al., 2016, 2017; Awang et al., 2018; Mahfouz et al., 2019, 2020; Sarwar et al., 2020; Bahkia et al., 2022).

Pooled-CFA Procedure for All Constructs

The main purpose is to measure the correlation value between the constructs in order to be able to assess whether the problem of multi-collinearity exists or not in the model that will be developed and estimated later. Correlation values between constructs will also be used to build a summary table of discriminant validity. CFA for pooled model is presented in Figure 3. Findings from the CFA procedure will be used to determine three types of validity and one type of reliability. The three validities are construct validity, convergent validity and

discriminant validity. The next process is to determine the composite reliability and determine the normality distribution of data set.

Figure 3: Findings from the CFA for pooled model



Determining Construct Validity

Construct validity can be made through examining the output value of fitness indexes for each category. There are three categories of compatibility index as presented in Table 6.

Table 6: Evaluation of Construct Validity through Compatibility Index

Name of Category	Name of Index	Index Value	Conclusion
Absolute Fit	RMSEA	**0.058**	The required level is reached
Incremental Fit	CFI	**0.929**	The required level is reached
Parsimonious Fit	Chisq/ DF	**2.202**	The required level is reached

Convergent Validity and Composite Reliability

Convergent Validity and Composite Reliability can be evaluated through the value of Average Variance Extracted (AVE) and the value of Composite Reliability (CR) which is calculated through the value of the weighting factor

(factor loading) as a result of the CFA procedure carried out. The values of AVE and CR values for the above construct measurement model are presented in Table 7.

Table 7: Assessment of Convergent Validity and Composite Reliability

Construct	Item	Factor Loading	CR (Above 0.6)	AVE (Above 0.45)
Economic Factor	E1	0.71	**0.739**	**0.538**
	E2	0.70		
	E3	0.68		
Social Factor	S1	0.85	**0.873**	**0.696**
	S2	0.87		
	S3	0.78		
Environmental Factor	ENV1	0.83	**0.850**	**0.544**
	ENV2	0.87		
	ENV3	0.84		
	ENV4	0.48		
	ENV5	0.58		
Affordability	A1	0.73	**0.930**	**0.552**
	A2	0.75		
	A3	0.66		
	A4	0.69		
	A5	0.73		
	A6	0.88		
	A7	0.64		
	A8	0.67		
	A9	0.88		
	A10	0.82		
	A11	0.67		
Home Ownership	HO1	0.79	**0.884**	**0.604**
	HO2	0.81		
	HO3	0.82		
	HO4	0.74		
	HO5	0.72		

Findings from Table 7 show that all AVE values (average value of extracted variance) exceed 0.45. This shows that all constructs in this research model have achieved Convergent Validity (Awang, 2014, 2015; Awang et al., 2018; Muda et al., 2018 Rahlin et al., 2019a, 2020, 2020a; Raza & Awang, 2019, 2020, 2020a; Sarwar et al., 2020; Fitriana et al., 2022).

Findings of regression coefficients between exogenous constructs against endogenous constructs as shown in Figure 4 and the findings of regression coefficients and significance values are shown in Table 8.

Figure 4: Findings from SEM analysis – Regression Model between Constructs

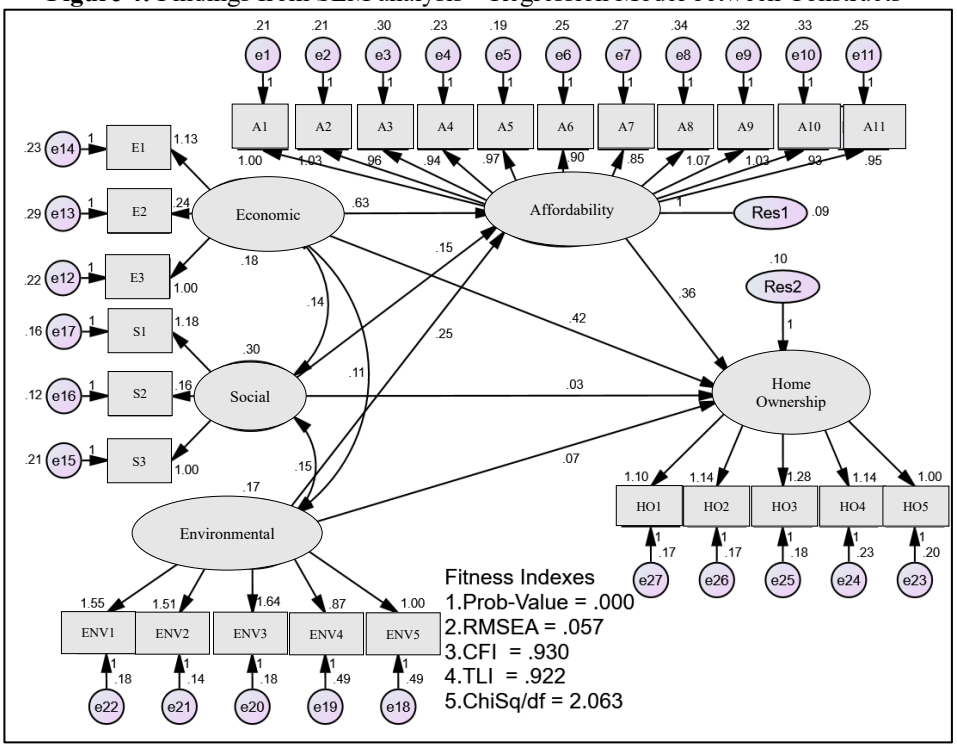


Table 8: Findings of Regression Coefficients and significance values

			Estimate	S.E.	C.R.	P	Result
Affordability	<---	Economic_Factor	.628	.111	5.662	.001	Sig
Affordability	<---	Social_Factor	.150	.065	2.306	.021	Sig
Affordability	<---	Environmental_Factor	.245	.091	2.700	.007	Sig
Home_Ownership	<---	Affordability	.355	.091	3.901	.001	Sig
Home_Ownership	<---	Economic_Factor	.419	.127	3.300	.001	Sig
Home_Ownership	<---	Social_Factor	.027	.064	.429	.668	Not Sig
Home_Ownership	<---	Environmental_Factor	.071	.087	.814	.416	Not Sig

Testing The Mediation Effect (Mediator)

The mediator hypothesis namely H5, H6 and H7 as shown in figure below. The first step is to test the hypothesis of indirect effects, which is the effect of the exogenous construct on the mediator construct, and test the hypothesis of the effect of the mediator construct on the endogenous construct. If these two hypotheses are significant, then the mediator effect from Independent Variable (IV) to Dependent Variable (DV) through the mediator exists. In other words, the

mediator function is significant. The second step is to determine the type of mediation that exists.

The next step is to verify the type of mediation that exists, whether it is a partial mediator or a full moderator. This answer can be known by testing the indirect effect from IV to DV that does not go through a mediator.

Figure 5: Mediation Effect for H5

	Mediator Hypothesis Statement
H_5	**Housing Affordability (A)** mediates the relationship between **Economic Factors (E)** and **Home Ownership (HO)** among civil servants

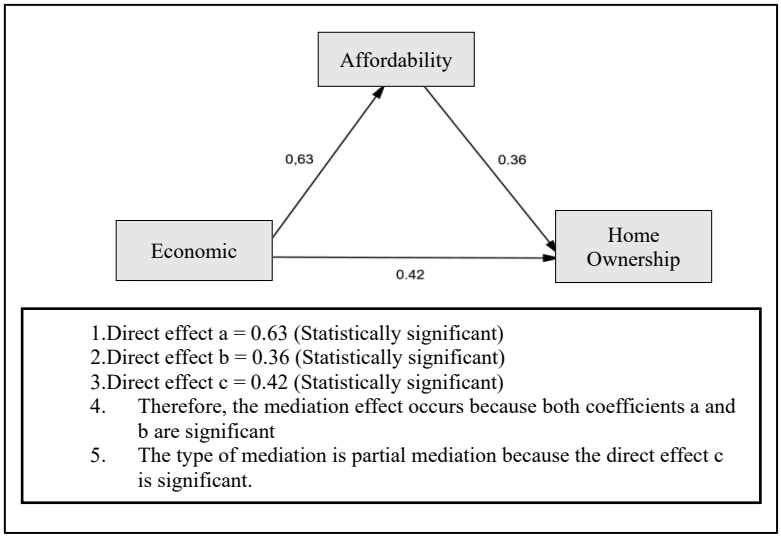


Figure 6: Mediation Effect for H6

	Mediator Hypothesis Statement
H6	**Housing Affordability (A)** mediates the relationship between **Social Factors (S)** and **Home Ownership (HO)** among civil servants

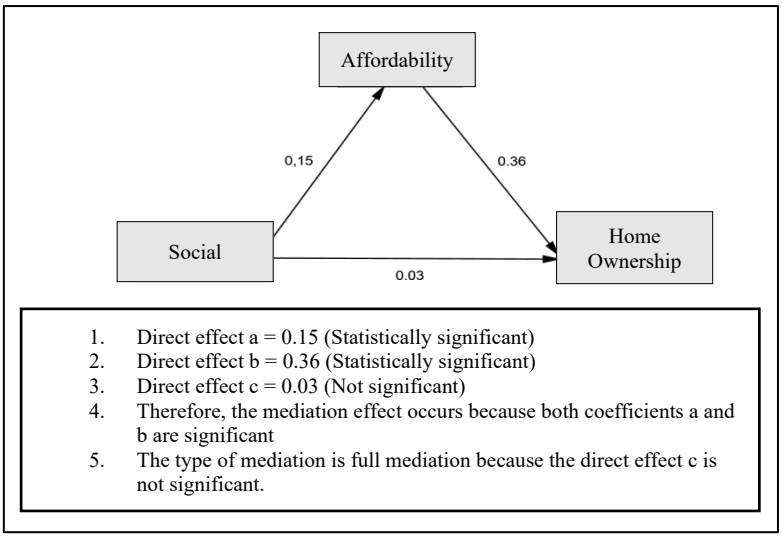
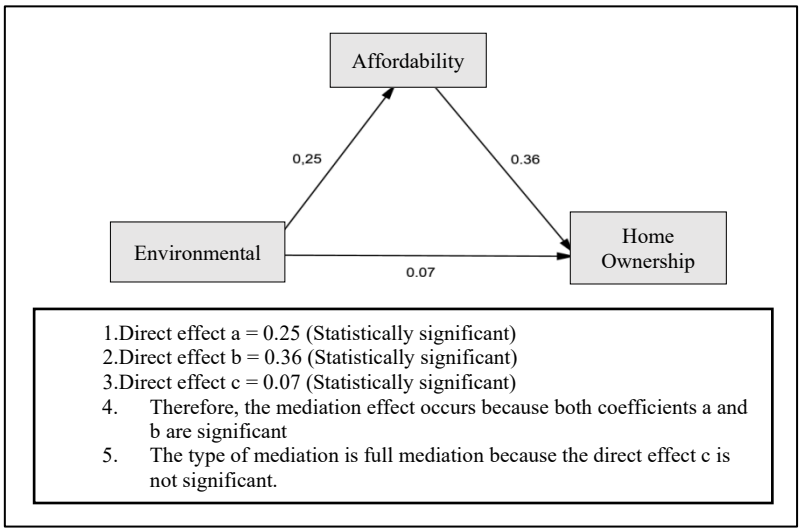


Figure 7: Mediation Effect for H7

	Mediator Hypothesis Statement
H7	**Housing Affordability (A)** mediates the relationship between **Environmental Factors (S)** and **Home Ownership (HO)** among civil servants



Based on the findings of the following study, the researcher can conclude that the results of the mediator test are consistent and this study shows the existence of a mediator effect which is affordability.

CONCLUSION

From all theories, this paper is proposing framework as in Figure 1 in order as guide to researchers who adopt housing affordability and housing sustainability in their research. By using the framework, all the essential criteria in sustainable and affordability are taken into consideration to proposed any home ownership model or fundamental theories in the academician studies and practical industries of research and development (R&D). This framework shall be taken further research to be exposed among the young generation in order to become one of the best approaches to be adopt by the worldwide ideas. Hopefully, the finding of this paper is managed to contribute in the housing development planning of regulation which involved Malaysian society and multi-racial community in various country.

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