



Research Article

Measuring Transport Expenditure on Housing Affordability: A Review

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Abstract

Housing affordability has been a major concern issue as the house price has increased significantly. Owning a house is significantly known as one of the major goals of citizens, and it reflects a single investment of a lifetime. Affordable housing is not focused only on house prices, but it also includes the quality and amenities of the house. There are many indicators to measure housing affordability in Malaysia such as locational, neighborhood, structural, and financial attributes. However, the traditional measure of the affordability of housing has generally ignored the cost of transportation that incurs a relatively high proportion of income. Therefore, this study aims to measure housing affordability by considering not only the cost of housing but the condition and location efficiency through measuring transportation costs. It is because incorporating transportation costs into the measure of housing affordability

Keywords: Housing affordability, locational, neighborhood, structural, financial, transportation expenditure.

Introduction

Home has been recognized as one of the essential needs and significant component in the urban economy. Additionally, owning a house is one of the major goals of citizens, and it represents a single investment of a lifetime. It acts as a shelter to support household living. Besides, the need for housing is the main priority for the citizens to ensure their ongoing lives. However, one of the biggest problems lower-income

Malaysian households face today is finding affordable, secure, and appropriate housing, since housing within an urban area is more expensive compared to housing in a rural area. Thus, housing ownership should consider factors such as the financial capability of the buyers, development cost, and the selling price.

Malaysians are facing problems in housing ownership since the house price has increased significantly. Besides, housing

prices in the urban area in Malaysia are becoming severely unaffordable recently. The high rate of urban growth due to migration, increase in population size, and income level significantly contributed to the housing market. The change in the housing markets was due to the increasing demand and fluctuating prices that affect housing affordability. Housing affordability is not a new issue and it has taken over the global attention. Besides, housing affordability has become one of the most critical development issues and a considerable challenge, especially for low incomes households. Most of the world, including Hong Kong, Japan, Australia, Ireland, Nigeria, Indonesia, and Singapore are facing the problem of unaffordable housing. The affordable housing issue has become the main focus of managing the growth of housing prices and reducing the effects of the housing issue.

A significant number of previous research on housing affordability have been focusing on housing costs and household income. Thus, a need has arisen for a broad and better understanding of housing affordability rather than simple measures based on housing expenditure and household income which cannot deal with issues such as housing conditions, location, and access to quality. Mulliner and Maliene (2012) criticized that pre-existing affordability literature focused on house prices rather than the condition, location, and neighborhood characteristics of the housing. Therefore, this study seeks to measure housing affordability by considering not only the cost of housing but also the condition and location efficiency through measuring transportation costs.

Literature Review

Concept of housing affordability

In many countries, housing affordability has drawn the main considerable attention for several years. Affordability is the ability of the person to provide something; that is usually referred to as the ability in financial terms. Housing affordability can be defined in three different ways (Gan and Hill, 2009); purchase affordability, repayment

affordability, and income affordability. Purchase affordability is considering the ability of the household to borrow enough funds to purchase a house. Repayment affordability is considering the burden on the household to pay the mortgage, while income affordability refers to the measurement of the ratio of house prices to the income of the purchaser. Besides, housing affordability is defined as the condition where people have the potential to save a certain portion of income to buy the house as well as any other consumption (Mostafa et al., 2006). In Malaysia, housing affordability is denoted as the rent-to-income ratio or house price-to-income ratio, known as income affordability. The median multiple is a common measurement suggested by the World Bank and the United Nations which rates the affordability of housing by dividing the median house price and annual median household income. Housing markets are rated as affordable at or below 3 times median multiple, moderately unaffordable at or below 4 times median multiple, seriously unaffordable at or below 5 times median multiple, and above 5 times rated as severely unaffordable (Suhaida *et al.*, 2011).

Locational attributes

Location attributes are highly related to the site or place where the housing is located; within an urban area or rural area. Distance is considered as the main factor that affects the buyer's preference in decision making, such as distance from the workplace, schools, shops, and other facilities (Sean and Hong, 2014). Daly et al. (2003) mentioned that location is a primary value attribute that impacts the buyer's preference in purchasing residential properties in Australia, UK, and Ireland. Besides, Kauko (2007) stated that location is an important factor to determine the success or failure of the residential housing project. Natasha and Hassan (2015) found that location attributes have a positive relationship and can have a positive impact on the intention to make a property investment. Location was considered as the highest contribution that influences the housing price (Olanrewaju et al., 2018).

Neighborhood attributes

The neighborhood is also one of the most important attributes to measure housing affordability. According to Sean and Hong (2014), neighborhood is defined as an area in which residents live together for the common interest. Previous research by Żróbek et al. (2015) has shown that cleanliness and low crime trends are examples of good neighborhood environments that are important aspects of the purchase of residential properties. A good neighborhood has a positive impact on housing prices. According to Teck-Hong (2011), a house in a good neighborhood is preferred, as households are willing to pay extra for a house of good environmental quality. Thaker and Sakaran (2016) mentioned that the good quality of a residential property can be valued by an excellent indoor and outdoor environment. Besides, Thanaraju et al. (2019) mentioned that the safety of the neighborhood is also considered as another important aspect when purchasing a residential property. This is due to the increase in the trend of crimes such as burglary and snatch. Besides, the security of the neighborhood is very important for the safety level of the residential area since the number of crimes in Malaysia is increasing (Mariadas et al., 2019).

Structural attributes

Numerous empirical studies have identified structural attributes as influential components of households' in the house-buying decision. According to (Teck-Hong, 2012), structural attributes that can impact home-buying preferences include lot size, the number of bedrooms and bathrooms, and the presence of a garden in a house. Hurtubia et al. (2010) mentioned that the number of bedrooms and bathrooms in a house are important characteristics to be considered when purchasing a residential property. For instance, in Saudi Arabia, private living spaces such as the number of bedrooms, the size of bedrooms, and the number of bathrooms are considered to be important factors because they have a direct relation with the problem of privacy (Opoku and Abdul-Muhmin, 2010). A similar finding

by Chia et al. (2016) concluded that the private living space is considered to be a key housing attribute because it can be directly related to the issue of privacy. Besides, Sundrani (2018) also mentioned that the number of bedrooms and the size of bedrooms are the most important features to be considered in their homeownership decisions.

Financial attributes

Financial attributes are important features that the household needs to consider in their homeownership decisions. Besides, financial attributes strongly influence the decision of homebuyers to purchase a residential property (Sean and Hong, 2014; Thaker and Sakaran, 2016). As mentioned by Mariadas et al. (2019), there are several key areas regarding the financial consideration such as interest rate, house price, household income, and ability to obtain financing. Li et al. (2014) also mentioned that financial factors such as length of the period for the payment, interest rate, and amount of monthly payment are the main considerations while choosing a residential property to purchase. Zainon et al. (2017) concluded that the financial factor has a positive relationship with housing affordability.

Transport expenditure

In recent years, there has been a new indicator of housing affordability that includes transport expenditure (Sabri et al., 2013; Yusoff et al., 2014). Housing and transportation are the two largest expenses for most households. Besides, housing and transport expenditure show a more complete picture of affordability in the neighborhood. The traditional measure of housing affordability generally focused on housing cost alone, while ignored the transportation cost which incurs a relatively high proportion of income. Therefore, combining housing and transportation cost offers an expanded view of affordability. Previous research suggested that incorporating transportation costs into housing affordability calculations can reveal a different pattern of affordability, especially in less accessible locations

(Dewita et al. 2018). Several studies from European countries provide a similar result of the importance of incorporating transportation costs to reveal more appropriate measures of housing affordability. Transportation expenditure consists of three important variables which are vehicle ownership, vehicle usage, and public transit. Vehicle ownership is determined by the number of the vehicles, the monthly payment of the vehicles, and

the annual amount of insurance and taxes. Vehicle usage is based on the amount of fuel consumption, monthly amount toll, and parking fees, as well as cost and maintenance of the vehicles. Public transit is the total amount of monthly expenses on public transit.

Summary of the Previous Research

Table 1: Summary of previous research on housing affordability.

Author	Year	Objective	Independent Variables	Dependent Variable	Conclusion
Rahim and Munaaim	2008	To determine the indicator of housing affordability in Malaysia, and the variables that affect housing affordability amongst the low-income.	Household income, household expenditure, types of work, level of education, working household, and housing installment.	Housing affordability.	Household income and household expenditure are the main indicators affecting housing affordability.
Bujang et al.	2010	To study the relationship between demographic factors and housing affordability.	Demographic factors such as gender, race, age, marital status, education level, job sector, the status of the job, monthly income, and the number of households.	Housing affordability.	Marital status, number of households, age, education level, and household income have influenced housing affordability.
Teck-Hong	2011	To examine the impact of neighborhood types on residential property values in Klang Valley	Location, structural and neighborhood characteristics.	Market price.	The neighborhood, structural, and location attributes are statistically significantly related to house prices.
Teck-Hong	2012	To determine correct housing attributes required for first-time homebuyers in the urban area.	Location, neighborhood, structural and social-cultural.	Homeownership.	Location and neighborhood are important attributes in the decision to purchase a house.
Tan and Cheah	2013	To determine the right housing attributes required by potential first-	The locational, neighborhood, structural, and socio-cultural housing attributes.	Homeownership.	The locational and neighborhood have an influence on homeownership preferences by

		time homebuyers.			first-time homebuyers.
Eshruq Labin et al.	2014	To develop affordable housing performance indicators (AHPI) for landed houses.	Income ratio, facilities and services, safety and comfort, quality management and grow home.	Affordable housing performance indicators.	Income ratio, facilities and services, safety and comfort, quality management and grow home can be applied as AHPI for landed houses.
Sean and Hong	2014	To determine the key factors for investors before making an investment decision to purchase a residential property.	The locational, neighborhood, structural and financial factors.	The motivation of property investment.	The results revealed that location, financial, and structural factors do affect property investors in making their purchases.

Author	Year	Objective	Independent variables	Dependent variable	Conclusion
Salleh et al.	2015	To identify the resident's preferences and the influencing factors on buying a property at the hill area.	Price, location, design, view and ventilation, type of neighborhood, facilities, and amenities in the neighborhood, Feng Shui elements, prestige, luxury, and style.	Property buyer decision.	The most influential factor in buying a property at hillside property was view and ventilation.
Chia et al.	2016	To examine the influence of housing attributes on house purchase intention.	The locational, financial, structural, neighborhood, socio-cultural, and developer brand.	Purchase intention.	Financing, location, structural, neighborhood, and socio-cultural have significant positive relationships with house purchase intention.
Zainon et al.	2017	To identify the determinants affecting the purchase decision among middle-income groups.	Price, design, location, quality, developer's success in the previous projects, the number of projects done by the developer, developer's popularity, public facilities, and safety and security.	Purchase decision.	House price is the main consideration in buying the house followed by safety and security and public facilities.
Rameli et al.	2017	To identify the affordability levels and also the socioeconomic factors which affect the homeownership affordability of low-income groups in Kuala Lumpur.	Household income, household expenditures, type of employment, education levels, household sizes, monthly payment for housing, and household savings.	Homeownership affordability.	Household income, household expenditures, and monthly housing payments affect homeownership affordability significantly.
Khan et al.	2017	To evaluate the preferences of first-time	Demographic, financial, location, structure,	Housing ownership.	Economic, financial, and neighborhood have a relationship

		homebuyers in buying houses.	neighborhood, and economic.		with housing ownership.
Mariadas et al.	2019	To determine the first home purchase decision among middle-income earners in Selangor.	Finance, location, neighborhood, and structural attributes.	Residential property purchase decision.	Location and structural factors have a negative relationship while financial and neighborhood factors have a positive relationship with a residential property purchase decision.
Salleh et al.	2019	To understand the consistency in purchasing residential properties among homebuyers in Seri Iskandar, Perak.	Location, type of land ownership, neighborhood, concepts and building specifications, financial, developer reputation, and socio-cultural.	Purchase decision.	Respondents place high values on neighborhood variables when deciding to purchase residential properties.
Thanaraju et al.	2019	To evaluate the relationship between the three main factors identified which are financial, location, and neighborhood towards housing preferences of homebuyers.	Financial, location, and neighborhood.	House purchase decision.	Locational factors contribute significantly to the determination of a buyer's preferences when purchasing a house.
Mariadas et al.	2019	To determine the urban residential purchase decision in Klang Valley, Malaysia.	Finance, location, neighborhood, and structural attributes.	Residential purchase decision.	Three factors that influenced the urban residential property purchase decision in Klang Valley are finance, location, and structure.

Sources: Authors' analysis

Table 2: Summary of previous research on transportation expenditure on housing affordability.

Author	Year	Objective	Method of data analysis	Conclusion
Mattingly and Morrissey	2014	To quantitatively examine intra-metropolitan combined housing and transport affordability in Auckland, New Zealand.	Combined Housing and Transport (CHT) affordability index	When transportation costs are incorporated into housing affordability measures, a different pattern of affordability emerges.
Saberi et al.	2017	To measure location affordability that incorporates both housing and transportation costs.	Housing + Transportation Index	There is a negative correlation between housing affordability and transportation affordability.
Dewita, Yen, & Burke	2018	To examine transport and housing affordability by exploring middle-to-low-income household's transport and housing expenses in the Bandung Metropolitan Area (BMA), Indonesia	Data envelopment analysis (DEA) method	DEA results showed that when transport cost is included, the impact on the overall affordability differs based on the type of housing and income-related travel behavior.
Dewita, Burke, & Yen	2019	To quantitatively examine transport and housing affordability by exploring middle-to-low-income household's transport and housing expenses in the Bandung Metropolitan Area (BMA), Indonesia.	Housing and transport (H+T) affordability ratio and interval data envelopment analysis (DEA) method.	Household affordability is not only affected by housing type but also by the choice of transportation modes. Transportation cost is significant and should be incorporated into affordability measures.

Sources: Authors' analysis

Methodology

As discussed before, there a plethora of attributes has been tested concerning their

influence on housing affordability. In this study, however, these attributes are proposed to assess and absent in most previous research, especially in the local context.

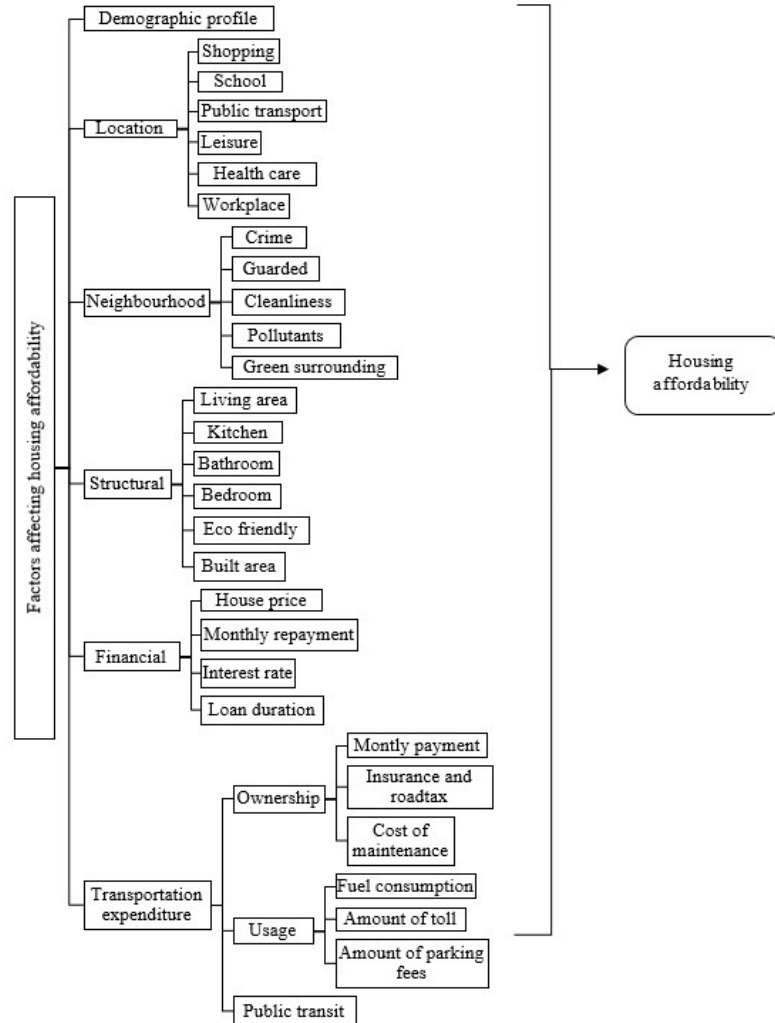


Figure 1: A proposed conceptual framework of the study

Conclusion

Housing affordability is a major challenge currently facing many countries. This paper stressed that housing affordability must be defined and assessed by a wider range of criteria. To determine whether the attributes matter, this paper includes several housing attributes. These include locational, neighborhood, structural and financial attributes of housing. This study also proposed a new factor namely transportation expenditure, along with other factors that were adopted from previous studies. These factors are expected

to specifically highlight the issue of housing affordability. Finally, based on the review of the literature, a conceptual framework was proposed. This study is expected to identify the factors that influence the affordability issue, particularly involving transportation expenditure.

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