

ROLE OF MICRO-HOUSING IN FULFILLING MIDDLE-INCOME HOUSING DEMAND IN URBAN AREAS: SRI LANKAN PERSPECTIVE

M.M.N. Mannapperuma¹, P.A.P.V.D.S. Disaratna², and I.E. Illeperuma³

ABSTRACT

Urbanisation and population growth challenge the housing market in urban areas globally. The unavailability of sufficient lands, limited housing spaces, high demand and high housing prices caused housing unaffordability. Consequently, micro-living has been successfully implemented in high-density urban areas worldwide to address housing unaffordability. In Sri Lanka, middle-income households in Colombo are the most vulnerable to housing unaffordability. Accordingly, this research aimed to investigate the suitability of micro-housing to address the issues in middle-income households in Colombo, Sri Lanka. The aim was accomplished through a qualitative approach by collecting data through expert interviews and analysing through content analysis with manual coding. Findings revealed the unavailability of land and high land prices as the major challenges faced by the middle-income housing market in Colombo. Importantly, the findings acknowledged Micro Houses (MHs) and Micro Apartments (MAs) as affordable housing options that effectively address the issues. The demand and the social acceptance of MHs and MAs in Colombo are led by two middle-income groups i.e. (i) youngsters, and (ii) elderly retirees. Herein, ease of maintenance and willingness to modernise were the main positive perceptions. In contrast, limited space and usage of foldable furniture cause negative perceptions. Construction and operation costs of MHs and MAs can be lowered by maximising natural lighting and ventilation and minimising material wastage. However, operational costs will not be changed considerably. Nonetheless, prevailing building codes and regulations barrier the implementation of micro-living in Colombo.

Keywords: *Micro Apartment; Micro House; Middle-Income Housing; Unaffordability; Urbanisation.*

1. INTRODUCTION

Housing fulfils the fundamental human need for shelter (Karunasena & Ranatunga, 2009; Niriella, 2017). Ruonavaara (2018) described housing as a tangible good which can be produced or purchased, consumed, and sold or demolished. Recently, it has become more than a place of living, yet a sense of dignity and community engagement. Purchasing a

¹ Undergraduate, Department of Building Economics, University of Moratuwa, Sri Lanka, nwjmp@gmail.com

² Senior Lecturer, Department of Building Economics, University of Moratuwa, Sri Lanka, vijithad@uom.lk

³ Lecturer, Department of Building Economics, University of Moratuwa, Sri Lanka, isurii@uom.lk

house is not as simple as purchasing other consumable goods. Some are willing to have one house for their entire lifetime, whereas others tend to purchase several houses during different phases of life. The decision to purchase or build a house is affected by diverse factors which are often connected with economic concerns and personal preferences (Ariyawansa, 2010). Economic concerns are formed by purchasing power (cost or price compared to income or other expenses), spending patterns (lease, rent, loan facilities, etc.), the lifespan of the product, and other factors that affect the price such as discount, allowances, payment period, etc. On the other hand, personal preferences are moulded by age, gender, educational background, occupation, social life, and other behavioural factors (Ariyawansa, 2010). During the past decades, a wide variety of housing options from tents to luxury villas, slums to luxury condominium properties and immovable to movable houses have emerged to satisfy varying customer requirements.

The population in urban areas exceeded 3.6 billion which is more than 54% of the global population in 2011 (Boeckermann et al., 2019). It is estimated to be 6.3 billion by 2050 (United Nations, 2011). Urbanisation and population growth challenge the housing market. Consequently, unavailability of sufficient land, limited housing spaces, high demand and high housing prices emerged in urban cities around the world. Consequently, housing unaffordability emerged as a critical issue especially among the middle-income class in Colombo, Sri Lanka (Kariyawasam et al. 2022). Economists define the middle-income class using the parameters of income or consumption (Shanthaarchch, 2022). On one hand, Bhalla (2021) as cited in Shanthaarchch, (2022, p.4) defined the middle-income class “to be those earning more than US\$ 3,658 (in 2020 prices) a year or US\$ 10 a day in purchasing power parity terms”. Conversely, Kharas and Gertz (2020, p.3) defined middle-income class “as those households with daily expenditure between US\$ 10 and US\$ 100 per person per day in purchasing parity terms”. Being specific to the Sri Lankan context, Shanthaarchch, (2022, p.4) defined the middle-income class as “individuals living in households, spending \$2 to \$10 (not including \$10)”. Further to the authors, in 2010, 75.2% of Sri Lankans belonged to the middle-income class. However, it decreased significantly due to the economic crisis and was reported as 48% in 2021 (World Bank Group, 2021). The Sri Lankan middle-income class suffers from the aforementioned housing issues frequently due to their modest income.

Micro Houses (MHs) which are designed to provide the necessities of living while minimising space usage can address a wide range of housing requirements across various demographics. Researchers have categorised MHs into two main categories i.e. (i) MHs on Wheels (MHOW), and (ii) MHs on Foundations (MHOF) whereas MHOF can be further categorised as semi-permanent or permanent (Shearer, 2018). However, micro-living is not limited to detached houses (Renn & Armlovich, 2016). MHs are detached establishments that usually range between 100–400 ft² (6–37 m²) (Brokenshire, 2019; Brown, 2016; Kilman, 2016; Mutter, 2013; Shearer, 2019; Zhang et al., 2022). Additionally, literature identified Micro Apartments (MAs) which are conjoined establishments usually less than 215 ft² (20 m²) in floor area (Mutter, 2013). However, this study focused on permanent MHOF. Even though the origin of the micro-housing movement was in the late 1990s in the United States of America (USA) (Shearer, 2015, 2019), it has been in demand recently due to affordability, simplicity, and sustainability (Brokenshire, 2019). Indeed, MHs and MAs offer limited living space prompting occupants to possess fewer material belongings and reduce consumerism. Consequently, they reported a rising popularity among people with middle to lower income (Brown,

2016; Mutter, 2013; Shearer, 2015). Particularly, it has become popular among young individuals, couples, and retirees with middle income (Zhang et al., 2022).

Colombo is the commercial capital of Sri Lanka and the most densely populated area (Ariyawansa, 2009). By the year 2018, the total population of Sri Lanka was 21.80 million whereas in Colombo it was 6.15 million which accounted for nearly 30% of the total population (Economics and Social Statistics of Sri Lanka, 2020). Importantly, Colombo is the most active and significant region in Sri Lanka in socioeconomic, political, and administrative aspects. Consequently, Colombo is facing a continuous escalation of housing demand especially in the Middle-Income Housing Market (MIHM) whose contribution is significant to the economic development (Rathnayaka et al., 2020). However, the housing market faces severe challenges in providing quality and affordable housing to meet the growing demand (Munmulla et al., 2023). Researchers highlighted the burning issues such as poor maintenance, illegal modifications, compacted spaces, inefficient arrangements, and neighbourhood disturbances (Ariyawansa & Perera, 2018). Further, Kariyawasam et al. (2022) emphasised that higher market prices restrict the affordability of quality housing in the middle-income society in Colombo. The aforementioned facts make consumer satisfaction with middle-income housing in Colombo questionable (Rathnayaka et al., 2020). Researchers have taken several noteworthy steps to investigate the use of MHs in addressing housing-related issues in Sri Lanka. Herein, Natasha (2023) explored the tendency of lower income society in Sri Lanka towards MHs. Munmulla et al. (2023) highlighted the economic viability of MHs via a comparative study between a modular construction MH and a conventional house. However, less research has been conducted in investigating the use of MHs in the middle-income society of Sri Lanka. Accordingly, this research aimed to investigate the suitability of permanent detached MHOF and MAs to address the issues in MIHM in Colombo, Sri Lanka. Hereafter, to avoid the convoluted language the term MHs referred to the permanent detached MHOF. The research has two objectives, i.e. (i) study the status of the MIHM in Colombo, Sri Lanka, and (ii) investigate the ability of MHs and MAs to address the issues in the MIHM in Colombo, Sri Lanka.

2. LITERATURE REVIEW

2.1 MIDDLE-INCOME HOUSING MARKET IN URBAN AREAS

The ancient practice of housing with mud, charcoal and leaves gradually changed with the evolution of the social economy (Jayasooriya, 2003). According to the author, the evolution resulted in rapid changes in the needs and behavioural patterns of the people. Subsequently, diverse architectural features were incorporated into Sri Lankan houses during the colonisation period (Edirisinghe, 2014).

The rapid population growth and urbanisation constantly escalate the demand for the MIHM in urban areas. More than half of the global population is now residents in cities, which occupy only 2% to 3% of Earth's land area (Hemakumara & Rainis, 2018). According to the United Nations (2022), urban areas will hold 68% of the world's population by 2050. Similarly, Colombo, Sri Lanka has attracted a large population who are seeking better standards of living, employment, and education (Ariyawansa & Perera, 2018; Rathnayaka et al., 2020). In 2018, the population of Sri Lanka was 21.80 million, and in Colombo, it was 6.15 million which was 28.21% (Economics and Social Statistics

of Sri Lanka, 2020). According to the United Nations (2022) projections, the Sri Lankan population will exceed 22 million by 2030 while the Colombo region will hold 7 million. Government policies play an important role in the MIHM. However, in the Sri Lankan context, the MIHM in urban areas is ill-treated by government policies (Niriella, 2017; Wickramaarachchi et al., 2021). According to Samaratunga and O’ Hare (2013), the focus of government policies is mainly on the high-rise high-density low-income public housing in Colombo. Moreover, developers are struggling to put sustainable housing options into practice due to constantly changing government regulations including building codes, zoning regulations, national rules, ordinances, and council rules (Kariyawasam et al., 2022). For instance, Urban Development Authority (UDA) Law, No. 41 of 1978 had been amended by parliament acts in 1979, 1982, 1984, 1987, and 1988 further, gazettes have been issued from 1978 and the latest gazette on UDA Law, No. 41 of 1978 was issued on 17th November in 2022 (Urban Development Authority [UDA], 2024). In addition, housing affordability is highly affected by purchasing power (Adabre & Chan, 2019; Hemakumara & Rainis, 2018; Jackson et al., 2020; Jayalath & Gunawardhana, 2017; Stone, 2006). Accordingly, rising housing prices, high construction costs, high interest rates, and limited supply are the key influencing factors of housing unaffordability (Leindecker & Kugfarth, 2019).

Figure 1 was developed based on the findings of several previous studies to provide an overview of the factors that influence housing unaffordability in the MIHM and the related implications.

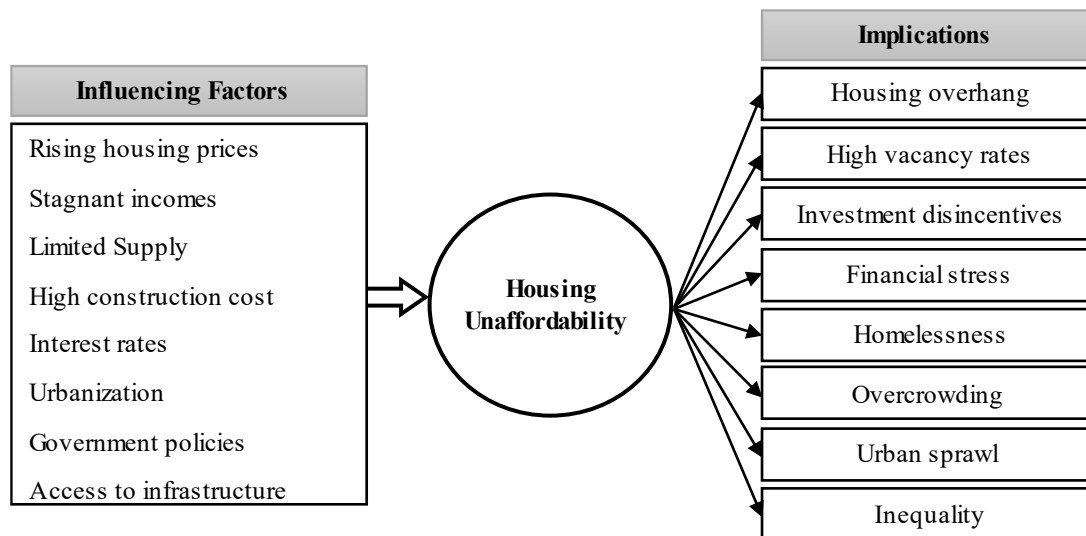


Figure 1: Factors that influence housing unaffordability and their implications

Sources: (Adabre & Chan, 2019; Hemakumara & Rainis, 2018; Jackson et al., 2020; Jayalath & Gunawardhana, 2017; Kariyawasam et al., 2022; Samaratunga & O’ Hare, 2013)

Housing unaffordability causes housing overhang, a situation where there is an oversupply of housing, leading to high vacancy rates due to the inability to afford it (Adabre & Chan, 2019). It negatively affects housing investments, and causes homelessness and overcrowding (Hemakumara & Rainis, 2018). Consequently, people are forced to move to cheap places or suburban areas, leading to urban sprawl (Hemakumara & Rainis, 2018). Ultimately, housing prices increase while the supply of affordable housing options is limited for the middle-income class in urban areas.

Due to the aforementioned factors most of the detached houses in Colombo have been currently shifted into in-built amenities in apartment buildings (Dunuwila & Devapriya, 2022; Jayalath & Gunawardhana, 2017). However, most of the apartments in Colombo fall into the luxury or semi-luxury category challenging the affordability of the middle-income population (Jayalath & Gunawardhana, 2017). Besides, researchers revealed that, in Sri Lanka, 10% of the residents spend not less than 50% of their monthly income on housing (Weeraratne, 2020). Importantly, Musa et al. (2015) contended that developers are less enthusiastic about low to medium-cost housing projects. Nonetheless, Jayalath and Gunawardhana (2017) explored an increasing demand for apartments among middle incomers due to the escalated land price. However, most of the middle-income population living in urban areas of developing countries reside in temporary accommodations with low security, inadequate infrastructure, and serious health issues (Ariyawansa & Perera, 2018; Musa et al., 2015).

Thus, MIHM in urban areas faces significant challenges due to the aforementioned demographic and economic factors (Dash & Das, 2020). Consequently, providing affordable housing for middle incomers who meet the required standards of living is a crucial problem in Colombo (Kariyawasam et al., 2022; Rathnayaka et al., 2020).

2.2 MICRO HOUSES AND MICRO APARTMENTS

MHs and MAs consist of a spacious room integrating the kitchen, dining area, and living room, a small bathroom near the kitchen with all the facilities, and sleeping lofts with ladders for the maximum utilisation of vertical spaces (Kilman, 2016). Initially, MHs and MAs became popular due to their simplicity and later catalysed as an effective solution for housing unaffordability (Shearer et al., 2019). Consequently, it is a growing concept particularly in the USA, Canada, New Zealand, and Australia who experience severe housing unaffordability (Shearer et al., 2019). Particularly, MHs become famous among retirees, youngsters, couples, and small families who identified the effectiveness and efficiency of micro-living (Dash & Das, 2020; Mutter, 2013; Renn & Armlovich, 2016; Shearer, 2018). In highly-demand real estate markets such as Tokyo, San Francisco, New York, Singapore, and Hong Kong MAs have increasing demand, particularly among young professionals (Dash & Das, 2020; Gazdag & Torlegård, 2018). For instance, a rental apartment named 'My Micro NY' by nARCHITECTS in New York and a rental apartment series named 'Kyosho Jutaku' by Yasuhiro Yamashita in Japan incorporated MAs in highly populated areas thereby redefined living in small. 'My Micro NY' comprises 55 apartment units of 260 ft² in nine stories (Arcilla, 2015). Figure 2 shows the arrangement of an apartment of 'My Micro NY' and Figure 3 illustrates how it is arranged for day use and night use by folding the convertible sofa to a bed. A 'Kyosho Jutaku' complex comprises more than 300 apartment units starting from 182 ft².

Accordingly, MHs and MAs provide affordable low-rise and medium-rise housing options by regulating per-capita housing costs in expensive urban areas (Renn & Armlovich, 2016; Shearer, 2018). Further, Rack (2016) introduced the concept of "small space, big city" describing the opportunity offered by MAs to reside in urban areas with all the facilities for a lower monthly rent compared to other housing options. Moreover, MAs are acknowledged as the most appropriate housing option for densely populated urban areas with a high demand for housing (Gazdag & Torlegård, 2018).



Figure 2: View of an apartment in 'My Micro NY'

Source: (Arcilla, 2015)



Figure 3: Day use of the apartment (above) and night use of the apartment (below)

Source: (Arcilla, 2015)

Even though, MHs and MAs have been widely acknowledged globally as an unconventional approach to broadening the boundaries of middle-income housing affordability in urban areas (Dash & Das, 2020; Keable, 2017), their applications are limited in Sri Lanka.

3. RESEARCH METHODOLOGY

Qualitative research focuses on phenomena related to kind and quality which explore the reasons for human behaviours and discover motives and desires through in-depth interviews (Kothari, 2004). Accordingly, a qualitative approach was adopted to accomplish the research aim. Initially, a comprehensive literature review was conducted to understand the MIHM in urban areas and the primary reasons behind the housing unaffordability. Additionally, it perceives the potential of MHs and MAs to address housing unaffordability in urban areas.

Subsequently, expert interviews were selected as the research strategy to explore the MIHM in Colombo and the use of MHs and MAs to overcome the challenges. Using the purposive sampling method, twelve experts were selected based on their experience, knowledge and expertise in the Sri Lankan housing market, MHs and MAs. Accordingly, the sample consisted of five quantity surveyors, five architects, and two marketing directors. Table 1 presents the profiles of the interviewees.

Table 1: Details of the expert interviewees

Respondent	Current Designation	Current working sector	Experience in housing construction	Qualifications			
				BSc.	MSc.	PhD	Ch.
E1	QS	Consultant	10 years	√	√		√
E2	Director (QS)	Consultant	31 years	√	√		
E3	Chief QS	Client	10 years	√	√		
E4	QS	Client	9 years	√	√		
E5	General Manager (QS)	Contractor	18 years	√	√		√
E6	Chief Architect	Consultant	27 years	√	√		√
E7	Professor/ Architect	Consultant	29 years	√	√	√	√
E8	Professor/ Architect	Consultant	49 years	√	√	√	√
E9	Assistant Director (Architect)	Client	20 years	√	√		√
E10	Architect	Consultant	25 years	√	√	√	√
E11	Executive Director (Marketing)	Client	25 years	√	√		
E12	Marketing Director	Contractor	28 years	√	√	√	

Paradis et. al. (2016) asserts that interviewing is a two-way method that examines the known data and shares knowledge. Accordingly, semi-structured interviews were conducted with the selected experts to collect the data. A document on micro living was prepared to brief the concept and to explain the aim, objectives and scope of the study to the interviewees. Interviewees were questioned under four major sections. In the first section, the interviewee's background details were inquired. The second section focused on the current status of the Sri Lankan housing market to explore the current trends and challenges whereas the third section focused on assessing the viability of MHs and MAs as a solution for identified issues in the MIHM. In the last section, the perception of the middle-income class in Colombo towards micro-living was focused on discerning the acceptance of micro-living by MIHM. Additionally, situational questions were raised to clarify and explore the details further. Finally, collected data were analysed by data reducing and displaying through content analysis with manual coding.

4. RESEARCH FINDINGS AND DISCUSSION

4.1 CURRENT STATUS OF THE COLOMBO MIDDLE-INCOME HOUSING MARKET

The second section of the interview guideline focused on the current status of the MIHM in Colombo. The Sri Lankan MIHM experienced several trends concerning demand, supply, social conditions, and economic conditions over the last decades. Conforming the findings of Dunuwila and Devapriya (2022) and Jayalath and Gunawardhana (2017) regarding the increasing demand for apartments, all the interviewees highlighted the trend towards apartments in Colombo in the last decade. Moreover, E5 specified that “*there are two trends in apartments i.e. (i) as a second home, and (ii) as an elderly home*”. As per E1, E2, E3, E4, E5, E7, E9 and E10, the main reason for the higher demand is the higher land prices and scarcity of lands. Further, E3 indicated that “*the trend towards apartment is driven by the easy maintenance, convenient life with facilities, flexibility, safety and security, modern amenities and services, simple living and the sense of community*”. However, the contribution of the middle-income class for the increased demand is less compared to that of the higher income class. In fact, E5 said that “*approximately 90% of*

the luxury and semi-luxury apartments are already occupied and new projects of similar kind are being initiated even with the prevailing economic crisis". E3 recognised unaffordability as the underlying cause of the lower demand of the middle-income class. Additionally, E9 emphasised reasons behind the decreased demand of middle-income society as external migration and the change of the priority of needs with the stagnant income. In brief, there is an upward trend in the demand for apartments in Colombo, however, high price/rent restricts the demand of the middle-income society.

All the interviewees identified the unavailability of land and high land prices as the major challenges faced by the MIHM in Colombo. Additionally, E1 mentioned that *"construction cost gets doubled with the inflation, tax provisions and other government policies such as import restrictions"*. According to E9, the exaggerated prices cause owning a house to be no longer considered a necessity by the middle-income society.

4.2 MICRO HOUSES AND MICRO APARTMENTS AS OPTIONS IN THE MIDDLE-INCOME HOUSING MARKET IN COLOMBO

The third section of the interview focused on the MHs and MAs as solutions for the identified challenges in the MIHM in Colombo. As the initiation, the interviewees' experience in the MHs and MAs construction projects was examined. According to the responses all the interviewees were involved in MHs and MAs construction projects. However, some of those projects were not termed as MHs or MAs even though they align with the definition. Most of the interviewees acknowledged MHs and MAs as affordable housing options for the MIHM in Colombo whereas E10 believed that MHs are not suitable and stated that *"even low incomers will not be satisfied with these sizes"*.

Construction cost is a primary factor that determines the cost/price of a house. E1, E2, E3, E4, and E5 stated that the total construction cost of an MH or MA is lower compared to a conventional house or apartment. However, Shearer (2015, 2018, 2019) repeatedly highlighted the higher cost per m² of an MH compared to a conventional house. Confirming that E3, E4, and E5 noted higher cost per unit floor area of MH or MA and explained the reason as the cost significant items such as sanitary fittings and finishes are divided among a small floor area. However, E3 and E5 focused on smaller-scale MA projects highlighting the shorter construction period and use of less advanced technologies. By implementing it on a smaller scale, the construction cost of MAs can be lowered compared to conventional apartments. Furthermore, the construction cost of an MA is lower compared to a luxury or semi-luxury apartment due to the reduced size. Similarly, interviewees suggested using natural light and natural ventilation and minimising material wastage to promote sustainability and reduce construction and operation costs. E3 and E4 stated that minimising wastage from the design is the most optimal way to achieve resource efficiency. Herein, E6 suggested designing the floor and ceiling areas based on the size of the tiles. However, operational costs will not be changed considerably in MHs or MAs as the capacity of the services is determined based on the number of occupants but not on the size of the house. Nonetheless, there may be a slight reduction in electricity costs due to the low number of lighting points in smaller areas.

Buildings play a vital role in urban aesthetics. Confirming, E9 noted that high-rise buildings and apartment complexes become an icon of Colombo without damaging the value of the city. *Thus, MAs will be fit* while enhancing urban aesthetics. Herein, E9 identified the significance of prioritising the changing needs of the country by stating that *"if we go with old patterns to protect the ancient look, we will remain as a developing*

country without any improvement". Dunuwila and Devapriya (2022) discussed how Colombo's urban aesthetic has shifted to accommodate the growing need for urban living.

As identified in the literature, traditions and religions affect the housing designs in Sri Lanka. However, people who are keen on traditions have innovatively modified the activities to be suited to modern housing. Furthermore, interviewees noted that integrating culture into the MHs and MAs is not an issue. On the other hand, E5 mentioned that *"most of the middle-income society living in Colombo have been there for work or education and thus not highly focusing on cultural and social icons"*.

However, all the interviewees assuredly pointed out that prevailing building codes and regulations barrier the implementation of micro-living in Colombo. In Sri Lanka, residential construction should be in accordance with UDA Law, No. 41 of 1978. Accordingly, the minimum floor area of an apartment should be 400 ft². Further, apartments should follow the Apartment Ownership Law, No. 11 of 1973 and its amendments and should be approved by the Condominium Management Authority (CMA). However, MHs or MAs are not aligned with these regulations. Thus, E6 and E9 highlighted the requirement to change the regulations indicating the necessities.

4.3 ACCEPTANCE OF MICRO HOUSES AND MICRO APARTMENTS BY THE MIDDLE-INCOME SOCIETY IN COLOMBO

The fourth section of the interviews focused on the perception of the middle-income society in Colombo towards micro-living. All the interviewees mentioned that initial perception is primarily based on attitudes and personalities which change with time. Confirming the findings of Brown (2016), Kilman (2016) and Mutter (2013) regarding the acceptance of micro-living interviewees indicated that both MHs and MAs will be accepted by young individuals and couples with a middle-income while retirees are more likely to choose MAs. Herein, E6 highlighted the willingness of the youngsters living in Colombo to have an easy and simple life. Additionally, E6 emphasised the rising willingness of elders such as retirees having a middle income, to live in MAs as maintaining large houses alone is difficult for them. Most elders choose MAs over MHs as they want to be in a community. Nevertheless, E2, E4, E7, and E11 stated that the acceptance of MAs as an affordable option by the Sri Lankans with the current inflation and economic crisis is questionable. In summary, the acceptance of MHs or MAs as an affordable housing option by the middle-income society in Colombo will depend on the perception towards simplicity, quality, ease of maintenance, and willingness to change.

Table 2 shows the perceptions of middle-income households in Colombo towards MHs and MAs in the view of experts. All the experts mentioned that initial perception towards anything is primarily based on the attitudes and personalities of people. However, it can be changed with time once they are experiencing it in real life. Eleven experts (91.6%) perceived the identification of MHs and MAs by MIHM for easy maintenance. In contrast, three experts (25%) identified 'reduced living cost' as a positive perception. Further, the positive perception towards MAs and MHs will be driven by affordability, simpler life, quality of living and interest in modernising. However, most experts identified the possibility of negative perception towards the limited space and usage of foldable furniture. Surprisingly, only one expert identified 'isolation' as a cause of negative perception towards MHs and MAs in the MIHM.

Table 2: Experts opinion on public perception towards adapting MHs and MAs to Colombo, Sri Lanka

No	Idea on Public Perception	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12
Positive Perceptions													
a.	Affordability	√	-	√	-	√	√	-	-	√	√	-	√
b.	Simpler life	-	√	√	√	-	√	-	√	√	-	√	-
c.	Reduced living cost	-	-	√	√	-	-	-	√	-	-	-	-
d.	Quality of living	√	-	√	√	-	√	-	√	√	√	√	√
e.	Ease of maintenance	√	√	√	√	√	√	-	√	√	√	√	√
f.	Positive attitudes towards changing, adapting, modernizing, etc.	-				-		-					
			√	√	√		√		√	√	√	√	√
Negative Perceptions													
a.	Isolation	-	-	√	-	-	-	-	-	-	-	-	-
b.	Lack of privacy	-	√	-	-	-	√	√	-	-	-	-	-
c.	Limited space	√	-	√	√	√	-	√	-	-	√	-	√
d.	Unfriendly furniture	√	√	-	√	-	-	√	-	√	√	√	√
e.	Reliance on social norms	√	-	-	-	-	-	√	-	-	√	√	√

5. CONCLUSIONS

Colombo MIHM is experiencing a continuous escalation of demand and facing severe challenges in providing quality and affordable housing. Poor maintenance, illegal modifications, compacted spaces, inefficient arrangements, and neighbourhood disturbances are the burning issues. Literature acknowledged micro-living as a viable solution for the said issues. MHs and MAs have been successfully implemented to overcome the housing issues in Canada, New Zealand, the USA, and Australia. However, it has not been sufficiently investigated in Sri Lanka. Thus, this research aimed to investigate the suitability of micro-housing in addressing the issues in the MIHM in Colombo, Sri Lanka. The aim was accomplished through a qualitative approach by collecting data through expert interviews and analysing through content analysis.

Findings revealed the unavailability of land and high land prices as the major challenges faced by the MIHM in Colombo. Additionally, inflation, tax provisions and import restrictions negatively impacted the MIHM. The exaggerated prices caused owning a house to be no longer considered a necessity by the middle-income society. Importantly, the findings acknowledged MHs and MAs as affordable housing options that effectively address the above issues. The construction cost of MAs can be lowered compared to conventional apartments by implementing them on a smaller scale. Construction and operation costs can be further lowered by maximising natural lighting and ventilation and minimising material wastage. However, operational costs will not be changed considerably in MHs or MAs as the capacity of the services is determined based on the number of occupants but not on the size of the house. Furthermore, integrating culture into the MHs and MAs is not a challenge. The demand and the social acceptance of MHs and MAs in Colombo are led by two major factors i.e., (i). the willingness of the middle-income younger generation living in Colombo to have an easy and simple life, and (ii). the willingness of middle-income elders living in Colombo such as retirees to be in a

community while getting rid of maintaining large houses. Herein, ease of maintenance and willingness to modernise were identified as the main positive perceptions. In contrast, limited space and usage of foldable furniture cause negative perceptions. However, prevailing building codes and regulations barrier the implementation of micro-living in Colombo. In Sri Lanka, residential construction should be in accordance with UDA Law, No. 41 of 1978. Furthermore, apartments should follow the Apartment Ownership Law, No. 11 of 1973 and its amendments and should be approved by the CMA. However, MHs or MAs are not aligned with these regulations. Thus, it is crucial to amend the regulations to ensure the effective implementation of micro-living in Colombo.

This research is significant as it addresses a crucial issue of the country by shedding light on an emerging concept as a solution. However, this research was limited to the context of Colombo Sri Lanka and examined only the experts' opinions. Thus, future researchers are encouraged to expand the realm by studying the occupants' perspectives. Similarly, expanding the study beyond Colombo will be noteworthy. Furthermore, studying the legal infrastructure associated with MHs and MAs is essential.

6. REFERENCES

- Arcilla, P. (2015, February 24). *New York to complete first prefabricated "micro-apartments" this year*. Arch Daily. https://www.archdaily.com/602157/new-york-to-complete-first-prefabricated-micro-apartments-this-summer?ad_campaign=normal-tag
- Adabre, M. A., & Chan, A. P. C. (2019). The ends required to justify the means for sustainable affordable housing: A review on critical success criteria. *Sustainable Development* 27(4), 781-794. John Wiley and Sons Ltd. <https://doi.org/10.1002/sd.1919>
- Ariyawansa, R. G. (2009). Demographic characteristics and planning challenges: The case of Colombo city. *Sri Lanka Journal of Population Studies*, 11, 93–106. www.statistics.gov.lk
- Ariyawansa, R. G. (2010). An empirical study of consumer behavior in the housing market in Colombo. *Built-Environment Sri Lanka*, 8(1), 11–19. <https://doi.org/10.4038/besl.v8i1.1906>
- Ariyawansa, R. G., & Perera, M. A. N. R. M. (2018). Socio-economic insight of the secondary housing market in Colombo suburbs: Seller's point of view. *World Academy of Science, Engineering and Technology International Journal of Architectural and Environmental Engineering*, 12(10), 982–986. <http://dr.lib.sjp.ac.lk/handle/123456789/7031>
- Boeckermann, L. M., Kaczynski, A. T., & King, S. B. (2019). Dreaming big and living small: Examining motivations and satisfaction in tiny house living. *Journal of Housing and the Built Environment*, 34(1), 61–71. <https://doi.org/10.1007/s10901-018-9616-3>
- Brokenshire, S. (2019). Tiny houses desirable or disruptive? *Australian Planner*, 55(3), 226–231. <https://doi.org/10.1080/07293682.2019.1634114>
- Brown, E. (2016). *Overcoming the barriers to micro-housing: Tiny houses, big potential*. University of Oregon. <http://hdl.handle.net/1794/19948>
- Central Bank of Sri Lanka. (2020). *Economics and social statistics of Sri Lanka*. Central Bank of Sri Lanka, Statistics Department. https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/statistics/otherpub/ess_2020_e1.pdf
- Dash, S. P., & Das, I. (2020). Feasibility of incorporating open spaces in the design of micro-apartments in residential environments. *PalArch's Journal of Archaeology of Egypt/ Egyptology*, 17(9), 6915–6939. <https://www.researchgate.net/publication/354674821>
- Dunuwila, S. R., & Devapriya, K. A. K. (2022). Analysis of the current housing market in Colombo metro region to enhance prospective consumer satisfaction. In: Sandanayake, Y.G., Gunatilake, S. and Waidyasekara, K.G.A.S. (Eds.), *Proceedings of the 10th world construction symposium* (pp. 102-112). DOI: <https://doi.org/10.31705/WCS.2022.9>. Central Bank of Sri Lanka. (2020). *Economics and social statistics of Sri Lanka*. Central Bank of Sri Lanka, Statistics Department. https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/statistics/otherpub/ess_2020_e1.pdf

- Edirisinghe, J. (2014). Revitalizing the built heritage for urban development: A case study on city of Colombo, Sri Lanka. *European Academic Research*, 2(5), 6365–6397. <https://www.researchgate.net/publication/283571520>
- Gazdag, N., & Torlegård, A. (2018). *Micro-apartments: A potential solution for the severe shortage of small affordable apartments in Stockholm* [Unpublished master's theses]. University of Stockholm.
- Hemakumara, G., & Rainis, R. (2018). Spatial behaviour modelling of unauthorised housing in Colombo, Sri Lanka. *Kemanusiaan*, 25(2), 91–107. <https://doi.org/10.21315/kajh2018.25.2.5>
- Jackson, A., Callea, B., Stampar, N., Sanders, A., Rios, A. D. L., & Pierce, J. (2020). Exploring tiny homes as an affordable housing strategy to ameliorate homelessness: A case study of the dwellings in Tallahassee, FL. *International Journal of Environmental Research and Public Health*, 17(2), 661. <https://doi.org/10.3390/ijerph17020661>
- Jayalath, A., & Gunawardhana, T. (2017). Towards sustainable constructions: Trends in Sri Lankan construction industry-A review. *International Conference on Real Estate Management and Valuation*, Sri Lanka. 137–143. <https://www.researchgate.net/publication/320907730>
- Jayasooriya J.A.D.C.K. (2003). *A study of the relationship between house form and behaviour pattern of people within their socio-economic background in Sri Lanka* [Unpublished master's theses]. University of Moratuwa.
- Kariyawasam, T. D., Wickramaarachchi, N. C., Udawatthe, C., & Weerakoon, K. G. P. K. (2022). *Sustainable housing for middle-income society in Sri Lanka*. International Conference on Real Estate Management and Valuation, Sri Lanka. <https://doi.org/10.31357/icremv.v6.6236>
- Karunasena, G., & Ranatunga, D. S. (2009). *Customer satisfaction of residential condominiums in the Colombo city: Developers' perspective*. Proceedings of international conference on business management, 6, 202–209. <https://www.researchgate.net/publication/324497003>
- Keable, E. (2017). Building on the tiny house movement: A viable solution to meet affordable housing needs. *University of St. Thomas Journal of Law and Public Policy*, 11(2), 111. http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/jchs_2016_state_of_the_n
- Kharas, H., & Gertz, G. (2020). The New Global Middle Class: A Cross-Over from West to East. In H. Kharas, & G. Gertz, *China's Emerging Middle Class: Beyond Economic Transformation*. Washington: Brookings Institution Press.
- Kilman, C. (2016). Small house, big impact: The effect of tiny houses on community and environment. *Undergraduate Journal of Humanistic Studies*, 2. <http://tinyhousecommunity.com/faq.htm>
- Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd ed.). New Age International (Pvt) Ltd, Publishers.
- Leindecker, H. C., & Kugfarth, D. R. (2019). Mobile tiny houses - sustainable and affordable? *IOP Conference Series: Earth and Environmental Science*, 323(1), 012010. <https://doi.org/10.1088/1755-1315/323/1/012010>
- Munmulla, T., Hidallana-Gamage, H. D., Navaratnam, S., Ponnampalam, T., Zhang, G., & Jayasinghe, T. (2023). Suitability of modular technology for house construction in Sri Lanka: A survey and a case study. *Buildings*, 13(10). 2592. <https://doi.org/10.3390/buildings13102592>
- Musa, A. R., Tawil, N. M., Ani, A. I. C., & Basri, H. (2015). An analysis of the selection criteria in purchasing a house in Klang Valley towards the quality affordable housing. *Life Science Journal*, 12(3), 51–57. <http://www.lifesciencesite.com><http://www.lifesciencesite.com>.8
- Mutter, A. (2013). *Growing tiny houses: Motivations and opportunities for expansion through niche markets* [Unpublished master's theses]. Lund University.
- Natasha, K. A. D. M. (2023). *Tiny housing as a sustainable and affordable housing alternative for low-income earners of Sri Lanka*. [Unpublished student thesis]. University of Moratuwa.
- Niriella, C. (2017). Emerging social-spatial polarisation within the housing market in Colombo, Sri Lanka. *Journal of Urban Regeneration and Renewal*, 11(2), 43–52. [Emerging social-spatial polarisation within the housing market in...: Ingenta Connect](#)
- Paradis, E., O'Brien, B., Nimmon, L., Bandiera, G., & Martimianakis, M. A. T. (2016). Design: Selection of data collection methods. *Journal of Graduate Medical Education*, 8(2), 263–264. <https://doi.org/10.4300/JGME-D-16-00098.1>

- Rack, F. (2016). *Micro-apartments as an emerging real estate market: Does the “small space, big city trade off work in Europe?* [Master’s Thesis]. EBS Business School – Real Estate Management Institute. GRIN Verlag. <https://www.grin.com/document/351831>
- Rathnayaka, R. M. K. B., Ariyawansa, R. G., & Endagamage, D. (2020). Factors affecting to buying decision of middle-income house buyers: Study on selected middle-income house projects in Colombo. *International Conference on Real Estate Management and Valuation*, Sri Lanka. journals.sjp.ac.lk/index.php/icremv/article/view/4950
- Renn, A., & Armlovich, A. (2016). Microunits: A tool to promote affordable housing. In *Retooling metropolis: How social media, markets, and regulatory innovation can make America’s cities more livable*. Manhattan Institute.
- Ruonavaara, H. (2018). Theory of housing, from housing, about housing. *Housing, Theory and Society*, 35(2), 178–192. <https://doi.org/10.1080/14036096.2017.1347103>
- Samaratunga, T. C., & O’Hare, D. (2014). Sahaspura: The first high-rise housing project for low-income people in Colombo, Sri Lanka. *Australian Planner*, 51(3), 223–231. <https://doi.org/10.1080/07293682.2013.820204>
- Shanthaarchch, A. (2022). Middle class Sri Lankans forced to migrate due to proposed new income tax policy? *The Island* p. 4. <http://epaper.island.lk/paper/2022/11/15>
- Shearer, H. (2015). *Tiny houses: A radical new solution for addressing urban housing affordability, or just another niche market?* 7th State of Australian Cities Conference, 9-11 December 2015, Gold Coast, Australia. <https://apo.org.au/node/63199>.
- Shearer, H. (2018). *Tiny houses: Planning for affordability and inclusion*. 2018 Joint Asia-Pacific Network for Housing Research and Australasian Housing Researchers Conference, Gold Coast, Queensland, Australia. [Tiny houses: Planning for affordability and inclusion.... - Google Scholar](https://scholar.google.com/citations?user=...)
- Shearer, H. (2019). *Tiny houses: Love, live or leave? what factors influence the decision?* 9th State of Australian Cities Conference, 30 November-5 December 2019, Perth, Australia. <https://apo.org.au/node/306846>
- Shearer, H., Bares, V., Pieters, R., Winkle, B., & Meathrel, K. (2019). Planning for tiny houses. *Australian Planner*, 55(3–4), 147–156. <https://doi.org/10.1080/07293682.2019.1632358>
- Stone, M. E. (2006). What is housing affordability? The case for the residual income approach. *Housing Policy Debate*, 17(1), 151–184. <https://doi.org/10.1080/10511482.2006.9521564>
- United Nations. (2022). *World population prospects*. Department of Economic and Social Affairs Population Division <https://population.un.org/wpp/>
- United Nations. (2011). *World Urbanization Prospects*. https://www.un.org/en/development/desa/population/publications/pdf/urbanization/WUP2011_Report.pdf
- Urban Development Authority (2024, June 25). *UDA act and amendments*. Urban Development Authority. https://www.uda.gov.lk/uda-acts-and-amendments_2021.html
- Weeraratne, B. (2020). Urban housing in Sri Lanka. In S. Bandyopadhyay, C. R. Pathak, & T. P. Dentinho (Eds.), *Urbanization and regional sustainability in South Asia: Socio-economic drivers, environmental pressures and policy responses*, 109–134. Springer Nature Switzerland.
- Wickramaarachchi, N. C., Chandani, S. K., & Thilini, M. (2021). Key determinants of time on the market: an analysis of residential housing market in Sri Lanka. *International Journal of Housing Markets and Analysis*, 14(5), 913–935. <https://doi.org/10.1108/IJHMA-06-2020-0071>
- World Bank Group. (2021). *Annual Report 2021*. Washinton. World Bank Group. <https://thedocs.worldbank.org/en/doc/cd05d27f0203b90751fcfe7145cd5a3d-0330122021/original/EDS05-Annual-Report-2021-English-Summary.pdf>
- Zhang, D., Gong, M., Zhang, S., & Zhu, X. (2022). A review of tiny houses in North America: Market demand. *Sustainable Structures*, 2(1), 2789–3111. <https://doi.org/10.54113/j.sust.2022.000012>