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Challenges and Technologies for Affordable Housing System

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Abstract

Housing affordability and provision of an adequate shelter are the challenges faced by the government in the developing countries. When the phenomenal rise in population, it resulted in shortage of dwelling units of housing especially for the low and middle income group earner. This paper aims to highlight the challenges in providing affordable houses for all. The literature analysis conducted highlighted the challenges which include high cost of construction materials and technologies, constraints on available land and high land cost, large population at the urban centers and financial constraints. The paper identifies the potential technology as a solution to deliver an affordable housing system. The finding shows that there were affordable technologies which can contribute to low cost housing which are interlocking and compressed earth block, thermal insulating technology, lightweight steel framing and bamboo reinforced wall panel. As a conclusion, the planning authorities and developers should monitor and solve the issues and challenges in providing affordable house. Using the locally available raw materials will help to reduce the construction cost. The affordable house technology may reduce the building construction costs and plays the vital role in increasing the house ownership.

Keywords: *Affordable House, Housing Technologies, Affordability, Housing Issue, Housing Challenges.*

Introduction

One of the major challenge in developing countries is to provide houses or shelters to satisfy the basic human needs. Government has to ensure all income levels will have access to housing ownership. Major concern is to the low and middle-income group earner because of their affordability. Their dream of owning a house is becoming difficult to realize. Isnin et al. (2012) state that it is difficult to the targeted group, low and middle-income group, to own a house due to high cost in housing prices and construction materials.

Bhangale and Mahajan (2015) define low cost housing which can be considered as affordable to low and middle income group earner if the housing unit price is not more than 30% of their household income. While Srivastava and Kumar (2018) define housing is low in cost when the society of low and median household income can afford on the housing unit.

The objective of this study is to find out the challenges in providing affordable house for all. Further, this study reviews the affordable housing technologies used in several countries to provide affordable housing system.

Affordable Housing Challenges

One of the pressing challenges for the government is to provide adequate shelters for all. In India, they faced a shortage of houses about 17.6 million unit (Tam, 2011). Gopalan and Venkataraman (2015) state that India had shortage of 18 million houses with 99% of this is for the low-income society. Following is the discussion on some of the challenges in providing affordable housing.

I. High Cost of Construction Materials and Technologies

Ugochukwu and Chioma (2015) state that the largest input to housing construction is the building materials. This caused the target population could not afford to own a house which is beyond their affordability limit. This point also agreed by Sardroud (2012), materials itself contributed to the critical elements in building construction cost.

II. Constraints of Available Land and High Land Cost

Shortage of land for the development is caused by the high population, rapid urbanization and poorly conceived policy and regulations (Gopalan & Venkataraman, 2015). Ugochukwu and Chioma (2015) viewed that the inaccessibility to the land caused the reduction of affordable housing provision. Scarcity of available land may contribute to the problem of high land prices, crowded neighborhoods and the squatter settlements.

III. High population at the Urban Centers

In the industrialization and urbanization era nowadays, residents from the rural area migrated to the urban centers. The migrants came to urban centers to gain a better employment (Karim, 2012). Deepak and Shanmugavelu (2014) wrote there is a big demand for housing to accommodate all people in India due to the large population. In the main cities and town, the slums and low income groups increase cause the provision of adequate housing more challenging.

IV. Income and Financial Constraints

To describe the housing affordability, housing price and income relationship is important. This factor leads to know the affordability of each person either to own or rent a house. The average income need to be addressed in order to support the debt for housing loan. Based on the examining salary of low and middle-income group, they are still facing the tight costs of living and could not own a house (Osmadi et al., 2015). Daud et al. (2017) state that the private sector should not focus only on a profit margin. They should more encourage to achieve the supply demand of affordable housing.

Affordable Housing System Technology

In order to provide an affordable housing system, it has more to do with innovations. Through a better management, appropriate use of available local materials, new skills and technology seeks to reduce the construction costs (Bhangale & Mahajan, 2015).

I. Interlocking Block & Compressed Earth Block

With the usage of local materials and does not require the sophisticated machine, interlocking block is quite generic, cost effective and eco-friendly (Deepak, 2012). An earthen bricks which compressed with manual hand operated or motorized hydraulic machines are called compressed earth blocks

(CEB). CEB use the locally available materials help to improve the local economy. CEB is the suitable choice in providing the affordable house due to this type of block made of local available material and reducing the transportation cost (Sengupta 2008). Herskedal et al. (2012) state that the interlocking compressed earth blocks allow for dry stacked construction which using the cement stabilized soil blocks.

II. Thermal Insulating Technology

Hu and Zhu (2012) found that by using the external wall thermal insulating system, the cost of the housing is affordable and rigidly controlled. The wall body achieved the thermal insulating performance by arranging the insulating materials in the bricks. Ali et al. (2018) found that the heat resistance wall panel contributed to low interior building temperature which can minimize the usage of air-conditioning system.

III. Lightweight Steel Framing (LSF)

From Mahdavinejad et al. (2011) study, they found that LSF technology contributed to reduce the construction cost. LSF technology may emphasize on the role to supply the economic and sustainable house. This will increase the housing ownership possibility and mitigate the housing shortage crisis. LSF were built with hot rolled structural steel, integrated with wood, masonry or other conventional materials to complete the construction.

IV. Bamboo Reinforced Wall Panel

Puri et al. (2017) found that the bamboo reinforced wall panel's cost is 40% cheaper compared to the conventional 5 inches thick single wall bricks. The prefabricated bamboo reinforced wall beneficial for affordable housing. Bamboo strips were used as the reinforcement in concrete to replace the conventional method of using steel bar. Daud et al. (2018) state that by using bamboo as the building materials, the call of sustainable construction can be achieved and reduction in cost because of using readily available raw material.

Conclusion

This paper has examined the challenges to deliver adequate affordable houses. Results from the overview of the literature shows that the challenges in providing the affordable house caused by high cost of materials, land availability, high population and financial constraints, i.e. low income. To adopt the cost effective and environmental friendly housing technologies is necessary to ensure the low income group have access to own a house. The government should monitor and solve the issues and challenges to supply affordable houses. Financing facilities should be provided to the low and middle-income group to access the housing markets. Housing policy should be improved on the planning and the implementation to deliver a decent mass of affordable houses.

The paper recognizes the technologies used in several countries as the solutions to construction of affordable housing system. More usage of readily available local materials should be encouraged by the government to minimize the cost of building construction. Affordable houses can be constructed with the cost-effective building materials and construction technology.

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