A Review: Application of Value Engineering for Affordable Housing

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Abstract

Owning a house is a dream that every person. The government doing efforts to ensure Indians have access to affordable houses. Affordable housing for all people is one of the important challenges faced by the developing countries. India is currently facing a big shortage houses. Out Of which, 95% shortage pertains to houses for Economically Weaker Sections (EWS) and for Lower-Income Groups (LIG).The dream of ownership of a house particularly for low-income group and middle-income group has became a difficult reality. so, there is a necessary to initiate cost effective, innovative and environment-friendly, high quality performance housing technologies for the construction of houses to enable the common people to own houses at affordable cost. This paper shows review of application of value engineering affordable housing ecosystem gaps to achieve housing for all.

Keyword- Affordable Housing, Value Engineering, Cost Effectiveness, Quality Improvement, Construction, India

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I. INTRODUCTION

Cities of India always kept open hand to new people to migrate and to get equal opportunities of education and employment. Urbanization is changing the India, but we have a question that is our cities are ready for receive that kind of migration? As per 2011 census, the country had a population of 1,210.98 million, out of which, 377.10 million (31.16%) lived in urban areas. In India, rapid urbanisation has increase the development challenges in the form of urban congestion, pressure on basic amenities like water supply and sanitation and most importantly, severe housing shortages in cities, especially, in the low cost segment. According to Ministry of Housing and Urban Poverty Alleviation (MHUPA), the urban housing shortage in the country at the end of the 12th Five-Year Plan was estimated to be 24.71 million for 66.30 million households. Out Of which, 95% shortage pertains to houses for Economically Weaker Sections (EWS) and for Lower-Income Groups (LIG). Problem is that because of shortage of housing cause haphazard illegal development of dwelling units and slums. 15% to 60% people of cities can be part of this haphazard development. There is cheaper house for them in slums but not healthy in terms of sanitation and other infrastructure facilities and there is houses in cities with all the basic facilities but not affordable to people of LIG and EWS people. We have to accept that those LIG and EWS people has equal rights for the housing facilities. Housing in India has been always a great challenge to government. Millions of houses are required to build in a certain period. If the period is not maintained the new slums will come up. The demand supply gap is more in affordable housing segment since Real estate developers and private players give attention on middle income and high-income segments due to higher revenue.

The concept has been developed, in which users are able to pay for housing. This affordability can be achieved by subsidizing the cost of housing which result into the ownership of the house, after some period, Depending on financial strategy. Apart from financial incentives, the actual cost of housing can also be decreased by the use of low cost of material, modern construction methods, sustainable design and other methods. Although all these ideas have been applied already, the housing shortage worldwide has not been solved yet because of local level constraints.

II. AFFORDABLE HOUSING

- As per US Department of housing and development families paying more than 30 % of their income for housing are cost burdened and may have difficulty affording necessities such as food, clothing, transportation and medical care and thus affordable housing means housing on which spending is 30% or less.
- For India, we consider affordable housing if one has to spend maximum 30% to 40% on it. it can be defined as housing affordable to economically weaker sections (EWS) and low income group (LIG).
- Affordable housing - also called low-income housing - is an emerging segment in the housing sector in India. Table.1 shows the definition of various category's affordable housing.

Category	*Size*	*EMI or Rent*
EWS	*minimum of 300 sq ft super built-up area* *minimum of 269 sq ft (25 sq m) carpet area*	

LIG	*minimum of 500 sq ft super built-up area maximum of 517sq ft (48 sqm) carpet area*	*Not exceeding 30-40% of gross monthly income of buyer*
MIG	*600–1,200 sq ft super built-up area maximum of 861 sq ft (80 sqm) carpet area*	

Table 1: Definition of Affordable Housing – MHUPA (2011)
Source: Guidelines for Affordable Housing in Partnership (Amended), MoHUPA, 2011

III. NEED FOR AFFORDABLE HOUSING IN INDIA

- Excessive urbanisation and skyrocketing property prices have forced people to live in slums in deteriorating living conditions.
- Cities like Delhi, Chennai, Bengaluru, Mumbai, Kolkata and Pune need 5, 34,400 housing units.
- It is clear that affordable housing is the only way the government can fulfil its dream of providing 'Housing for All by 2022'.
- Minimum requirement of 30 million houses by 2022.

IV. OBJECTIVES OF STUDY

- To study the existing scenario of the affordable housing.
- To carry out the review study of application of value engineering for affordable housing.

V. BENEFITS OF AFFORDABLE HOUSING

- Construction of such large number of housing will share in GDP & economic growth
- Assets creation and job creation
- New housing development will help to improve the quality of life in cities
- Possibility To achieve city without slum
- Prevention of haphazard growth of the city

VI. HOUSING SHORTAGE

Fig. 1 shows housing shortage categories wise in India,

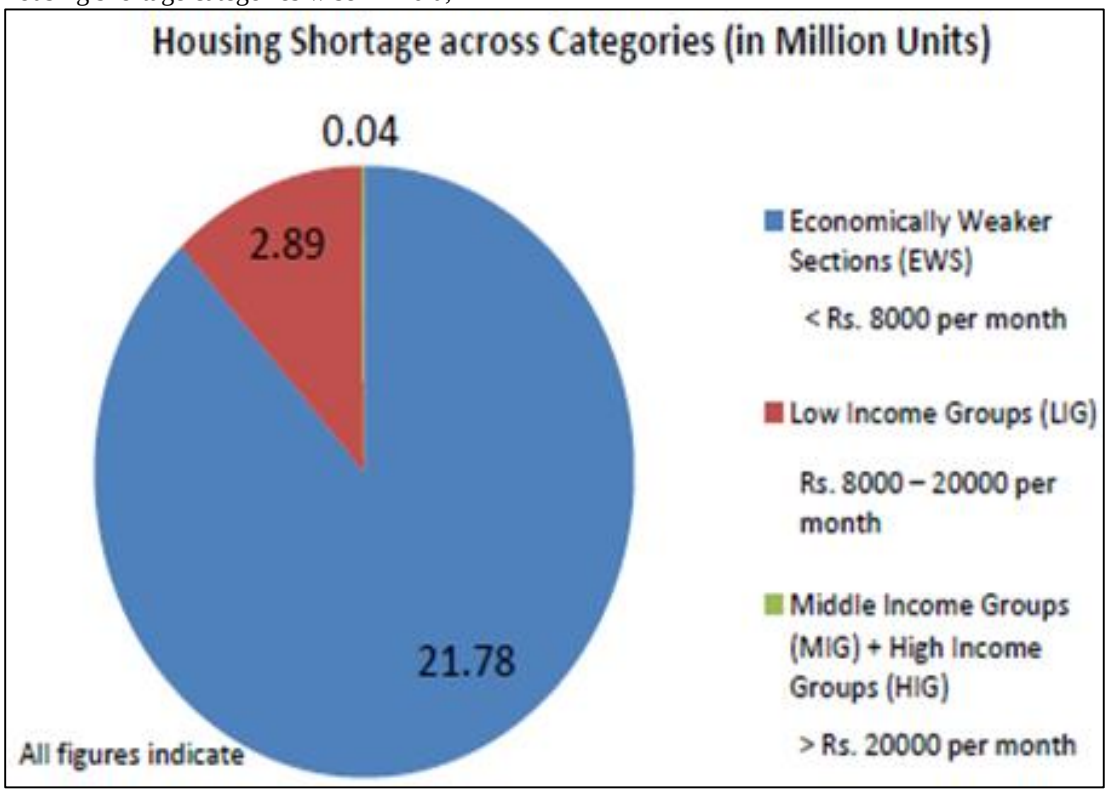

Fig. 1: Housing Shortage
(Source: Low cost urban housing in India and habitat for humanity 2017)

Fig. 2 shows housing shortage state wise in India,

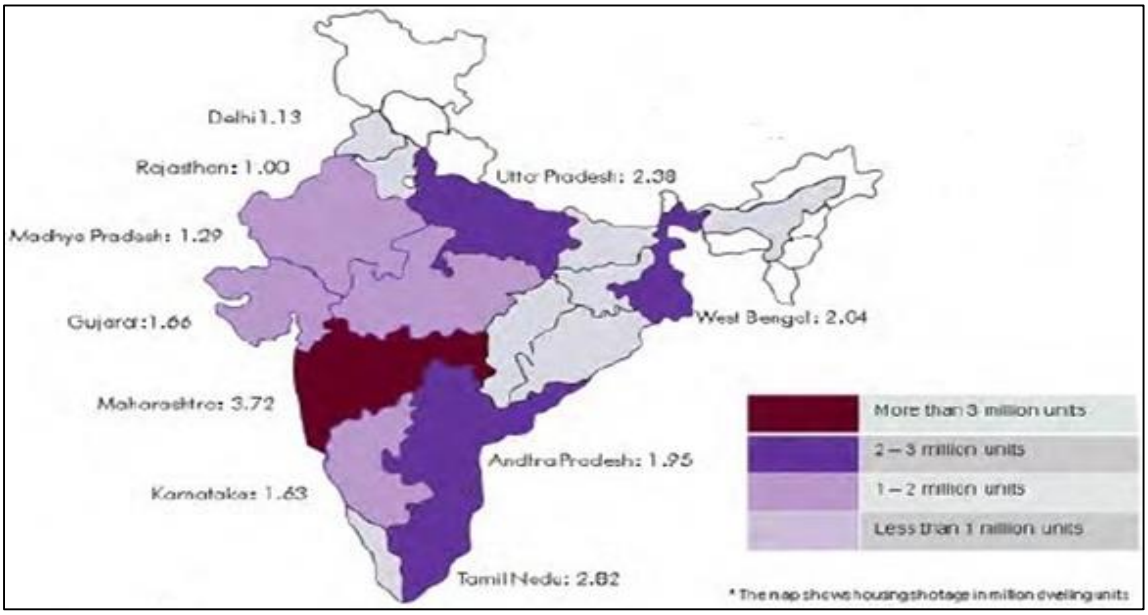

Fig. 2: Housing Shortage state wise

VII. TREND IN HOUSING AFFORDABILITY IN INDIA

As per the Housing Development Finance Corporation (HDFC) Report (2016), the affordability ratio, defined as property prices to annual income, has declined from 22 in 1995-96 to 4 in 2016. After the sharp fall in the 1990s it has largely been stable in recent years (chart).

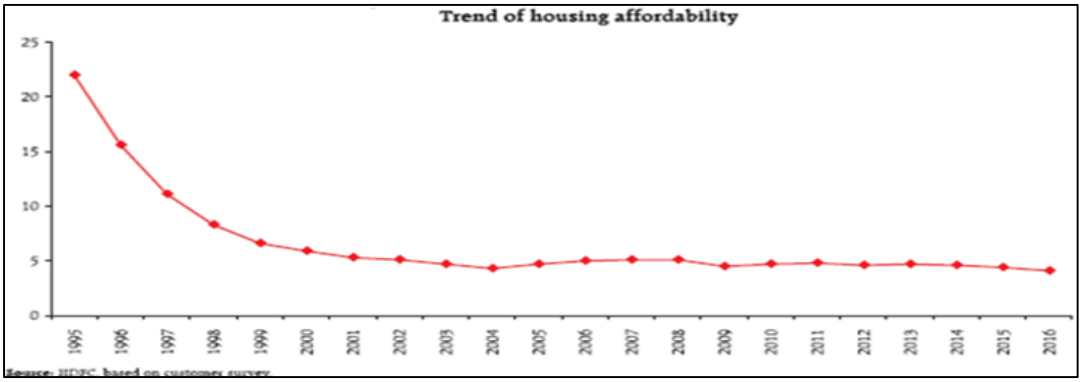

Fig. 3: Affordable Housing Ecosystem
(Source: Low cost urban housing in India and habitat for humanity 2017)

A. Pradhan Mantri Awas Yojana (URBAN)

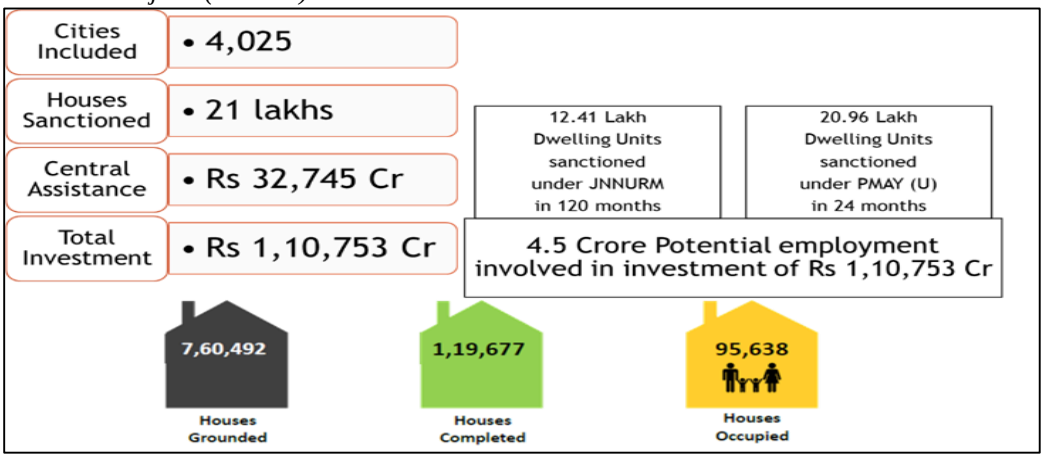

Fig. 4: Pradhan Mantri Awas Yojana (Urban) scenario untill now
(Source: National Workshop on Urban Transformation - Learnings & Way forward)

B. Value Engineering

- "Value engineering is defined as the systematic application of recognized techniques by multidiscipline teams which identify the function of a product, project or service; establish a worth for that function; generates alternatives through the use of creative thinking; and provides the needed function, reliabilities, at the lowest overall cost or Life Cycle Cost."
- The Main Function of VE is identifying and removing unnecessary cost.
- VALUE = FUNCTION / COST

1) Why use Value Engineering?

- Improve Quality
- Save Money
- Save Time
- Satisfy Customer
- Build Teamwork

2) How is VE Done?

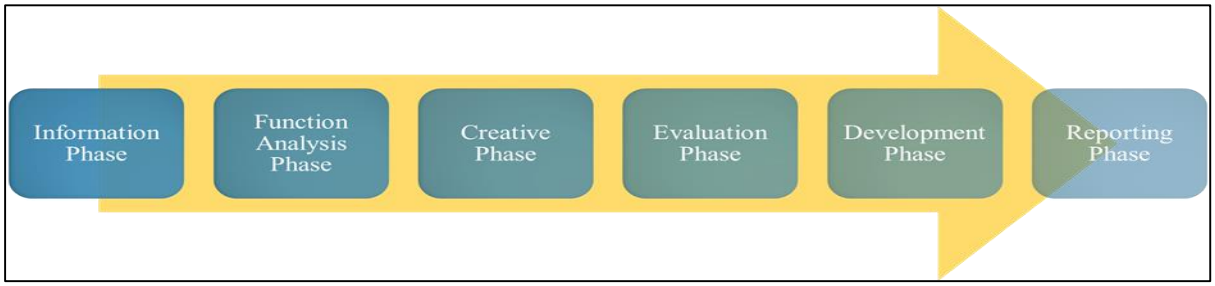

Fig. 5: Ve Job Plan

VIII. LITERATURE REVIEW

- Vivian W. Y. Tam (2016) concluded that Strength & Durability of the structure, stability, safety and mental satisfaction are factors to be considered when reduction of house cost. Reduction achieved by effective utilization of locally available building materials & techniques must be durable, economical and accepted by users. And also High efficiency of skill worker, minimize waste in design, Apply good management practice, postponing finish work. Using low cost technologies in walling and roofing only can save cost 26.11 % and 22.68 % respectively.
- Zarina Isnin (2011) projected that the housing alteration projects provides opportunity to enhance the social , economic and environmental performance of the property as required in many sustainable development concepts. It gives the methodology for field study by investigation through first site observations and interviews to house owners whether they are satisfied with the work done or not.Overall context of housing project are important Design quality of low cost housing is often neglected and fail to meet the human satisfaction in terms of Basic amenities and infrastructures.
- Manjesh Srivastava (2017) elaborated that 30 million units housing shortage for "housing for all by 2022" scheme If official fails 200 million indian will be in slums by 2022 With traditional building technologies, it is impossible to overcome shortage.Huge misconception that low cost housing can be constructed by only utilizing cheap building material of low quality.Locally available material can be save transportation cost up to 30 % Use of Different alternative like concept of prefabrication or monolithic construction , flat slab, prevent waste of material.
- Darshan Parakhiya, Prof. Jitendra Patel(2017) adopted five phase job plan value engineering method,
- Information phase
- Creative phase
- Judgement phase
- Development phase
- Recommendation phase
- To replace the various material in various functional components of the building and making it more valuable in terms of quality and cost. Concludingly paper determine it, success of project, deciding where and how project will be built. Value engineering is not only reducing the costs, increasing the design standards making it easier to build the project and saving time and money.
- Racha Raghwan, Ibrahim Abotaleb (2016) elaborated that value engineering does not influence just project costs and quality, but also it proved to have positive impacts on the environmental and the worldwide trend of green construction. It shows a case study of value engineering applications in the large-scale residential project for sustainability. Overall saving of the project resulting from the full value engineering study range between 20% to 30% of the element cost. Value engineering is a powerful approach for cost saving & quality improvement. It has worldwide known benefits, but it is not applied in proper methodologies and mixed up with the concept of cost saving rather than improving the value.

IX. MAJOR FINDINGS

Followings are reasons for unnecessary costs (poor value):

- Shortage of time
- Misleading information
- Hasty decisions based on false assumption
- Lack of ideas
- Lack of funds
- Resistance to Change
- Unrealistic temporary circumstances
- Politics
- Bad habits and attitudes beliefs
- Over design & Unrealistic safety factors
- Continues changing in the owner requirements
- Lack of communication coordination
- Using unsuitable standards & specification

X. CRITICAL FINDINGS

- Due to increased urbanisation in India, it is mandatory to address the huge demand supply gap in affordable housing segment, Specially for LIG and EWS people. The main reason behind the slum and haphazard development is the lack of affordable housing. Some incentives from government sector and private sector in terms of sustainability and technical approach could help to achieve the "housing for all" goal by 2022. Going by trends of housing shortage and the pace of additions in housing stock in the country, the existing housing shortage is only expected to increase in the near future. While this presents a challenge for policy makers, both from the implementation and monitoring perspective.
- Value engineering is an effective and efficient tool for identifying and removing unnecessary cost in building projects ensuring sustainable valuable development. It has worldwide known benefits, but it is not applied in proper methodologies and mixed up with the concept of cost saving rather than improving the value.
- Government agencies commonly funding subsidies for affordable housing projects for reducing housing shortage, so systematic study of these projects are required as it leads to reduction in the overall cost and saving the money of the Government that can be utilized for the betterment of other works in state as well as in the nation.

XI. CONCLUSION

Based on a literature review, it was found out that majority of the affordable housing projects, which are completed, and up being deteriorated and hence they are unable to satisfy their entire design period.

Due to using poor quality material, lack of supervision, lack of proper detailed study of locally available material and techniques, etc. quality of affordable housing is poor. Based on that technological solution must be provided to improve the quality of affordable housing projects.

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