Project Management Strategies for the Conservation and Adaptive Reuse of Old Residential Buildings into Commercial Spaces

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Abstract - *The study explores the efficiency of project management strategies in converting old residential buildings in Chennai into commercially viable spaces through adaptive reuse techniques, balancing heritage preservation and modern economic demands. Objectives include preserving architectural integrity, identifying effective project management strategies, and assessing economic feasibility and potential ROI. The research focuses solely on residential buildings, specifically in Chennai, with a detailed examination of preservation methods and development of a project management framework. Methodology involved a literature review, case studies, and analysis of materials and defects of a selected house in Saidapet, Chennai, proposing conservation techniques and a zoning plan. The economic viability was demonstrated with a payback period of 1.65 years for converting the house into a restaurant, underscoring the economic benefits of such adaptive reuse projects. The study suggests that INTACH could collaborate with property owners to conserve properties for mutual benefit, utilizing advanced techniques like Crack Detection Sensors, Tell-tale cracks, and Flat-Jacks for quality restoration. Findings are specific to the region and may not be universally applicable due to regional regulatory and cultural variations.*

***Key Words*: Conservation, Adaptive reuse, Project Management, Old Residential Building, Cost of Conversion.**

1. INTRODUCTION

The adaptive reuse form of conserving old residential building into commercial spaces addresses the dual goals of preserving architectural heritage and meeting the modern economic demands. Hence this process requires careful project management to ensure both the conservation of historical elements and the functional adaption to a present day commercial use.

1.1 Aim and Objective

The aim of the study is to investigate and analyse the efficiency of project management strategies in the conversion of old residential buildings into commercially viable spaces through Adaptive Reuse techniques. The objectives of the study are;

Integrity - To focus on heritage preservation and architectural integrity.

Strategies - To identify the potential project management strategies that can be adopted for such residential-to-commercial conversions.

Economic feasibility - To access the economic feasibility and potential return on investment.

1.2 Scope and Limitations

This study includes study of only residential buildings in Chennai. To investigate methods to preserve the historical significance of the residence. To offer insights into potential innovations and technologies that can enhance the efficiency of project management. In-depth study of the economic viability and financial considerations associated with such conversion projects.

The study will not concentrate on the representations of the architectural features of the selected old residential building. The Findings may not be universally applicable, since it may be influenced by regional variations in regulations and cultural factors. The study doesn't concentrate on the subjective opinions of the stakeholders.

2. METHODOLOGY

The methodology which was followed for the study was, firstly, a literature study was done to understand methods of conservation in various aspects like importance of adaptive reuse, theories, examples and economics. Secondly, a house was selected in Saidapet, Chennai for the study and the materials used along with their defeats were analyzed. Testing and techniques for the same were studied through conditional mapping. A proposal of specific conservation technique for defeats of each material along with the zoning plan was given. Lastly, cost of conversion and payback analysis were done for the adaptive reuse of the house in to a restaurant.

3. LITERATURE REVIEW

We can see that even from 19th century there is high scope for adaptive reuse projects and it is seen that residential buildings are the ones which are often converted.[1] It is understood that by adaptive reuse of building into hotel there is expectancy of return on investment for the owners and hence it is good to consider Adaptive reuse strategy for your building.[2]

If a building has to be utilized again with a purpose adaptive reuse is a better solution, in this way we find a new use for an existing building. There are 4 approaches for adaptive reuse typology approach, technical approach, programmatic approach, strategic approach, which can be used individually or by taking up two strategies together.[3] In an adaptive reuse project it is important to keep in mind the aspects like investment and its marketing, the site conditions and structural integrity during construction, also the government rule and bye laws. By knowing all these it will be easy to plan and execute the project without any discrepancy.[4] For a successful Adaptive reuse project it is important to understand the various factors like architectural, structural, economic and environment which is influence the project in one or the other way. [5] Economic feasibility should be the main criteria for study.[6]

Also in a survey done it is seen that adaptive reuse not only have economic and social benefits but it also gives a nostalgic feeling regarding the past cultures and the past styles in architectural practices.[7] while implementing adaptive reuse strategy in a building it is important to know the spatial zoning for the new use. The semi-public spaces can be converted into public area, the utility area can remain the same and the private spaces can be converted as restricted entry areas.[8] In case of a multi storey building, there can be more than one interventions for the new use.[9] The cost of an adaptive reuse project id huge and depends on the activities that is required to be carried out during the restoration phase.[10] Even though the cost of investment in adaptive reuse projects is similar to new construction there are many advantage for the building which makes it worthwhile.[11] Also a life cycle analysis done for new and adaptive reuse projects show that the adaptive reuse not only benefits the cost of construction but also significant decrease impact on environment compared to new construction.[12]

Conservation is not just about preserving and restoring the materials in a building but also to know the heritage value of the house or the site. In turn this helps in preserving the characteristics of the material and the heritage value of the house.[13] The different agents that can be used for wood and brick restoration, agents like linseed oil, polymers and can be used.[14] It is important to know that in the process of conservation according to the guidelines provided by ASI (Archaeological survey of India), INTACH (Indian National Trust for Art and Cultural Heritage) and ICOMOS (International Council on monuments and Sites). It is mandatory to apply lime plaster in the process of conservation and restoration.[15]

4. CASE STUDY

The selected house for the study is the Karneeshwar kovil street house is located at 43, Karneeshwar Street, Suriyammapet, West Saidapet, Chennai. The architecture style of house is a hybrid of Agraharam style. The age of the building id 98 years as it was constructed in 1926. This was the first ever two storey house constructed in the Karneeshwar Kovil Street. It is a Residence property type with 234 sqm area. The property is still in use under private ownership.

Fig -1: Karneeshwar kovil street house

4.1 Building Materials

The materials used in construction of this house are bricks, teak wood, terracotta tiles, lime and clay mortar, lime plastering. The teak wood has been used in madras roofing. Also wood is used for wooden columns with stone base and for wooden balustrade. Terracotta is used in tiling and façade decorations. Clay bricks of 1'6" thickness has been used with lime and clay mortar as binding material. Lime plastering has been used for finishes.

4.2 Defeats in Materials

There is major deterioration in the façade elements like the terracotta ornamentations are damaged and distress of the column plaster. Rectification and usage of the same materials are required. Internally peeling of finishes, terracotta flooring damages, erosion of binding of the metal fixtures at ceiling was observed. Total deterioration of the backyard along with trash thrown shows the poor maintenance.

Fig -2: Defects in materials

4.3. Project Approach

The defeats of the various materials in the house was studied and respective conservation techniques was proposed. On the other hand zoning plans was proposed in order to know the extent of restoration to be done. Below are proposed zoning plans for the conservation of Karneeshwar Kovil Street House.
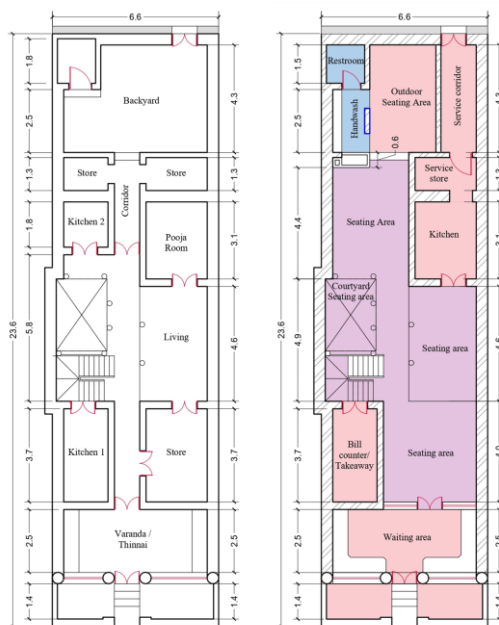

Fig -3: Before and after zoning plans

Through this a cost of the project was derived and it was found that the cost of conversion is Rs.37,76,164.

Few test and techniques were proposed for the conservation bricks, like crack detection sensor & sound crack detecting method, tell-tale crack method and flat- jack method. These help in knowing the strength of the brick and locating passive cracks efficiently.

5. RESULTS

Average earnings from a commercial space and payback years calculations are as follows;
Area : 234 sqm
Total cost of conversion   = **37,76,164** Rupees (Approx)
Payback Formula is given by

$$Payback = \frac{Initial\ Investment}{Annual\ cash\ inflows}$$

Also the UNESCO offers 10% of the total budget every 6 months for maintenance.
10% of total budget = 10% of 37,76,164
= **3,77,616** Rupees (for every 6 months)
Per year   = **7,55,232** Rupees (Approx)

For a restaurant, average inflow of customer per day

$$= \frac{total\ area}{1.5} = \frac{234\ sqm}{1.5} = \textbf{156 people per day}$$

Average earnings per person for a small scale restaurant is **Rs.550**
Hence 156 x 550 = **85800 per day**
= **25,74,000 per month**
The profit is taken as 10% which, **10% of 25,74,000 is 2,57,400**

Hence,
Earning per month : 1,28,700
Earnings per year   : 15,44,400
10% of Fund   (+)   7,55,232
                       22,99,632

Annual Cash inflows : **22,99,632** rupees

$$Payback\ Years = \frac{Initial\ Investment}{Annual\ cash\ inflows}$$
$$= \frac{37,76,164}{22,99,632}$$
$$= \textbf{\textit{1.65 years}}$$

The payback for the investment done can be withdrawn within **1.65 years**.

6. DISCUSSION

Government incentives is an added advantage for conservation of building, in this case study the conservation of the house can fetch 10% of the total project cost every 6 months. From the above calculation it is seen that the

payback years for the adaptive reuse is 1.65 years which shows that the conservation of the house is a viable option.

7. CONCLUSION

A small residential building having its own heritage value should be conserved to retain the cultural and bring in the nostalgic feeling. Adaptive reuse of such residential building into commercial building should be considered for economic benefits. INTACH can collaborate with these residential property owner and conserver the property for the benefit of both.

Even though the damages are visible, it is recommended to use various methods available to know the deeper extents of damages. Techniques like Crack Detection Sensor, Tell-tale crack and Flat - Jack can be utilized for better quality of testing and restoration. In the taken case study of converting an old residential house to a restaurant the payback years for the investment done is 1.65 years indicating that the investment is viable.

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