

Adaptive Reuse of Historic Building

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Abstract

Adaptive reuse explores the choices between destruction and recreation, giving a location a new cycle rather than locking it in a certain moment in time. Adaptive reuse maintains its lengthy history while solving the issue of land scarcity and planting a new layer without removing the roots of former levels. Due to the rapid growth and development worldwide, nations tend to preserve their historic sites that represent their heritage to assist communities in preserving their wide variety of environmental personality and heritage. The adaptive reuse technique is employed for this purpose, with the phrases "adaptive reuse" and "renovation, refurbishment, and rehabilitation" often used interchangeably. However, this study seeks to distinguish each term based on a framework discussed in the literature and determine the value that could be achieved by considering the potentials of the three sustainability pillars while adaptively reusing historic structures.

Keywords: Re-Architecture, Adaptive reuse, Restoration, History, Heritage, Revitalization.

1. Introduction

Reusing something for a use other than what it was intended for or recycling it so that the material that makes up the object may be used again greatly lessens the environmental effect of creating the object from entirely fresh raw materials. This reasoning also holds true for buildings, where the construction may be kept while the user is changed. Adaptive reuse is the act of modifying existing structures—those that formerly had one use but are now used for another—while maintaining their original historic features. It revitalizes and modifies the city's historic fabric. While preserving the historical value of the structure and its surroundings, the adaptive reuse of a building should have little influence on the surrounding area. **‘Adaptive reuse is self-defeating if it fails to protect the building’s heritage values.** (“Uncanny conversions: the good, the bad and the dirty in adaptive reuse”) A successful adaptive reuse project respects the structure’s original significance while adding a contemporary touch to it.

India is a nation with a long history dating back more than 4,000 years. Some of the greatest architectural wonders in the world have been built by our ancestors over the years. The historical artefacts are nevertheless divided into two groups. The first ones are the monuments that have accrued historical value over time and draw numerous tourists due to the nature of their design, space, scale, and original usage. The second group comprises ancient buildings that have not been registered, such as palaces and havelis, which, although being significant historical and cultural attractions, are unable to draw tourists. Therefore, it is crucial to reinvigorate these historic structures by giving them appropriate modern uses. Therefore, our next generations may profit from and be conscious of our ancestry and where we came from. It is important that city planners, architects, and historic preservationists can work together to discuss the

environmental benefits that tie into adaptive reuse. As we continue to deal with growth in our cities there is always a need to create new buildings to fulfil this demand

To address the environmental advantages of adaptive reuse, it is crucial for city planners, architects, and historic preservationists to collaborate. There is always a need for new structures to be built as we deal with the expansion of our cities.

Through adaptive reuse, heritage buildings may be transformed into useable and accessible places, which will be advantageous to the neighborhood in a sustainable way. The relationship between present and future generations has become stronger, which is good for societal sustainability. More job opportunities become available, and tourists are drawn to the cities to support the economies. Embodied energy, or the amount of energy used from the purchase of natural resources through the delivery of the product, was decreased regarding environmental sustainability.

Aim and Objectives

The Aim of this study is to analyze the challenges and opportunities associated with adapting historic structures for contemporary usage.

Objectives of this paper are as follows.

To analyze the regulatory frameworks and quality standards for adaptive reuse projects in historic buildings.

To study the environmental benefits and challenges of adaptive reuse in historic buildings.

To Identify innovative design strategies and technologies that can facilitate the transformation of historic buildings for modern use.

Table 1 Research Plan

Introduction	Background and context of the research
Literature Review	<ol style="list-style-type: none"> 1. Historical background of architecture and preservation 2. Different approaches to preserving historic buildings. 3. Adaptive reuse of historic buildings 4. Social, and environmental benefits of adaptive reuse.
Data collection	<ol style="list-style-type: none"> 1. Case studies of successful and unsuccessful transformations of historic buildings 2. Data analysis of case studies.
Results	<ol style="list-style-type: none"> 1. Overview of the findings from the literature review 2. Summary of the results from data analysis 3. Discussion of the implications of the findings
Conclusion	<ol style="list-style-type: none"> 1. Summary of the objectives, and findings

2. Literature study

Need to study adaptive reuse.

The sole means for preserving structures that don't fit into any of these categories is to "keep them in active use, i.e., adaptive reuse." Retain an old building when its immediate context is changing drastically, and its original function stays no more valid, one must adapt to the changing conditions by making alterations

required for its new use so that they do not affect the intrinsic value of the historic building. Additionally, "the built environment must maintain continuity while also changing." Continuity implies a slow and steady rate of change. Change is necessary to keep the concept of physical form alive. It is the function of a building, the activity within and around it, that gives it meaning. A building continues to live through its change of use in the absence of the old functions.

Different approaches, shown in India.

In India, the Wealth Tax Act came into force with effect from 1st April 1957, which is a tax on the value owned by a person levied at 1% on the amount of wealth as on 31st March every year where such amount exceeds Rs. 30 00,000.

The Act exempted anyone building a former ruler of the Princely States, which the Central government has declared as his official residence, but the former rulers gave their palaces or buildings other than their official residences to the government on lease for the use of Government purposes. Even in history, there have been various buildings that were adapted into some other use.

Adaptive reuse is important for maintaining a neighborhood's identity, as it embodies the community's valuation of the asset in terms of its social, historical, or cultural dimension.

During the war, many buildings were temporarily used as hospitals and base camps. In a few decades resulting from industrialization, several defunct factories and warehouses have been transformed into educational institutions, medical facilities, and even places of worship that have undergone a similar rebirth, fusing the new with the old. Consequently, it can be said that the idea of "reuse" is not brand new in India. Conscientiously or subconsciously, it has evolved into a way of life. Havelis are frequently used as stores and offices. Palaces are converted into hotels, mill buildings into offices, government buildings into palaces, and residential streets into business streets.

Depending on their historical contexts and methods for incorporating the new purpose into the constructed form, various adaptive reuse schemes can take one of three forms. They are:

1. It could keep a building for its original use.
2. It could adapt a building to a new use; change in use.
3. Only its facade is maintained and changed the rest of the building, Facade retention.

Types of interventions applied in historic buildings.

Preservation: every measure maintains the monument's standing. preserving the site's current condition and minimizing degradation.

Conservation: Consists of all proactive safety precautions and interventions that prolong life and preserve the historical structure's identity. Each measure taken to maintain the site is done to protect its cultural heritage.

Maintenance: During a building's lifespan, maintenance includes both preservation and proactive conservation measures. constant protection of a location and its surroundings

Restore: measures to reclaim the old building's appearance or functionality

Refurbishment consists of making improvements to a structure to satisfy functional and/or financial requirements.

Rehabilitation: is the process of changing a historic building's use in a way that complements the structure.

Renovations: are actions taken to modernize a building's components, such as increasing a historic structure's energy efficiency.

Restoration: is the action(s) of repairing an existing structure to its original state; it is the process of restoring a site to a known previous state by eliminating accretions or by reassembling existing pieces without the addition of new material.

Conservation ethics

Research and Recording

Before any intervention is undertaken, the building's or site's historical evolution must be thoroughly studied, and the state and characteristics of the structure or site must be completely documented. This will often include complete, comprehensive drawings as well as photographic and written documentation of the structure that is being modified.

Compatibility of Use

A historic structure should often be used for the purpose for which it was intended. The historical character or reputation of the building must not be seriously impacted by changes or new uses that are significantly different from or inconsistent with the former usage. **Minimum Intervention**

Minimal loss of fabric

The scale or design of the adaptation work must not ruin or negatively impact the building's character. Because of this, it is important to adapt to historic structures with caution. Wherever feasible, the building's original internal design and plan should be retained.

Reversibility

This is based on the principle that nothing should be added to the building that later cannot be taken away. In addition, any alterations to a building should be capable of being removed and made good without too much collateral damage to the existing structure and fabric.

Use of appropriate techniques and materials

Except where the fabric has failed due to intrinsic flaws, repairs should typically be made using the same materials and manufacturing techniques that were used in the original fabric.

Only when new materials and methods have been thoroughly tested and their advantages exceed any possible risks to the building's character may they be adopted.

Identification of new work

Any new construction or major new changes to an existing structure are best accomplished without any attempt at disguise or artificial aging, must be original creative works, and should not be imitations of preexisting designs. Work should enhance rather than duplicate the current fabric. Every new piece of work must be documented and, where necessary, physically recognized.

Continued maintenance

Protection must incorporate an ongoing maintenance program that adheres to recognized conservation norms.

Documentation of work

All treatment techniques and materials must be adequately recorded.

Process of adaptive reuse

The research in Adaptive Reuse Strategies for Heritage Buildings: A Holistic Approach looks at developing a model that will help in the decision-making process of implementing one adaptive reuse in a heritage building. This model will help with deciding what course of action should be taken with the building.

The first step deals with who participates in the decision making. Secondly, analysis of the heritage building which considers the building's physical characteristics and previous uses. Choosing a conservation strategy to implement is the next step. Does a structure just require repair or rebuilding work, for instance? Fourth, involves assessing the environmental, social, economic, and other potentials that will stem from the project. Lastly, considering the adaptation of the building.

Intervention degree

1. The seven degrees are:
2. Preservation of the actual state
3. Prevention of degradation
4. Material consolidation
5. Restoration
6. Rehab services
7. Reproduction
8. The process of reconstruction

Advantages of adaptive re-use

It is believed that old buildings were made with better grade of construction materials as compared to the latest construction material that is why a longer life span have.

Moreover, older buildings consist of strong building envelopes which maintain proper heating and cooling, numerous windows help to create proper ventilation and many other factors help to achieve energy efficiency.

The benefits of reuse projects also include social factors such as rejuvenating the historical and cultural values of a building.

Older buildings have the ability to create urban character and 'sense of a place.'

Barriers of adaptive re-use

1. **Physical restrictions:** Existing floor layouts, number of columns/walls and structural system layouts
2. **Economic considerations:** Direct and indirect costs of conservation
3. **Social considerations:** Intangible and non-economic perspectives of maintaining day-to-day lives of people who are attached to the place.
4. **Building rules, laws, and other restrictions:** Compliance with current construction norms, rules, conservation principles, licensing requirements, and planning criteria
5. **Insufficiently skilled craftspeople and limited supplies.:** compatibility issues between new and existing materials, as well as a lack of locally available people with the necessary skills for conservation work
6. **Limited response to sustainability agenda:** Limited support received from building owners and commercial property markets to make buildings sustainable.
7. **Complexity and technical difficulties:** Refurbishment techniques, technical installations and innovative solutions required.
8. **Maintenance issues** High cost of maintenance and repair due to physical deterioration and defects
9. **Inaccuracy of information and drawings:** Lack of detailed information on flaws, dimensional anomalies, and drawings of historic structures
10. **Creative value compared to redevelopment:** Creative outside appearance and finishing of the building.

3. Case studies

Case Study 1: Chidambara Vilas'



Figure 1 Chidambara Vilas'

Chidambara Vilas' in Chettinadu Pudukottai, Tamil Nādu, India, is a 120-year-old royal mansion that has been formerly the home of Nattukottai Chettiars and has become a heritage hotel. The majestic Chettinadu Mansion in Kāraikkudi, built in 1902, includes spectacular architecture, Italian marble flooring, and oak furnishings. It is approximately 6.2 miles from Thirumayam and 1.5 m from Chettinad.

The architectural style

As previously described, the mansion is characteristic of Chettinadu, maintaining an eclectic design integrating Indian and colonial elements. Spatial hierarchy is portrayed by diversity in décor, shifting from

the highly ornamented and ornate to plain and functional as one walks around the home. Local resources like baked bricks, lime plaster, Aathangudi tiles, terracotta tiles, and raw granite were used to build the mansion. The interior is embellished with the imported materials like Italian marble, Burma teak, rose wood, Belgium glass and stain glass. Madras terrace is used for flat roofs and the lofty ceilings covered with wooden sloped roofs false ceilings are constructed with a framework of Burma teaks and panels of decorative teak wood or Aathangudi tiles.

Historical context

The Chettinadu Mansion is among the oldest and largest residences constructed by the Chettiars of Chettinad. The estate is now managed and maintained by the family's sixth generation. Most of these ancient artefacts are on display in the museum. In the late nineteenth and early twentieth centuries, most of the Chettiars fled to Burma or Ceylon. By 2010, just seventy-four of the original 96 communities remained.

Conservation theories and practices

Numerous ancient residences in Chettinadu have already been demolished, either to time or to destruction. Only a few of the remaining properties are still owned and operated by their original owners. As there was a desire to preserve some of these houses, a handful were transformed into Heritage hotels using the adaptive reuse approach. In this vein, the 'Chidambara Vilas' were leased to the Sangam group of hotels for 30 years in 2011. This stately estate was converted into a heritage hotel by using the following conservation ideas and techniques while retaining its original content:

1. Reuse that is adaptable
2. Reconstruction
3. Creation of new places and contemporary services in accordance with conservation ethics

Recyclability According to the outcomes, **adaptive reuse was carried out with proper regard for the ideology of this traditional residence and with minimum interference.** There are two sorts of spatial utilization patterns that have been observed.

The first kind allocates identical usage to the original use of the area, whereas the second type allocates alternative usage to the space with little intervention such as shutting entrances, constructing a partition wall, supplying lighting fixtures, and so on.



Figure 2 Ground Floor Plan — Original mansion.

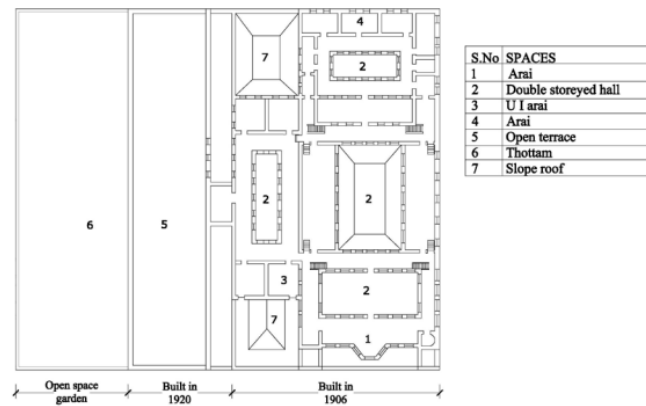


Figure 3 First Floor Plan — Original mansion.



Figure 4 Ground Floor — After restoration and adaptive reuse.

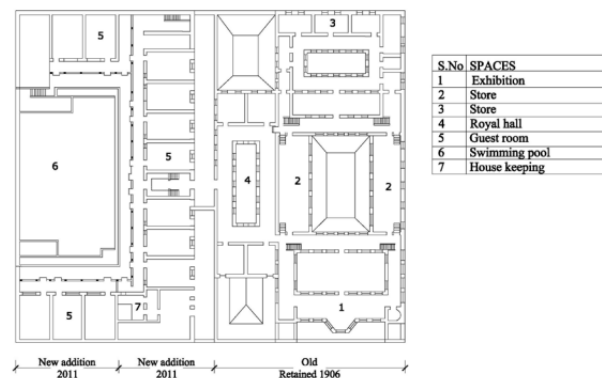


Figure 5 First Floor — After restoration and adaptive reuse.

Mathil suveru - compound wall

Originally it was used as security present day use is Height increased and used as gallery to exhibit culture of Chettinadu.

Munpuram – front open space

originally it was used as with kinaru (well) and related bathing and washing activities of men. present day use is Kinaru retained as a cultural artifact.

Thinnai – raised platform with columns.

originally it was used as Greeting and entertaining male guests present day use is receiving guests.

Kannakkupillai arai - accountant’s room

originally it was used as Office room of the family's male accountant present day use Hotel's office and accounts room.

Pattagasalai - men's greeting room.

originally it was used for business discussion present day use Display area of Chettinadu artifacts.

Valavu - single central courtyard

originally it was used Conducting religious festivals and ceremonies present day use Demonstration of the traditional activities during the festivals times to experience.

Arais - rooms

originally it was used Sleeping, storing valuables and other grocery present day use Store.

Pendir arai – women's room

Originally it was used Exclusive women's room for sleeping and other activities present day use Dining hall for guests.

Kottagai – double storeyed hall

originally it was used Conducting life cycle ceremonies present day use Exhibition space of paintings and experimental kitchen.

Bhojana hall (dining hall)

originally it was used Dining for guest's present-day use restaurant.

Samyal arai - kitchen

Originally it was used Cooking using traditional choola (open hearth) present day use Cooking with modern gadgets.

Suttrupathi - corridor

originally it was used Sleeping, relaxing present-day use for circulation and accommodating modern services.

Thottam - garden

Originally it was used Cattle sheds and garden present day use Swimming pool and ancillary facilities.

Restoration and rebuilding

Restoration It has been noticed that the mansion is restored in two ways.

1. Consistent restoration measures
2. Material restoration, as some of the materials and techniques employed in Chettinadu mansions are unique to the region and only available locally.
3. Cleaning of the whole premise
4. Cleaning of all architectural features such as floor tiles, ceiling tiles, arches, and façade elements
Replacement of raw granite tiles from a local quarry in the first courtyard
5. Cleaning and preservation of all timber elements such as columns, brackets, ceiling frames, doors, and windows
6. Use of traditional lime wash across the house
7. Painting in traditional Chettinadu colour scheme
8. Using iron rods to cover open wells and preserving them as cultural artefacts.

Measures for material restoration

1. Using Aathangudi tile masons to rebuild the existing pattern and colour of damaged Aathangudi tiles on the roof and floor.
2. Typical Chettinadu plaster was made on-site by local Chettinadu craftsmen and put to the wall surface wherever the plaster had failed.

New addition to building

Expansion of areas and new offerings that are compatible with conservation ethics The old mansion was extended to fulfil the needs of a contemporary hotel, such as guest rooms, a swimming pool, and facilities such as a lift, air conditioning, lighting, water supply, drainage, water recycling, and a treatment plant. To retain the continuity, it is done in accordance with the Chettinadu architectural style and character, components, building processes, materials, and finishes. Furthermore, new areas built are sensitive to the existing historic fabric to meet the current needs of a historical hotel, and this is accomplished in the new extension in the following ways:

1. Providing a thinnai difference in the guest bedrooms as an expansion of sill
2. The use of furniture such as hardwood tables, chairs, and drawers with traditional Chettinadu detailing.
3. Utilization of materials consistent with the existing mansion for the new expansion, such as baked brick for the walls, lime wash, Chettinadu plaster, and a wooden false ceiling. Additionally, ancient doors and door frames bought from abandoned Chettinadu houses are used.
4. The installation of attached toilets in guest bedrooms has been done with caution, with a channel in the walls to allow the plumbing lines so that it does not interfere with the overall aesthetic.
5. Minor details, such as electrical accessories in the form of switches and switchboards, have been duplicated using fresh material while adhering to the original specifications.
6. Facilities such as the sewage plant, the water recycling and treatment plant, and the electrical room are meticulously designed and executed in a discrete manner.
7. The swimming pool's ancillary rooms are finished with a slanted roof and terracotta tiles to match the original fabric.
8. The extension's facade treatment is precisely matched with the architectural heritage by adding traditional components such as parapets, stucco, columns, arches, and colour palette.
9. The interior of the guest elevator features a Chettinadu railing made of teak wood.



Figure 6 Before and after of Chidambara Vilas'

Case Study 2: Dharampura Haveli

The historic Haveli, spread over five hundred square yards, was designed in the architecture of the Mughal style, around a central courtyard with elaborate woodwork decorations. It was initially intended to feature a mix of residential and commercial uses. The lower ground floor shops opened to the street, and the remaining stories were constructed as residences. The ground level with a grand entrance and the first story was built at the same time, while the second floor was a later addition in the mid-20th century.

The project in Dharampura, which aims to restore and rehabilitate a 135-year-old Haveli (built in 1880), is the first of its kind in the walled city of Delhi.



Figure 7 Dharampura haveli

Architects started this project looking at a broken structure which was declared as an inhabitable space for living by the government of Delhi. Without any plans or drawings, we had to develop a program even before starting the design which involved the building survey, to prepare measured drawings & structural repairing & strengthening of the building.

The design process involved a very elaborate 2 years research of the whole urban fabric of Chandni Chowk. The resulting space had elements from Hindu, Mughal, Jain & Rajasthan's Architecture. We were bound to amalgamate traditional architecture with contemporary modern architecture to create an inviting space for both Indians & Foreigners.

Architects had visited all the old cities of India to understand the relevance of such a project & to collect a considerable number skilled labor who understand traditional architecture elements. Architects replicated all the elements which were used earlier, some of them in a modern way.

Every room or space has its own theme which reflects various flavors of architecture & livelihood in Chandni Chowk. All furniture, lights & artifacts were designed especially for each space according to its use & the theme taken.

Condition before the revamp

The old haveli, which was built in 1887 AD, was abandoned, and desperately needed conservation work to bring it back to its former splendor. The Municipal Corporation of Delhi once deemed the structure hazardous, and because of the rising water level on all floors, the structure experienced extreme wetness. The old woodwork had become weaker because of this and was deteriorating naturally. To accommodate bathrooms, kitchens, and other amenities, the rooms were poorly organized and separated into smaller spaces. The service connections, such as exposed pipes and dangling wires, increased the commotion while the roof was being installed, causing the entire structure to collapse, and increasing the amount of work required for rehabilitation.



Figure 8 Corridor before restoration

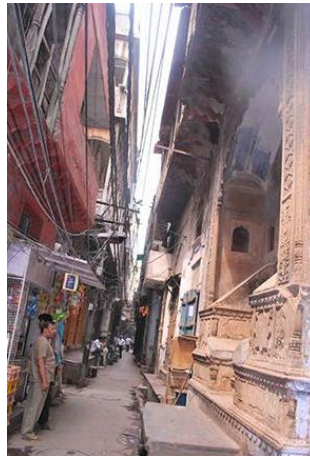


Figure 9 Entrance gate before restoration

Purpose

The purpose of restoring the Haveli was to combine ancient construction methods with current understanding to maintain the architectural legacy. The preservation of the land's potential archaeological deposit was always a major concern. There was a significant task, but there was also an unwavering determination to not only restore the Haveli's former splendor but also to sustain it for many years to come architect Kapil Agarwal spent six long years restoring a haveli in the heart of this conundrum.

The haveli's entrance is through a restored, huge, 135-year-old wooden door with carvings and M.S. strips. The ceiling is done with interesting patterns of Mahbubani art. The entry to the main Haveli has a silver clad door, in line with the lift lobby. The open courtyard is designed like a classic haveli courtyard, with an octagonal floor pattern and a water fountain in the middle.

The second level of the old haveli was inhabitable due to fractured floor slabs and floor access, with a Ground +2 structure. We had to retrofit various spaces like restaurants, a museum, shops, and diverse types of rooms in the renovated and structurally improved Ground +1 structure and construct the 2nd and 3rd floors and a terrace area. A thorough overhaul procedure was used to achieve this. Epoxy grouting, FRP wrap additions, and columns were needed to reinforce the primary structure. The slabs were all fixed, and some areas had micro-concreting done. The same scale and finish were used to recreate every architectural section, but different materials were used to improve the quality and reduce the cost. All

these components were rebuilt with the aid of highly trained labor that was hand-selected from various regions of India.

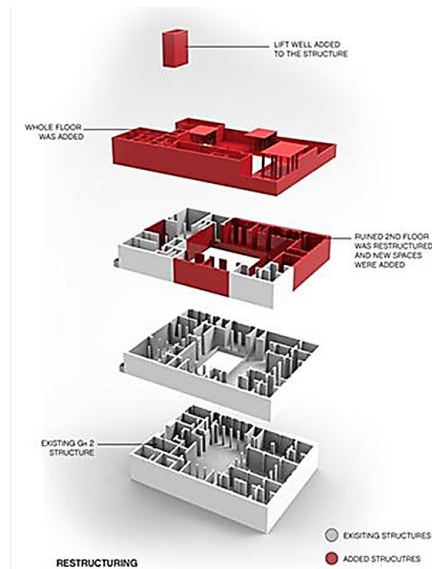


Figure 10 Additional construction

The idea was to stagger all these functions around the courtyard, providing good visual connectivity, improving the light and air quality throughout the Haveli. On the ground floor the courtyard extends into the restaurant area through the wide glass panels which replaced the existing doors under arches. The upper floors are placed with a setback from the floor below it. This helps more in visual connectivity.

Elements

Lakhori, the traditional accent of the restaurant:

The goal was to give the restaurant an old appearance by using lakhori brickwork and preserving the existing arched vaults. The area was previously used as a living room + store. The restaurant features green-painted doors that divide the family eating areas from the main dining area on the side that opens to the courtyard and provides a full view of the haveli.



Figure 11 Traditional accent of the restaurant

The restaurant, with a capacity of fifty, features dark, polished wood furniture and the rustic appearance of lakhori bricks. The ceiling is painted with rough-textured stucco, and a decorative chandelier is designed using laser-cut M.S. boxes in an antique copper finish. The kitchen, with a dumb waiter for the terrace, is in the basement through a narrow staircase. The design combines various shapes, components, and materials from Havelis, enhancing the overall aesthetic.

An envelope around the courtyard, a traditional pertinency

Choti Haveli, located in Galli Anar, offers a unique architectural ambiance with six rooms and a spa on the first level. The rooms are individually designed, with unique proportions and natural light, allowing for a seamless flow of movement. Private rooms, including two suites, are situated on the first and second floors, with each floor featuring a covered patio. These suites feature a living area, bedroom, and a lavish toilet, with arches and columns in Rajasthani style architecture dividing the space. The haveli's energy is heightened by the windows that open onto the winding streets of Galli Anar.

The hallway railings are contemporary clones of previous haveli architecture, made of wood and painted GI pieces. The front patio space, featuring glass panels and arches, is a popular spot for dancing and music performances. The second-floor features seven rooms, including three suites, and small pockets of space for open sheesha rooms with a lounge setup.

Terrace, a visual delight

The Haveli's main focal point is the spacious patio area on the third story. Views from the terrace include the magnificent Red Fort, Jama Masjid, and other notable sites like Sis Ganj Gurudwara and Shankaracharya/Jain Mandir. The terrace turns into a vantage point from which we can see the entire Chandni Chowk neighborhood, which breathes life and substance into the Haveli. A large, white-painted jharokhas that spans an entire corridor has been draped from the third floor's walls. The jharokha's railing is made of laser-cut stone designs. Rajasthani and Jain architectural styles have been combined to create this interior design.

The terrace also holds a part of the restaurant with the main attraction being the sitting below the “Barah Dhari” which is a structure made of wooden clad M.S. columns and beams and a glass pergola. To create a luxurious dining atmosphere, the wall behind the Barah Dhari is transformed into a water wall and is accented with fountains. To give the room more character, the flooring is made from zigzag patterns made from black and white stones. The staircase mucus is not left unattended. They are once again accentuated by stone carvings of traditional components, jaalis, and stained glass in various colours. The elevator machine room's wall has been given a mural inlay treatment.

Inspired from Mughal style of floral patterns in stone. It is also decorated with wooden windows and traditional brick.

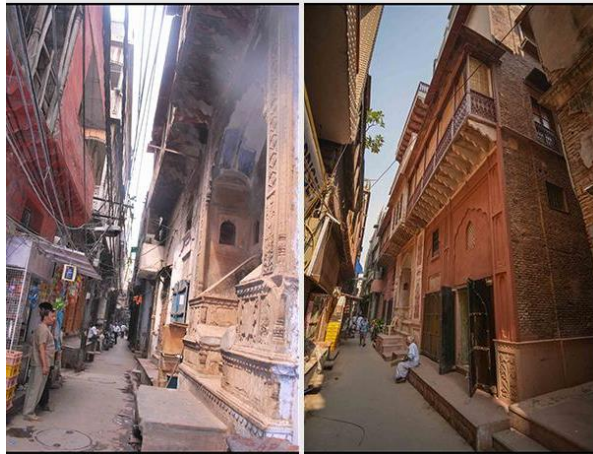


Figure 12 Entrance door before and after

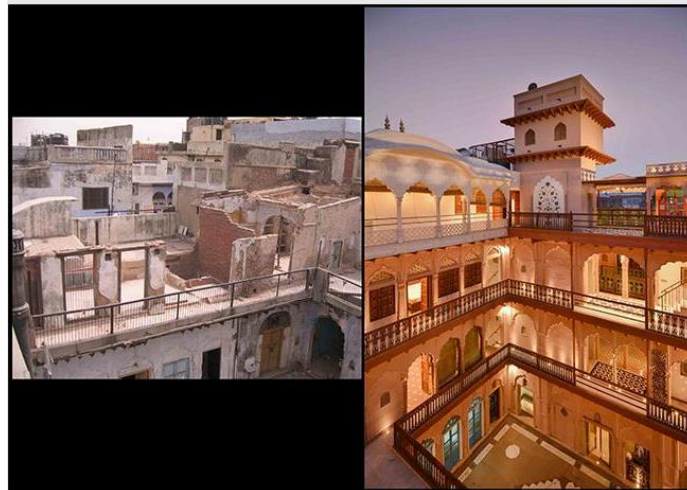


Figure 13 Courtyard view before and after restoration

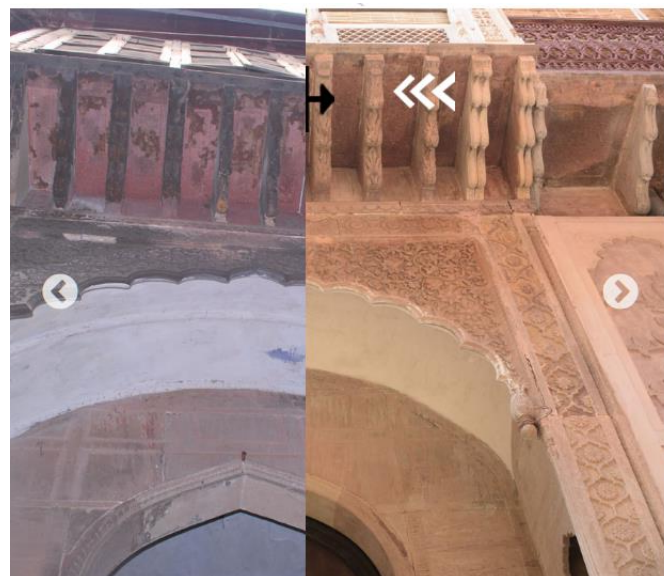


Figure 14 Details before and after



Figure 15 Courtyard before and after restoration

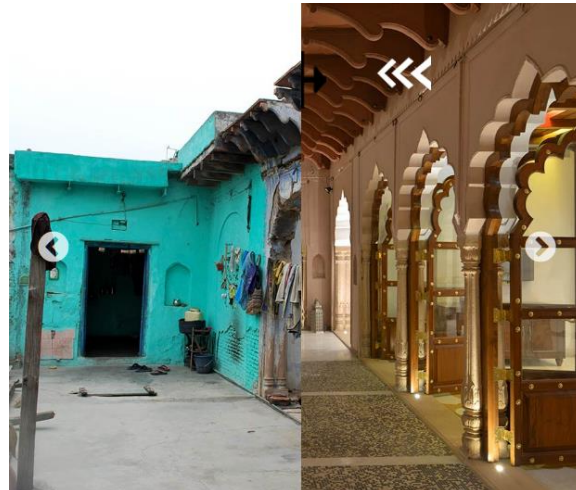


Figure 16 Lobby before and after

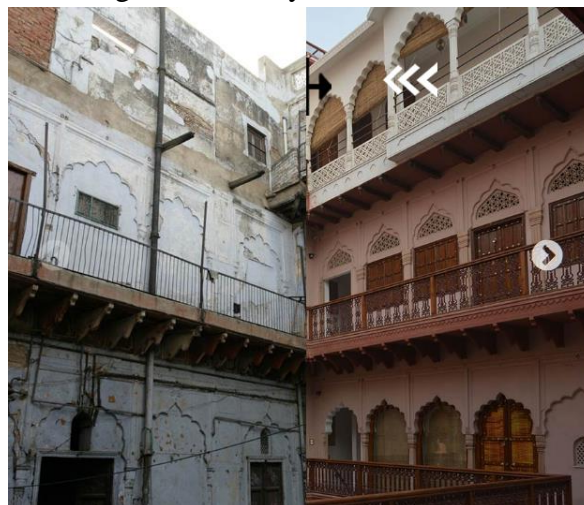


Figure 17 Courtyard before and after restoration

Comparative analysis

Detail	Chidambara Vilas	Dharmapura haveli
Location	Tamil Nadu	Delhi
Vicinity	Chettinadu pudukottai	Chandni chowk
Age of the building	120 years	135 years
Architectural Style	Traditional Chettinadu architecture	Traditional Rajasthani
Before	Old royal mansion	Mix of residential and commercial uses.
After	Heritage hotel	Exquisite Mughal restaurant and hotel
Influence	Influenced by Tamil and Dravidian architecture	Rajasthan and Mughal architectural influence
Incorporation	<ul style="list-style-type: none"> • Painting in traditional chettinadu colour scheme • Facilities such as the sewage plant, the water recycling and treatment plant, and the electrical room are meticulously designed and executed in a discrete manner. 	The ceiling has been painted
Material used	Wood, stone, and terracotta	Sandstone, marble, and colourful tiles
Roof design	Local materials like wood, stone, and terracotta	Domed roofs with intricate jali patterns
Landscaping	Lush gardens with fountains and sculptures	Courtyard gardens with plants and flowers
Retained	<ul style="list-style-type: none"> • Traditions courtyard • Handcrafted tiles • Wood carvings 	<ul style="list-style-type: none"> • Arched vaults • Courtyard • Wooden entry door
Addition	<ul style="list-style-type: none"> • The extension's facade treatment is precisely matched with the architectural heritage by adding traditional part. • Swimming pool in courtyard • Modern amenities and conveniences 	<ul style="list-style-type: none"> • Second and third floor level • Columns • Mahbubani art in the ceiling • Updated facilities and infrastructure

Advantages	<ul style="list-style-type: none"> • Attracts business. • Extends life of the building • Increases land value. • Retains cultural values 	<ul style="list-style-type: none"> • Attracts business. • Extends life of the building • Increases land value
Challenges	<ul style="list-style-type: none"> • Finding skilled artisans • Balancing between traditional and modern needs 	<ul style="list-style-type: none"> • Without any plans or drawings, they had to develop a program. • Structural decay and restoration requirements

4. Conclusion

The conclusion for this study is that adaptive reuse of historic structures is essential for sustainable development and can have significant beneficial economic and social effects on society. The study aims to analyze the challenges and opportunities associated with adapting historic structures for contemporary usage, evaluate the benefits and challenges of adaptive reuse in historic buildings, identify innovative design strategies and technologies that can facilitate the transformation of historic buildings for modern use, and analyze regulatory frameworks and quality standards for adaptive reuse projects in historic buildings.

This research strives to offer strategies for the successful adaptive reuse of heritage buildings with minimum interferences in the existing forms, designs, and Interior elements.

It demonstrates that it is not only important to retain and restore them but also to adapt them to give them new uses that are like their original intents.

Adaptations for contemporary use have resulted in newer forms based on old forms but adapted for contemporary use. The research also emphasizes keeping the character of the current shape and space.

For instance, by adding insulation to the walls and double glazing to the windows, the original building envelope and window frame are improved and conserved. The use of contemporary materials in the new addition may be an updated version of the old; as a result, it preserves historical identity while also being a product of modern technology. This material preservation of elements maintains the original characteristics of a building. Finally, this process looks at long-term feasibility for a neighborhood; specifically, it proposes the transformation of uses for different building typologies.

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