

Architectural Design of Life

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Abstract—Since the beginning, nature has been a source of inspiration for man. Perspective of man for nature and architecture is witnessed in all forms of construction. Ancient civilizations are evidence of such derivation. Man has tried to incorporate its different forms, in his daily life. Vernacular Architecture mainly exhibited dominance, prosperity, culture and religion of India but it has been altered with series of examinations and implementations. Presently, we all are residing in a museum of architectural masterpieces. Artistic approach and its incorporation in designing have led us from caves to apartments and bungalows. Ranging from multi-storied buildings to urban establishment all require architectural planning. Even for nuances such as spacing of furniture, presence of sunlight, scope for ventilation, cleanliness of surrounding etc it is essential. Making something alive from inert materials is what architecture all about. For a layman architecture is merely related to beautification but truly its role can be identified in every form, utility and purpose. Besides art and aesthetics, architecturally designed buildings have an element of human touch which makes our life much pleasant and comfortable. The liveliness we experience after we enter a park, shopping mall, historical monument or our own living room is all because of efficient architectural efforts which reflect the vision of an architect. Imagine a place where all things appear similar, everything you taste is sweet, wouldn't that be monotonous? We have variety and balance because of introduction of art in our life. If a school and a theatre were to be designed in a similar way would someone ever go for a movie? The answer is obvious.

1. INTRODUCTION

From prehistoric times man realized the need of shelter for safety and security. Protection from climatic conditions, wild animals and other forces of nature has been a priority to him. Therefore he started residing in caves. But since caves were far away from rivers he started carving shelter along the bank of the river. Trees, bamboos, leaves etc. were used give strength to his home. With time he started using mud reinforced with husk to protect the walls which was followed by construction of floors. Thereafter used natural stones, gravels etc. and arranged them in the form of masonry. But problem arose when he saw mud getting washed away by rain. With experiments he discovered that mud bricks if burnt in fire were stronger and more resistant making structure much more stable and durable. And its use became much popular. Similarly by observing natural environment he adopted shapes that are naturally available such as curves from river waves, circle from sun, leaf's triangular shape and many more. With time the concepts of light and shades during different hours in

a day became clearer to him. Following this path of learning he gained knowledge about spacing as his hut or cave was not sufficient for him. So he built elongated huts to fulfill his requirements. But that too was not convenient as the dimensioning was not proper. Baffled with this he learned how to proportion the dimensions. This way by experiencing and incorporating the learning from those incidents man evolved in his early age and with no knowledge of what he is making he developed something. For making his own life comfortable he made modifications consecutively and mitigated troubles.

2. VERNACULAR ARCHITECTURE

Vernacular Architecture was influenced by local materials, needs of the local people, craftsmanship, rich diversity of India's climate, the intricate variations in local social customs, ideologies of rulers, culture and religion. It has been estimated that worldwide close to 90% of all building is vernacular, meaning that it is for daily use for ordinary, local people and built by local craftsmen. Due to the lack of proper planning, earlier designs lacked intuitiveness and efficient utilization of the resources. Indian vernacular architecture has evolved organically over time through the skillful craftsmanship of the local people.

2.1 Indian vernacular architecture

Architecture has bloomed from vernacular to modern. The architecture of India is rooted in its history, culture and religion. Indian architecture progressed with time and assimilated the many influences that came as a result of India's global discourse with other regions of the world throughout its millennia-old past. The architectural methods practiced in India are a result of examination and implementation of its established building traditions and outside cultural interactions. Table 1 gives the details of the architectural style adopted in history of Indian Architecture.

Table 1

S. No	Time Period	Salient Features
1.	The Indus Valley civilization (13300-1700BC)	*Cities built of brick, roadside drainage system, and multistoried houses. *The baths and toilet system. * The grid layout planning of the cities with roads at exact right angles.

2.	600BC-200AD	*Walled and moated cities with large gates and multi-storied buildings which consistently used arched windows and door. *Buddhist architecture blended with Roman architecture and Hellenistic architecture to give rise to unique blends—such as the Greco-Buddhist school.
3.	200 AD-1200AD	Grandeur of construction, beautiful sculptures, delicate carvings, high domes, gopuras and extensive courtyards were the features of temple architecture in India. Examples: the Lingaraj Temple at Bhubaneswar in Odisha, Sun Temple at Konark in Odisha.
4.	1100AD-1526AD (Vijayanagara Empire, Hoysala Empire)	*The temple architecture had elements of political authority. This imperial style of architecture and was adopted in administrative structures across the Deccan. *A feature of Hoysala temple architecture is its attention to detail and skilled craftsmanship. The temples of Belur and Halebidu are proposed UNESCO world heritage sites.
5.	1526AD-1857AD (Mughals)	*Mughal tombs of sandstone and marble show Persian influence. *The double dome, the recessed archway, white marble and parks while stressing on symmetry and detail was visible during the reign of Shah Jahan. *Quranic verses were described on the walls of the buildings. * Examples: Red Fort at Agra and the walled city of Fatehpur Sikri, Taj Mahal
6.	1615AD-1947AD (colonial rule)	*Architecture became an emblem of power, designed to endorse the patron. *The European colonizers created architecture that symbolized their mission of conquest, dedicated to the state or religion. *Indian villages consisted of clay and straw houses, later transformed into a metropolis of brick and stone. The Victoria Memorial in Calcutta is the most effective symbolism of British Empire, built as a monument in tribute to Queen Victoria's reign..

2.1.1 1947 AD—present

In recent times there has been a movement of population from rural areas to urban centers of industry, leading to price rise in property in various cities of India. Urban housing in India balances space constrictions and is aimed to serve the working class. Growing awareness of ecology has influenced architecture in India during modern times.

Climate responsive architecture has long been a feature of India's architecture but has been losing its significance as of late. Indian architecture reflects its various socio-cultural sensibilities which vary from region to region. Certain areas are traditionally held to be belonging to women. Villages in India have features such as courtyards, loggias, terraces and balconies. Calico, chintz, and palampore of Indian origin highlight the assimilation of Indian textiles in global interior design. Roshandans, which are skylights-cum-ventilators, are a common feature in Indian homes, especially in North India.

3. MODERN ARCHITECTURE

The concept of modernism is a central theme in the efforts of 20th century modern architecture. Gaining global popularity especially after the Second World War, architectural modernism was adopted by many architects and architectural educators, and continued as a dominant architectural style for institutional and corporate buildings into the 21st century.

Modern architecture is an amalgamation of art, guidelines, innovation, aesthetics, comfort, newer materials, economical and eco-friendly designing and planning. People too give preference to architecturally planned buildings as it has a scope of incorporating intuitiveness, aesthetic, comfort, privacy, innovation and safety. An architect considers all the possibilities while designing a building. Keeping in mind the function and purpose of the building along with its environmental impacts and most importantly the cost, he prepares a plan for the structure. Any building that is termed architecturally planned will certainly have cost parameter under control. Optimum utilization of resources would have occurred in all pieces of modern architecture which is the peak requirement of the world.

Modern architecture has the same power of attraction, what makes cities great increase in the number of tourists and turning cities into a new tourist attraction. The example that best describes this is Dubai, known worldwide as a Middle Eastern capital of extravagance.



Fig. 1

Examples of certain buildings of modern architecture are enlisted in Table 2.

S. No	Name of the structure	Its effects
1.)	Bosco Verticale (Vertical Forest shown in Figure1.)	Each tower houses trees between three and six meters which help mitigate smog and produce oxygen. It is also used to moderate temperatures in the building in the winter and summer.[9] The plants also attenuate noise.
2.)	Sydney Opera House shown in Figure2(by architect Jon Utzon)	The image that was created by unique performance of shell of the object became a global landmark in Sydney, but also symbol across Australia.



Fig. 2

3.1 Architecture as a source of information

Architecture was and is an expression of lifestyle and spirit of the times certain epochs and cultures in which it arise. Many cities throughout Europe (Paris, Rome, Athens, Venice, Amsterdam and many others) are an ideal example of how the spirit of an era, an era still lives through the architecture of buildings built in this period, based its entire tourist offer and its development just on the monuments culture in the field of architecture, but also on the cultural characteristics of the society belonging to an age when architecture was created. It can be said that the architecture in this case is source of information about the history and the element that identifies the city, nation, country.

4. BENEFITS OF ARCHITECTURAL PLANNING

In relation to buildings, architecture has to do with the planning, designing and constructing form, space and ambience that reflect functional, technical, social, environmental, and aesthetic considerations. It requires the creative manipulation and coordination of material, technology, light and shadow. Architecture also encompasses the pragmatic aspects of realizing buildings and structures, including scheduling, cost estimating and construction

administration. As documentation produced by architects, typically drawings, plans and technical specifications, architecture defines the structure and/or behavior of a building or any other kind of system that is to be or has been constructed.

Nowadays customized buildings are being built as per the requirements of the owner. People expect something new from the architect. Architect after doing certain inspection of the site prepares a plan according to certain guidelines stated by the government agencies, keeping in mind the form, function and purpose of the building. Drawing his ideas from nature he plans the planning such that liveliness in the building might prevail.

Architecturally planned buildings are flexible as scope for future expansion and construction is present. Another benefit is that units in such buildings are harmonious with each other as this form of designing is integrated and not discreet. Interior and exterior designing is also given importance because the building should be appealing to the user and viewer as well. Privacy, a primary requirement of an individual, is at the top of head while designing different rooms in the buildings. The essence of landscaping and sustainable construction is also added.

The cost of such construction can easily be altered by changing the traditional materials with cheaper and easily fabricated materials. Newer materials such as emulsion paints, wall putty, P.O.P etc are nowadays being used at high rate. People prefer tiles rather than mosaic and concrete floors as they are easily fixed and give good appearance

5. ADVANCES IN ARCHITECTURE

Architects were born from builders—men and women whose hands were so familiar with a technique and material that they pushed its limits and innovated to make their surroundings a little bit better. Some of those innovations or advancements changed the face of human history:

- Flexible materials that could be implemented in different environments were used the world over to form geometric spaces that protected, which allowed socialization and migration of culture and thought.
- Concrete and aggregate allowed burgeoning cultures to construct smooth and strong elements that were used to defend communities, build on permeable ground, and create permanent structures that we still can marvel at hundreds of years later.
- Steel was used to span distances that were considered impossible to spatially cross before. It also allowed great heights to be achieved, which resulted in sociological density.

While these may be material advancements, the only way they were executed was by careful planning, calculation, and design. Our forefathers and foremothers used everything they

had to convey these ideas and document them. They used rock walls, mud, tanned skins, papyrus, created special measuring tools, manufactured paper.

5.1 Technologies and Softwares

Today we can use the new technologies of BIM, environmental simulations, logistics virtual scheduling and construction software to fully realize a building's lifecycle. We can build before we build. We can communicate details and ideas across oceans in seconds. We can document and share conditions in real time. BIM takes CAD a step further by introducing collaboration, coordination, space planning, estimation, clash detection, and detailing. It also does four-dimensional (4D) modeling (which is 3D with time added) and 5D (which is 4D plus cost estimation). The technology of today is a paradigm shift because it is changing processes in addition to tools. Three of the biggest advancements that will impact us in the near future are:

- Social Virtual Cloud Environments
- Mobile Hardware
- Imaging and Visualization

Visualization of space is essential to understanding. We now have tools that can allow us to virtually walk through a space WHILE standing. We can PRINT 3D models of our designs. We can render our data rich models dynamically in a photorealistic manner using the latest GPU hardware and software.

There are softwares such as AUTOCAD, REVIT, STAAD.PRO for 2D and 3D drawing. These softwares can be used to produce a video in which a walkthrough can be obtained from several angles which helps the architect to analyse and predict how the building would appear from inside as well as outside.

5.1.1 STAAD or (STAAD.Pro)

It is a structural analysis and design computer program. It supports several steel, concrete and timber design codes. It can make use of various forms of analysis from the traditional 1st order static analysis, 2nd order p-delta analysis, geometric non linear analysis or a buckling analysis. It can also make use of various forms of dynamic analysis from modal extraction to time history and response spectrum analysis.

5.1.2. Autodesk Revit

It is building information modeling software for architects, structural engineers, MEP engineers, designers and contractors. It allows users to design a building and structure and its components in 3D, annotate the model with 2D drafting elements, and access building information from the building model's database. Revit is 4D BIM capable with tools to plan and track various stages in the building's lifecycle, from concept to construction and later demolition.

5.1.3. 3D Modelling

Planning innovation has been driven by the growth of smart cities. CyberCity3D (CC3D) is a geospatial-modeling innovator specializing in the production of smart 3D building models. It creates smart digital 3D buildings to help the architectural, engineering and construction sector visualize and communicate design and data with CC3D proprietary software. The models integrate with 3D geographic information system platforms, such as Autodesk and ESRI, and can stream 3D urban building data to Cesium's open architecture virtual 3D globe. It provides data for urban, energy, sustainability and design planning, and works in conjunction with many smart city SaaS platforms such as Cityzenith.

5.1.4. Modular Construction

Modular construction is increasingly popular where a building is constructed off-site using the same materials and designed to the same standards as conventional on-site construction. It limits environmental disruption, delivering components as and when needed, and turning construction into a logistics exercise. It also has strong sustainability benefits, from fewer vehicle movements to less waste. With up to 70 per cent of a building produced as components, it allows a move towards "just in time" manufacturing and delivery. In use in the United States and UK, Chinese developer Broad Sustainable Building recently completed a 57-storey skyscraper in 19 working days using this method.

5.1.5. Asset Mapping

Asset mapping focuses on operational equipment, including heating and air conditioning, lighting and security systems, collecting data from serial numbers, firmware, engineering notes of when it was installed and by whom, and combines the data in one place. The system can show engineers in real time on a map where the equipment needs to be installed and, once the assets are connected to the real-time system using the internet of things, these can be monitored via the web, app, and other remote devices and systems. It helps customers build databases of asset performance, which can assist in proactive building maintenance, and also reduce building procurement and insurance costs.

6. CONCLUSION

In order to achieve success, a sustainable project must be socially as well as economically sustainable. Such a project should communicate with its society, should attract and be inspiring, and over all must make economic sense. Architecture in terms of tourism is now an integral element of the planning of the city, whether it is of cultural heritage or contemporary architecture. When it comes to heritage, it is the architecture resulting in a particular context that is completely defined and therefore it is a testimony about history. In this sense, the architecture can become a brand that describes the

identity of certain social or cultural groups, and linked to the cultural and educational tourism. Although today in most cases this architecture is un-functional and hard switching to modern forms of construction works and the city life, it must be preserved and used in the planning of sustainable development of the city just as part of the tourism industry.

Architecture's role in civil works has shaped our lives and has made it comfortable. Living standards of people have been raised which ultimately results in healthy environment. With burgeoning need of digitization, construction and urban planning projects need for architects have gone up. **Make in India** plan of Govt. is focused on developing 'Smart cities in the country. At this point when we are talking about sustainable development the most fundamental requirement is to put up structures which fulfill their objective and at the same time go with the nature and sustain the population growth and land decreasing problems.

Modern architecture, unlike the architecture of cultural heritage, is viewed from the aspect of entertainment and spectacle, even if we talk about function of the structure, location or shape. Unusual and controversial form that uses all the benefits of modern technology certainly attracts the attention of visitors, but this is not always enough. Location which provides the context and function that brings the economic viability and the possibility of continued use of space is also one of the important factors for the transfer of a work of architecture in the branded product. Modern cities nowadays pay a great attention to precisely such projects, as drivers of further development and city expansion, as well as the region, in some cases and countries. Great architecture, not only that it promotes economic and social development, but it becomes a product that markets itself as a symbol that exceeds target group and everyone's must-see tourist destination.

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