

# Humanising Architecture through Innovations

Diagnosing the much needed discussion on Sustainability across various typologies and perspectives, this essay focuses on the idea of 'innovation' and 'transferability' or, in other words, scalable models, replicable technologies and alternate methods of construction.

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“It has been 40 years since the first oil-price crisis, 20 years since the inauguration of the term 'sustainable development' by the Brundtland Commission, and five years since the financial shock of 2008. What is the state of sustainable construction? The inconvenient truth is that, although a lot of things have been discussed, little has changed in the last 40 years about our everyday behaviour or the way we construct and operate buildings.”

– Hansjürg Leibundgut<sup>1</sup>

The call for an ecological way of life after the industrial revolution is perhaps one of the most impactful changes in the design attitudes and acumen the world over. Examining facts, theories, philosophies and practices from various perspectives, 'sustainability' today is more than a metaphor. It is about being functional and ecological, and yet not socially disconnected or contextually irrelevant. Innovative solutions to ecological problems do not just refer to mechanical solutions that look alien or are inappropriate within the climatic context of a region but just original approaches to design that yield better performances. It does not literally have to be a translation of Corbusier's statement that, "a home is a machine to live in", in a contemporary avatar. It also does not refer to systems or structures that act as an appendage and are exceedingly out of place. The parameters of contextualism, universally endorsed design principles, environmental performance and resource management, all hold true for buildings that respond to sustainability through innovations. But those built environments that display a peculiar or unique technological, systemic or methodological difference in approach from the conventional, are what we shall trace by means of this classification.

'Innovation and technology' is perhaps the most identifiable or perceivable attribute of sustainable architecture. In Juhani Pallasma's<sup>2</sup> words, "In fact, the purely visual understanding of the art of architecture may never in history have been more dominant than in today's architecture of the commercialised image, reinforced by the digital media and world-wide journalism. Even sustainability is most often judged by the eye as an aesthetic and symbolic aspiration rather than through an analysis of the actual performance." By 'innovation' we refer to breakthrough technologies, systems and methods of construction which can be implemented in order to reduce the ecological impact of a building. 'Transferability' is the adaptability/scalability of these innovations through bigger modules or more easily replicable elements, concepts, techniques and systems. Together 'innovation and transferability' can be classified into: (1) **Intelligent planning concepts**, (2) **Innovative systems and technologies**, and (3) **Alternate methods of construction**.



<sup>1</sup> Intelligent planning: The Kanchanjunga Apartments in Mumbai by Charles Correa Associates makes use of double-height balconies, a reinterpretation of verandahs, for a layered reading of space that creates comfortable living conditions in the units. (Image: courtesy Charles Correa Associates)

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Design decisions made at the inception, later define the entire ecological ethos of the building falling under the classification of **intelligent planning concepts**. Most of these design interventions are usually derivatives or adaptations of traditional wisdom which help reduce the energy consumption of buildings through passive methods. Kanchanjunga Apartments by Charles Correa Associates is an apt example of an architectural idea that was way ahead of its time. Kanchanjunga was a breakthrough in unconventional approaches to housing, revolutionary when it was built. It not only rearticulated the layered protectiveness of the verandahs, a post-colonial design influence, and double height balconies, an innovation of the architect, but also referred to an escalating urbanisation and the changing climatic conditions of the sprawling city of the then Bombay. “A building has to be rooted in the ground on which it is built” as Correa said in one of his recent lectures, planning itself can make a building viable for the environment it is built in.

Later examples of planning such as the Oberoi Udayvilas by Abhikram and the Islamic Study Centre by Yashwant Mistry also display forethought in innovation. While the former makes use of indigenous and traditional concepts like clustered planning with numerous interconnected courtyards and lime-based mortar and plaster instead of cement mortar for binding; combining a traditional style of architecture with modern functions, in not just the aesthetics but also the wisdom of designing passive climatically responsive systems, thus reducing the embodied and the consumed energy of the hotel; the latter uses structural principles in tandem with design such as the use of mortar-less brick vaults held by their own compressive strength, the use of semi-circular wind turrets for inlets regulating the ventilation and microclimate of the buildings through passive cooling and water moats which run around one of the structures for evaporative cooling. They both reduce the materials needed to run and maintain the structures thus effectively enhancing the economic and ecological performance of the building better than so-called 'advanced' buildings.

However, it is important at this juncture to understand that efficient and innovative planning alone cannot address the entire ecological responsibilities of a building. In most cases, including the above mentioned examples, intelligent planning works in tandem with innovative systems and technologies or alternate methods of construction in order to build upon what has already been achieved by planning. For instance the Pearl Academy of Fashion in Jaipur by Morphogenesis uses orientation to the sun, usage of a louvered façade based on shadow analysis, appropriate buffering of usable spaces through corridors and enveloping verandahs that cut off the heat transfer, circulation of natural air through self-shaded



† Intelligent planning: At The Pearl Academy of Fashion in Jaipur, by Morphogenesis, self-shading sliver courtyards keep the sun out and help regulate temperature and daylighting of the study areas. The perforated outer skin is derived from computational shadow analysis, based on the orientation of the façades. (Image: © Edmund Sumner)

sliver courtyards and staircases, for maintaining a healthy environment inside the institute. Similar projects that satisfy intelligent planning as well as innovative structural systems and technologies and combine the two to formulate buildings that sit lightly on the earth are the Healthcare Centre at Dharmapuri by Flying Elephant Studio and the Centre of Hope by Hundredhands which we shall elaborate in detail, further in the essay.

The working of built environment usually concerns **systems and services, the mechanical and technological parts of the building**. Over the past few decades, one has consistently seen a rise in the number of 'intelligent' and 'smart buildings' expanding to the scale of 'smart cities'. Townships and towers of intelligent 'boxes' eyewashing the buyers into 'green' properties in the real estate industry (commercial offices and housing), has become a common practice. Sadly, there is nothing 'smart' or 'intelligent' about any of these innovations except that they are slaves to technology and create spaces whose embodied energy and consumption for sustenance should rightfully discard them as rather unsophisticated and wasteful. They also make lazy users who think their stake in the entire debate goes just as far as snapping their fingers to switch of the lights or using 'less-water' urinals. They show no premise in design or original thought rather just replicate mindlessly, systems that are not sustainable in developing economies, aiming at making the quick buck. The economics of sustainability is perhaps the biggest detriment to most developing nations. It caters to the aspirational needs or the greed and thirst of the consumer who feels a misplaced sense of pride and sophistication in owning a property in one of the many 'greenest luxury towers of the world', with almost no background on the impact of their investments in wasteful designs or the word 'sustainability'. In 'Reinventing Technology Locally', Hansjurg Leibundgut articulates, "We have to accept the progress of technology, but we also need a new technological revolution, one based on local materials, manufacturing, and energy resources. There neither is a uniform global policy that will effectively achieve sustainable development, nor should such an approach exist for sustainable development." As architecture, as culture, sustainability has to mean different things in different countries. It cannot be as easy as creating systems that sense your presence to switch on the lights. It has to be more sensitive than that.

The problem also lies herein that **innovative systems and technologies** which truthfully address sustainable architecture have perhaps not evolved into a more 'transferable'

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† Intelligent Planning + Innovative Systems: The Primary Healthcare Centre at Dharmapuri by Flying Elephant Studio combines the universal design principle of favourable orientation with the subtle layering of spaces, providing a louvered verandah enveloping the inner building to buffer the heat and sun out. An inverted roof further helps collect rainwater. (Image: courtesy Flying Elephant Studios)

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form in India or other developing countries because of the constant tug-of-war between environmental needs and economic demands, but there have been sincere attempts in tackling the issue through brave interventions in giving comfortable and eco-friendly environments. The South Asian Human Rights Documentation Centre by Anagram Architects, with its efficient climate responsive planning like orientation to the site and the usage of the dynamic 'breathing thermal barrier', a twirling layered brick screen wall that modulates the protection from sun and heat and the permission of air to enter the building, testifies this classification. Because these innovations are usually not and cannot be implemented in projects of larger magnitude immediately, residential architecture is the playground for such explorations. A wide range of housing and habitat solutions have been recognised, of different scales and types, addressing the issues of sustainability, identifying with different regions of the country. The Shrujan Trust Building in Bhujodi by Indigo Architects, in the hot and dry West and the Murugan House by KSM architects in the humid and equatorial southern tip of the country respond to the different contexts of the regions but use a similar innovation in doing so – a wind tower/wind catcher. However, in both the cases the supplementary planning is opposite with the former creating horizontally spread out and open spaces with deeper courtyards and minimal windows/openings, and the latter creating a compact interior to cocooning the occupants from the heat. House by a River, in Karjat by ArchitectureBRIO, however, goes back to berm and hill architecture, embedded in the hilly slopes of Matheran, stably anchoring itself into the site and letting the landscape grow on it, merging with the ecology of the place. The housing developments of Good Earth are based on the idea of building ecologically sustainable and responsible dwellings for their clients. Like most of their projects, 'Elements' at Edapally in Kerala makes use of terrace gardens in the balcony of each apartment in order to regulate the microclimate of each dwelling unit and simultaneously control the external façade of the building that thus arises as a 'vertical green' housing, in a very literal translation of the term.

It is a common observation that the architecture of office buildings has somewhat been reduced to a play of façade and lighting design and repetition of a wrongly perceived 'sophisticated' glass façade that negates buildings into towering greenhouses. Unsuitable for our country, and more so because of the pretense of modernity put in front of the society, the fully transparent commercial and office towers devoid of sunshield act as solar collectors. The heat collected is then thrown out with air conditioning instead of any amount



↑ *Alternate Methods: The Samode Safari Lodge by Pradeep Sachdeva Design Associates adopts traditional vernacular systems of architecture from surrounding villages and combines this with a Ferrocement skin to reduce the brick and steel used for construction. (Image: courtesy Pradeep Sachdeva Design Associates)*

of evaporative or passive cooling, depending mostly on mechanical systems making these towers expensive and heavy. The export of these glass towers from the West to Asia, and especially the gulf countries is one of the most unhealthy and unsustainable developments of the last century. They consume far more energy and stand dumbly before the issues of environmental depletion.

However, office buildings like the KMC Corporate Office in Hyderabad by Rahul Mehrotra and Associates break this stereotype of office architecture. Its steel and glass structure with an RCC framework, uses a double layered façade, a cast aluminium trellis with creepers growing atop with integrated mist irrigation, and a dedicated group of twenty gardeners employed for the regular upkeep of the façade. The entire system effectively cools the building and shows environmental and economic responsiveness as well as innovation, a positive approach to sustenance which is congruent with the region. 321 Tardeo, by sP+a (Sameep Padora and Associates), incline towards a more visibly 'technological' form but essentially implement the same concept of vertical landscaping with a slight variation. 321 Tardeo uses a double layer again, creating planters on each level which cover the outer façade of the building allowing the greens to grow over a period of time and cover the façade with creepers. This will, as in most such cases, reduce the heat transmission into the interiors of the building helping in keeping it cool naturally. Contextually however, the KMC Office Building reads as better fit in its own surroundings nevertheless 321 Tardeo, cannot be disregarded because of its visual semblance to a universal image of green architecture based on technology; both do their part efficiently in introducing an innovation in office towers. On the flipside, passively cooled buildings such as the Torrent Research Centre in Ahmedabad also set a benchmark in innovative sustainable practices. The Torrent Research Centre has a detailed and complex designated ventilation system, using wind towers on a project of such a scale as opposed to niche residences. These towers work as a series of inlets for channelising air and reducing energy consumption to such an extent that over the period of the past thirteen years, the project has saved enough energy in order to breakeven its cost of construction and maintenance.

David Adjaye<sup>3</sup>, while authoring 're-placing art and architecture', talks about how architecture should be more radical. "Traditional architecture schooling often stresses the use of technology to develop new forms, instead of investigating the meaning of form in the time in which we live. This is a very defeatist approach, as it neglects the core purpose of architectural practice: Defining the question. There is a duality that exists – the balance between the philosophical ideas and the practical answers that architecture can offer. I propose that thinking, and the process of idea generation, is far more important that

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↑ *Alternate Methods: The Centre of Hope Orphanage in Chennai is located in the hot and humid equatorial climate of Chennai. It uses shaded terraces, filler slabs and brick vaulted roofing to build within a low budget and yet produce well-ventilated spaces. (Image: courtesy Hundredhands)*

perfecting a technique." It is critical to point out that 'innovation' is a word of much lure. Our sensory understanding of 'innovation' and sustainability may equate the two, but fact is that **innovation is a subset of technology** and not vice versa, because in today's day and age 'innovation for the sake of it' is really whimsical and unnecessary. Innovation, in terms of not just new unconventional techniques of using traditional materials, but also **alternate techniques that use unconventional materials**, is necessary as they encourage a new thought process in sustainable building construction. The Samode Safari Lodge by Pradeep Sachdeva Design Associates and the Centre of Hope by Hundredhands do the same using familiar materials but in inventive ways to produce architecture of value. While the former hospitality project uses local timber roof with a structural framework on which Ferro-cement skin is laid, cutting down on the overall steel and cement used; the latter uses vaulted brick roofing and filler slabs to reduce the cost of construction and maintenance and increase the efficiency of this relatively low-budget facility for an NGO. The Healthcare Centre at Dharmapuri by Flying Elephant Studio (Holcim Award for Sustainable Construction, 2011) was also designed in a low budget, with a small footprint as a double layered building, wherein an airy verandah running around the 'building within the building' in conjunction with orientation to the sun cools the interiors, and an inverted pitched roof with a central gutter collects rainwater. These examples illustrate successful **alternate techniques** using familiar materials; systems with which some improvisation can be replicated on to projects of diverse scales and in similar regions.

However, some **alternate construction methods** are still experimental and are restricted to projects of smaller scales because of issues of scalability and thus cannot be called 'transferable'. Nevertheless, it is critical to discuss them although they are not mainstream as yet, because of their potential with advancements in research and development. Stabilised earth blocks, compacted earth walls, bamboo posts and corrugated roofing sheets, bamboo prefabricated panels, thatch, terracotta hollow blocks and fly ash bricks are some alternate materials apart from recycled or reclaimed materials like wooden posts, panels, flooring, mosaics and tiles. The Anangpur Building Centre by Anil Laul is widely regarded as a work that made the paradigm shift towards exploring alternate methods of construction and successfully so, ahead of its time. Built with respect for the natural contours, the use of local stone and twisted brickwork, masonry built furniture, space frames, arches, domes and vaults as structural systems and a cohesive attempt for minimisation of construction material alongside an ecologically rational architecture, compel us to look towards it time and again and be inspired; as does the Manav Sadhna Activity Centre and Creche in Wadaj by Footprints E A R T H which ingeniously recycles municipal waste in order to create affordable



↑ Alternate Methods: The Inspiration Office in Kochi employs a composite system with RCC stilts, combining bamboo and concrete in structures and using ecological materials as much as possible in the moisture and bio-attack prone region of Kerala. (Image: courtesy Inspiration)

housing and address environmental pollution. Filler slabs using glass bottles, plastic bottles and bricks, stone slabs, cement bonded particle boards, clay tile covers and roofs and G I Sheets for roofing and many such recycled materials have been used to create an open campus used by the people as a community space.

With a more practice-centric approach to the discussion of sustainability let us consider **some practices that are dedicated to this exploration of alternate methods.** Mansaram, a Bengaluru-based firm, principally takes the approach of 'responsive creativity/creative responsiveness' as they term it, using bamboo as their main material for construction. The Earth House at Bengaluru built in stabilised earth blocks, corrugated bamboo sheets and solar panels on the sloping roofs and Bamboo Symphony, reinventing bamboo as crete walls from prefabricated panels alongside stabilised earth block walls and a green roof made of bamboo lattice grid on supports, substantiate this effort of using the 'house as a research project' and a functional one at that. Inspiration, a Kochi-based practice, among other initiatives, also looks at 'bamboo prefab' as a system of construction using a combination of prefabricated bamboo panels alongside minimal steel and concrete to replace parts of the structure with bamboo. The Inspiration Office building implements engineered bamboo construction as a predominant system is perhaps one of the largest successfully executed cluster of contemporary buildings in bamboo, although not entirely. To counteract moisture and bio-attack in the tropical rainforest climate of Kerala, the buildings are compelled to stand on RCC stilts for protection and longevity, nevertheless reducing the use of steel and cement by 70-80 per cent and its own self-load by 50 per cent.

Peter Buchanan<sup>4</sup> in his compelling campaign 'The Big Rethink' for The Architectural Review says, "Much very good architecture is being produced in the pursuits of the green agenda. But the common flaw in this work is that it focuses on objective issues such as ecology and technology; it does not yet give due emphasis to the subjective dimensions of psychology and culture." While this may hold true in the context of the industrialised western world, I would like to add to the same by elaborating that in India, most good or 'sensible' architecture

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↑ Alternate Methods: The Anangpur Building Centre has time and again been a source of inspiration for site planning and architecture that blends with the ecology of its site. The recycling of materials and alternate construction techniques like vaults, domes and arches rationalise the use and reuse of such architecture. (Image: courtesy Anangpur Building Centre)



↑ Alternate Methods: The Manav Sadhna Activity Centre embodies experimentation in sustainable architecture, using municipal waste to create filler slabs and walls, scientifically tested to be eco-friendly, providing economical solutions. (Image: courtesy Footprints E A R T H)

already rides on the merits of being psychologically and culturally conversant, but the quantifiable or measurable aspects such as energy consumption and life cycle costs are what differentiate all 'sensible' architecture from 'sustainable' architecture. Innovations alone cannot solve the issue as they have to be replicable and scalable, but can be used in tandem with all the other criteria of sustainability, in order to mitigate ecological concerns of the inherently 'messy' act of building. Though many may argue that sustainability cannot merely have an aesthetic or visual identity and this is a result of technology which has type-casted sustainable architecture to 'look' a certain way, and that is undoubtedly true, the fact that practical and sensibly designed technologies, systems, methods, materials and alternatives transform architecture measurably, needs to be regarded as well. ■

#### References:

1. Leibundgut, H (2014). *The Economy of Sustainable Construction*. Ruby Press, Berlin.
2. Pallasma, J. *Architecture and the Human Nature - searching for a sustainable metaphor*. Helsinki.
3. Adjaye, D (2012). *Authoring: Re-placing Art and Architecture*. Lars Muller Publications, Switzerland.
4. Buchanan, P (2011). *The Big Rethink Part 1: Towards a Complete Architecture*. The Architectural Review.