

Role of minimalist design in housing affordability case example: Chandigarh. Papal del diseño minimalista en el ejemplo de caso de asequibilidad de la vivienda: Chandigarh

Asees Prab¹, Ambuj Kumar², Parminder Kaur³, Prateek Dhasmana⁴

1-Assistant Professor, Amity School of Architecture and Planning, Amity University, Punjab, India
email: aseesprab10@gmail.com

2- Director, Chitkara School of Planning & Architecture, Chitkara University, Punjab, India
email: ambuj.kumar@chitkara.edu.in

3- Associate Professor, Chitkara School of Planning & Architecture, Chitkara University, Punjab, India
email: parminder.kaur@chitkara.edu.in

4- Assistant Professor, Chitkara School of Planning & Architecture, Chitkara University, Punjab, India
email: prateek.dhasmana@chitkara.edu.in

ABSTRACT

The paper postulates upon the constitutional (physical) features of minimalistic style of architecture in two diversified typologies of affordable housing in Chandigarh- modern and contemporary. Furthermore, it assesses the efficiency of the physical manifestation of minimalism in tandem with its operational efficiency based on a set rubric of parameters. The survey of the mentioned typologies reveals that the modern government housing excels in delivering aesthetic appeal, functional capacity, thermal control, and affordability within the set principles of minimalism, whereas the contemporary CHB affordable housing, though functionally efficient, lacks in aesthetic appeal and tasteful application of minimalism. Therefore, the research establishes minimalism as a plausible approach to planning and design of cheap dwellings, thus, providing a new perspective to the typical sense of affordable housing. The attempt to connect the two worlds- affordable housing and minimalistic architecture- in a pragmatic manner shall open new avenues of research on diversified sites and scales.

Keywords: affordable housing, minimalism, architecture, affordability, sustainability.

RESUMEN

El documento postula sobre las características constitucionales (físicas) del estilo minimalista de la arquitectura en dos tipologías diversificadas de vivienda asequible en Chandigarh: moderna y contemporánea. Además, evalúa la eficiencia de la manifestación física del minimalismo junto con su eficiencia operativa en función de una rúbrica establecida de parámetros. El estudio de las tipologías mencionadas revela que la vivienda gubernamental moderna se destaca por brindar atractivo estético, capacidad funcional, control térmico y asequibilidad dentro de los principios establecidos del minimalismo, mientras que la vivienda asequible CHB contemporánea, aunque funcionalmente eficiente, carece de atractivo estético y buen gusto. Aplicación del minimalismo. Por lo tanto, la investigación establece el minimalismo como un enfoque plausible para la planificación y el diseño de viviendas económicas, brindando así una nueva perspectiva al sentido típico de vivienda asequible. El intento de conectar los dos mundos -vivienda asequible y arquitectura minimalista- de manera pragmática abrirá nuevas vías de investigación en sitios y escalas diversificadas.

Palabras clave: vivienda asequible, minimalismo, arquitectura, asequibilidad, sostenibilidad.

INTRODUCTION

The pressing requirement for adequate housing is a global issue which is more dominant in urban areas of developing countries (Paris 2007). It is particularly more alarming in densely populated cities with rapid population growth (Tighe 2010). It is a measure of the present shortfall in livable conditions, marking the number of households that do not have access to satisfactory living conditions (Jaycox 1977). In India, the economically weaker section (EWS) includes households that have an annual income up to Rs. 3,00,000 (Rupees Three Lakhs), while the Low-Income Group (LIG) entails households that have an annual income between Rs.3,00,001 (Rupees Three Lakhs One) up to Rs.6,00,000 (Rupees Six Lakhs) (Mohua, 2017). Customarily, affordable housing and quality living of the marginalized people has been evaluated in isolation (Salama 2011). The process of supply of shelter at the minimum possible rates needs to be supplemented with better functional living environment for these people. In order to improve the approach of affordable housing construction and supply, it is important to have a better knowledge of the end users (Singh 2018). The preceding arguments call for a holistic and trans-disciplinarily data base, including social, economic, technical, aesthetic and design aspects (Salama 2007). Resultantly, the area of the study consists of the evaluation of the concept of 'minimalism' as a medium to achieve efficiency in building design and cost reduction in the construction of housing. The research explores the aesthetically, functionally and socially relevant design scheme for marginalized population in an urban context, through minimalism, to provide suitable microenvironment.

The concept of architectural minimalism has a wider abstraction than mere pruning of ornamentation and simplification of spatial arrangement (Nikolic & Vasilski 2018). It is distinguished by attributes of geometric authoritarianism, simple and effective materiality, purity in expression, functional efficiency and generally monochromatic clean surfaces (Vasilski 2016). The style imparts openness, order, homogeneity and harmony to the otherwise cluttered and 'visually noisy' built environment, both interior and exterior (Cerver 1997). In addition to the geometry, it is also the color, texture, light and scale of the form and space that gives the quintessence of minimalism in architecture (Qudwa 2017).

Besides setting a certain visual expression, minimalist architecture greatly helps in economization of the building through application of appropriate materials and filtration of functional requirements (Gudkova & Gudkov 2015). Therefore, the application of minimalistic design principles, in domestic architecture, enables creation of unique solutions for affordable housing by including simplistic components that decrease the construction and maintenance cost while upgrading the living conditions (Zabruskova et al. 2021). The inclination to the employment of straight lines and pure shapes, monochromatic color scheme, clutter-free surfaces could be considered as paraenesis of the industrial design, modular fabrication and mass production (Nikolic & Vasilski 2018). Minimalistic housing characteristically includes multifunctionality and flexibility, where a single space caters to multiple activities at different times, leading to utmost utilization and purposeful arrangement of space (Wong 2018). Additionally, the elementary and rectangular volumes ensure economical construction and energy saving, leading to better indoor climate, leading to minimal energy consumption and optimum comfort (Vasilski & Stevovic 2019). Furthermore, compact installation of furnishings and services within the residence can address the budgetary constraints of affordable housing (Zabruskova et al. 2021).

MATERIAL AND METHODS

The study is a compound of two features: minimalism and affordability. The research exercises qualitative and comparative method to evaluate the contribution of minimalism design principles on housing affordability in an urban scenario. Identified framework of parameters of minimalistic design (constitutional and operational), derived from the literature study, has been devised to assess its influence on affordability of a housing unit. The investigation of design constitution of the housing is driven by geometrical form, spatial arrangement, façade composition, color

courtyards and terraces, and keeping the circulation areas to a minimum. Interestingly, though physically rigid in design, the houses (owing to the thermal control mechanism and building setbacks) are flexible in nature and allow themselves to expand and contract with the change in the seasons. Through cold evenings in winters, the design of the building envelope enables the occupants to stay warm within the limits of the house, making the house look inwards. Contrarily, during warm evenings in summers, the living spaces spill over the boundary walls, reshaping into urban living rooms, enabling social engagement for the occupants with the outside, thus dilating the house outwards. As a substantial variation from traditional residences which are enclosed by elongated and deep *verandahs*, Jeanneret completely obliterated these threshold spaces in affordable housing. He argued that the *verandahs* were a costly alternative measure for climate control, equivalent to the construction cost of a standard room and resultantly delivering interiors that were dark and dingy (Joshi, 1999). Furthermore, limited fenestration (through small openings and vertical windows) was added to cut down on the cost of lintel construction and glazing installation.

With time, the population explosion and rural to urban migration caused a shortage of housing in the city, resulting in property prices rising beyond the capacity of lower income groups. Therefore, the marginalized population was pushed to thrive in cheap accommodations in the urban villages, as the authorities bought time to prepare a more permanent housing arrangement. Several pockets in the city were developed as formal affordable housing especially in sectors 15, 38 (W), 41, 47, 49 and 52 for the LIG at nominal charges. These apartments were produced for ownership purposes only. The recently developed affordable housing by the Chandigarh Housing Board was inspired by the existing minimalistic example of Corbusier's work as well. Resultantly, other than the traditional and incremental housing in the urban villages, the city comprises of two formal typologies of affordable housing- the modern and the contemporary, where the modern affordable housing became a prototype for shaping the newly constructed affordable Chandigarh Housing Board units. While the modern housing was provided to the people based on their designation at their respective offices, the CHB houses were provided based on the economic condition of the people. The government housing is provided to the occupants only for the duration of their service to the government. In contrast, the CHB apartments are sold to families with income within the range of EWS or LIG.

The geometry of the government and CHB housing is ordered regulated and synchronized. Both the accommodations impart a spacious, yet economical utilization of the area. However, the contrast can also be seen in the façade compositions of the two typologies. Between the government and the CHB affordable housing, the modern architecture maintains creativity and visual interest while the contemporary form of design looks oversimplistic and monotonous. The concept of minimalism (whether intentional or incidental) is maintained in the planned affordable housing through subtle color schemes.

Additionally, internal, and external furnishings of the modern housing incorporated concrete benches, in-built niches and various other installations that further strengthened the minimalistic design of the habitable spaces, which seem to be missing in the other typology. In continuation, the materials and construction techniques of the contemporary planned housing projects impart the quality of minimalism through homogenous engineering and construction, thus opening the discussion for modular fabrication.

Based on the set parameters, the operational efficiency and affordability of the residences can be assessed. As per Table 1, the modern government housing excels in delivering aesthetic appeal, functional capacity, thermal control, and affordability within the set principles of minimalism. The contemporary CHB affordable housing, though functionally efficient, lacks in aesthetic appeal and tasteful application of minimalism.

Table 1: Evaluation of Constitutional and Operational framework of the specified dwelling typologies in Chandigarh.

		Government Affordable Housing	Contemporary Affordable Housing
Primary Information	Nomenclature	House Type 14-D, 14-J (SS), 14-J (DS)	Chandigarh Housing Board Affordable Housing
	Plot Area	72-83 square meters	40 square meters
	Location	Sectors 7, 11, 15, 19, 20, 24	Maloya, Dhanas, Ramdarbar, Mauli Jagran, Sectors 38 (W), 41, 47, 49, 52
Constitutional Parameters	Geometry	Ordered	Ordered
	Spatial Arrangement	Compact ; Guided	Compact ; Guided
	Façade Composition	Composed ; Unimposing ; Humble	Featureless ; Monumental
	Colour Palette	Grey, white and hues of red	Mostly grey
	Furnishings	Embedded ; Permanent	Indefinite ; Changeable
	Materiality	Brick, concrete and white plaster and terrazzo flooring	Concrete blocks with pre-fabricated economical materials
	Construction Techniques	Onsite ; Mass production	Onsite ; Mass production
Operational Parameters	Visual Expression (Exteriors and Interiors)	Simple ; Modest ; Homogeneous ; Monochromatic	Simple ; Modest ; Homogeneous ; Monochromatic (Exteriors) and Multicolored (Interiors)
	Aesthetic Appeal	Pleasing	Unpleasant
	Multifunctionality of Spaces	Achieved	Not achieved
	Thermal Comfort	Attained	Partially attained
	Style of Design	Minimalism	Minimalism

DISCUSSION

In sync with the modern housing, the planned affordable housing in Chandigarh reflects minimalism through its simplistic design, clean geometric forms, and flexible internal spaces. The materials, construction members, furnishings and colors used are also minimized. The outcome displays profusion of functional efficiency in terms of thermal comfort, multifunctionality of spaces and overall aesthetic appeal in the built form, especially in the modern government affordable housing. The application of principles of minimalism in low-income housing has manifested out of need, rather than just for beatification and synchronization of the collective composition. Additionally, the proposition of minimalistic design imparts a decorum in the architecture that is not just conceptual in its meaning but relies on rationale of economization.

The constitutional and operational aspects of minimalism have been highlighted in the paper, not as a remake of minimalism, but as reevaluation of its principles in the light of affordability. Therefore, the set rubric of parameters amalgamates into reflecting an innovative style of minimalistic and affordable architecture. The role of minimalism

on affordability is depicted through figure 2. The overlap in the factors (geometry, spatial arrangement, façade composition, furnishings, materiality, and construction techniques) driving minimalism and affordability, establishes a close connection between the two. Therefore, the research establishes that minimalism can be one of the viable and crucial approaches for design of cheap dwellings, providing a new perspective to the typical sense of affordable housing. The research adds value to the comprehension of the space allocated to habitation, making them both appealing and affordable. The attempt to connect the two worlds- affordable housing and minimalistic architecture- in a pragmatic manner shall open new avenues of research on diversified sites and scales.

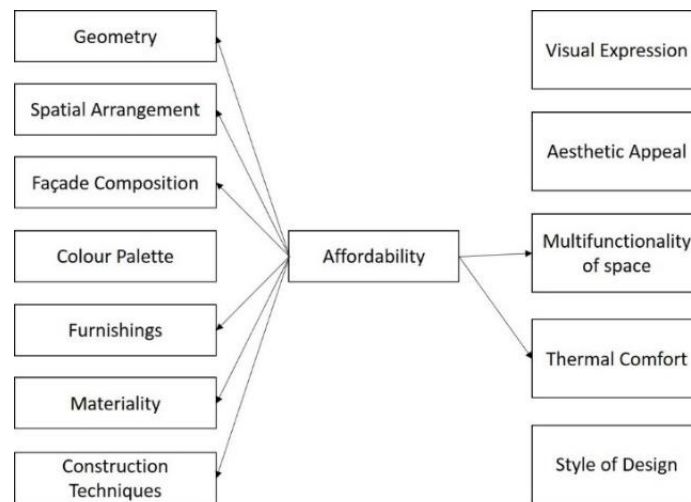


Figure 2: Dependency of Affordability on elements of Minimalism

REFERENCES

- Al Qudwa, S. 2017. Aesthetic Value of Minimalist Architecture in Gaza. *Contemporary Aesthetics (Journal Archive)* 15(1): 14.
- Bahga,S., and Bahga, S. 2000. *Le Corbusier and Pierre Jeanneret: Footprints on the Sands of Indian Architecture*, Galgotia Publishing Company, New Delhi. p.127.
- Cerver, A.1997. *Architecture of Minimalism*, Hearst Books International, New York.
- Gudkova, T. V., & Gudkov, A. A. 2015. Representation of elite values of the modern society in minimalist living architectural space. *Indian Journal of Science and Technology* 8(10): 1-7.
- Joshi, K.1999. *Documenting Chandigarh: The Indian Architecture of Pierre Jeanneret, Edwin Maxwell Fry and Jane Beverly Drew*, Mapin Publishing Pvt. Ltd., Ahmedabad.p.43.
- Jaycox, E. V. 1977. Housing the poor: The task ahead in developing countries. *Urban Ecology* 2(4): 305-325.
- Ministry of Housing & Urban Poverty Alleviation Government of India, Pradhan Mantri Awas Yojana (Urban)–Housing for All, 2017. <https://mohua.gov.in>

Sustainability, Agri, Food and Environmental Research, (ISSN: 0719-3726), 11(X), 2023:

<http://dx.doi.org/10.7770/safer.v11i1.2963>

Nikolic, M., & Vasilski, D. 2018. Minimalism in contemporary architecture as one of the most usable aesthetically-functional patterns. *Facta Universitatis, Series: Architecture and Civil Engineering* 15(3): 333-345.

Paris, C. 2007. International perspectives on planning and affordable housing. *Housing studies* 22(1): 1-9.

Singh, J. P. 2018. Chandigarh's Experiment with Affordable Housing. In *Urbanization Challenges in Emerging Economies: Energy and Water Infrastructure; Transportation Infrastructure; and Planning and Financing*. Reston, VA: American Society of Civil Engineers.388-394.

Salama, A. M. 2011. Trans-disciplinary knowledge for affordable housing. *Open House International*. 36(3).

Salama, A. M. 2007. Contemporary Qatari Architecture as an Open Textbook. *Archnet-IJAR: International Journal of Architectural Research* 1(3):101-114.

Tighe, J. R. 2010. Public opinion and affordable housing: A review of the literature. *Journal of Planning Literature* 25(1):3-17.

Vasilski, D. 2016. On minimalism in architecture-space as experience. *Spatium*. 61-66.

Vasilski, D., & Stevovic, S., 2019. in *Cities 3.0, Strategies, Concepts and Technol. for Planning the Urban Future, Tagungsband Proceedings*.

Wong, L. 2018. Tiny affordable housing in Hong Kong. *Indoor and Built Environment* 27(9): 1159-1161.

Zabruskova et.al 2021. Formation of the actual typology of urban multi-apartment dwelling based on the principles of minimalism and autonomy of residential complexes. *EDP Sciences*. In *E3S Web of Conferences*.274: 01039.

Received: 20th October 2022; Accepted: 20th October 2022; First distribution: 29th October 2022.

Note: special edition procedure.