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INFLUENCE OF MODERNISM ON POST-INDEPENDENCE INDIAN ARCHITECTURE

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ABSTRACT

The modern architecture, which was conceived as a reaction to the chaos and eclecticism of the earlier 19th century was taking its shape in the late 19th century and earlier 20th century. The exact timeline in which the modern movement in architecture started in the world cannot be described with precision. But 'Modern architecture' had its origin in the developments of the late 18th century with major thrust on the idea of progress. This movement of modern architecture in India started quite late in the first half of 20th century. Its development in India started with the isolated efforts of some foreign architects' works. But the movement gained momentum only after the arrival of foreign trained Indian architects with imbibed policy of modernism in their mind. Final thrust to this movement was given by the political patronage bestowed upon the idea of modernism by the then Prime Minister Pt. Jawahar Lal Nehru, when he invited Swiss born French architect Le Corbusier to design the state capital city of Chandigarh. This paper delves upon the Influence of Modern architecture of these foreign architects built in India on the Post independence Indian architecture.

Keywords: Le Corbusier, Modernism, Modern Architecture

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1. INTRODUCTION

The birth and development of modern architecture in the world started in the late 18th century. The movement had origin in the idea of progress with contribution of number of developments that had taken place simultaneously such as loss of confidence in the renaissance tradition and theories supporting it, industrial revolution, advent of new construction techniques, prefabrication and standardization. All these developments not only lead to new set of problems, but also suggested new ways of handling it with stress on utilitarian basis of architecture, away from revivalism and eclecticism (Lang, 2002). Further boost to the movement was given by engineering, which gave the know-how of using new materials, simplicity of line & honesty of expression. In India, the origin and flourishment of modern architecture was not a natural process of architectural evolution, as in the case of west. Its advent & development in India got delayed

because of Britishers dominance and their policy of using pompous classical style for the politics of representation over simplicity, utility and unembellished structures of James Ransome, the first appointed consulting British architect to government of India and a propagator of Modernism (Scriver et al., 2015). The movement took off in India gradually in the first half of 20th century with the arrival of foreign trained Indian architects such as Achyut P. Kanvinde, Habib Rahman, Piloo Mody, Durga Bajpai, Gautam Sarabhai & Gira Sarabhai. It gained momentum with the arrival of Le Corbusier, Pierre Jeanerette, Jane B Drew & Maxwell Fry and later Allen joseph Stein & Louis I Kahn.

2. POST INDEPENDENCE INDIAN ARCHITECTURE

The architectural evolution of post-independence India represents a dynamic narrative of transformation reflecting the nation's journey from colonial legacies to a modern identity shaped by both local and global influences. Since gaining independence in 1947, Indian architecture has undergone a profound metamorphosis characterized by distinct phases that encapsulate shifting aesthetic values and technological advancements. In the immediate aftermath of independence, the architectural landscape was significantly influenced by Modernism, a movement that championed functionality, simplicity and the integration of new technologies (Serenyi,1985). This period was marked by a conscious effort to break away from traditional colonial styles and establish a new architectural identity that resonated with the ideals of a newly sovereign nation. A notable example of this modernist approach is the design of Chandigarh by Le Corbusier, whose work introduced a formal and functionalist aesthetic that laid the groundwork for future architectural endeavors in India. His architecture represented a departure from the past and signified a new direction in Indian architecture. This new direction of Indian architecture was characterized by a new architectural vocabulary of free-flowing plan with use of reinforced concrete frame structures, purity of form, orthogonal massing, independence of facade from structure for expressionism, simplicity of line, honesty of expression, horizontal strip windows from end to end of building, roof garden, brise-soleil and unembellished facades i.e. exclusion of superfluous and decorative elements (Lang et al., 1997). Kahn's arrival, a decade later, taught Indian architects' sensitivity to handle material and light along with orchestration of composition of open spaces. The sixties and the seventies witnessed the flourishment of Indian architecture nurtured by this foreign master architects' architecture. The architectural style which emerged became synonymous with the architectural vocabulary given by these foreign masters, which included purity of form, honesty of expression, simplicity of line, monochromatic expression and monumentality in expression at a few occasions.

3. INFLUENCE OF MODERNISM

In this study, to find out the influence of Modernism on Post-independence Indian architecture was carried out by doing case studies of twenty-one works of foreign masters of modernism in India. On the basis of these case studies, elements of modern architecture were identified and categorized in five broad categories, namely, Form, Planning, Structure system, architectural expression and elements & details. These broad categories are further sub-categorized as follows

1) Form

- F1 Simplicity of Form

- F2 Purity of Form
- F3 Orthogonal Massing
- F4 Sculpturesque Form
- F5 Form as an Expression of function

2) Planning

- P1 Free plan
- P2 Functional flexibility

3) Structure System

- S1 Free façade
- S2 Framed structure
- S3 Projecting horizontal planes

4) Architectural Expression

- E1 Unembellished facades
- E2 Geometrical planar facades
- E3 Simplicity of line
- E4 Straightness of skyline
- E5 Exposed brick / raw concrete finish
- E6 Brise – Soleil
- E7 Honesty of Expression
- E8 Freedom of Expression
- E9 Monochromatic Expression
- E10 Presence of Sculpturesque elements on roof/façade
- E11 Surface texture
- E12 Visual weight
- E13 Monumentality in Expression
- E14 Presence of pilotis

5) Elements and Details

- D1 Roof Garden/Activity area
- D2 Ribbon windows
- D3 Corner Windows
- D4 Crispy cut window openings
- D5 Free standing sculpturesque Staircase / Ramp
- D6 Rainwater spouts
- D7 Presence of roof elements
- D8 Sculpturesque entrance

Then, to see the influence of the architecture of these foreign master architects in Indian architects' architecture in the post-independence era, twenty-seven works of fifteen Indian architects built in the post-independence era were studied and analyzed with reference to architecture of works of foreign architects and identified elements. These works were selected based upon the literature review and majority of the works included were of Indian architects who were associated with foreign

masters during their Indian commission. The whole study represents a section of the entire scenario a microcosmic picture to represent post-independence Indian architecture.

4. FINDINGS AND DISCUSSION

The analysis is done by testing the significance of variation in mean scores of buildings of both the groups under the components of overall architecture, form, planning, structure system, architectural expression and elements & details, using two-tailed independent samples t-test through SPSS (version 21) software. T-test is used as it is an ideal tool to test significance of difference between means of two samples. In addition, the reason to use two tailed test is that the variation in the architecture of native architects in comparison to their foreign counterparts could be either positive or negative. Thus, in a two-tail test, the rejection region is located in both the tails. Further, size of variation is calculated using eta squared test.

The abbreviations used with their significance and methods of interpreting results are mentioned below:

N	-	Number of buildings
M	-	Mean of the group
S.D.	-	Standard deviation of the group
t	-	value of 't'
p	-	Significance (2-tailed)
eta squared	-	Size of variation
Percentage variation	-	eta squared X 100

- If the value of 'p' is equal or less than 0.05, then there is a significant difference in the mean scores of the two groups.
- If the value is above 0.05 (e.g. 0.06, 0.10), there is no significant difference between the two groups.

To know the size of variation between both the groups in percentage, eta squared is multiplied with 100.

4.1. STATISTICAL ANALYSIS

This section discusses the statistically analyzed results of the study of forty-eight projects (Twenty-one of foreign master architects and twenty-seven of Indian architects), the selection criteria of which has already been stated. The analysis is done on Influence on Post-independence Indian architecture (1950-80). The influence of architecture of works of foreign master architects in India on the architecture of Indian architects' works built within 30-35 years post-independence, has been studied under the following components. The component wise analysis is carried out to find the Influence on-

- Overall architecture
- Form
- Planning
- Structure system
- Architectural Expression
- Elements & Details

4.1.1. OVERALL ARCHITECTURE

An independent samples t-test was conducted to evaluate the influence of architecture of foreign architects' works on architecture of Indian architects' works. There was no significant difference in scores for foreign master architects' buildings (M=103.76, S.D=16.44) and Indian architects' buildings; [(M=95.33, S.D=17.12); t(46)=1.721, p=0.092]. The magnitude of the difference in the means was very small (eta squared = 0.061, **percentage variation= 6.1%).** (**Figure 1**)

Figure 1

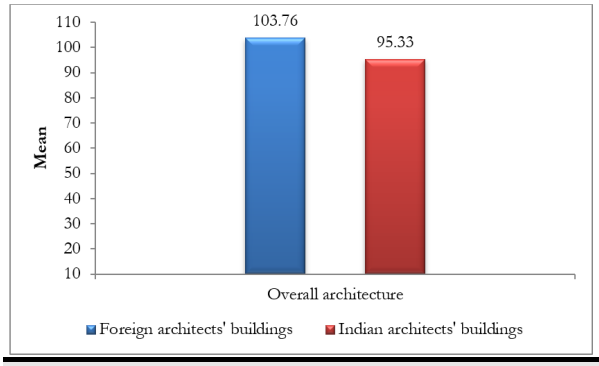

Figure 1 Variation of Means in Overall Architecture (1950-80)

The result shows that there was negligible difference in the architecture of foreign architects' works and architecture of Indian architects' works. It means that there was a strong influence on the architecture of Indian architects' works. Though, the statistical analysis of such type was conducted for the first time to find out the influence, yet some of the architectural critics' theoretical findings support our results. The supportive theoretical findings are given below.

The most profound foreign influence on India's search for a new architecture during the early years of independence came from the Swiss-born Frenchman, Le Corbusier and his colleagues Pierre Jeannneret and the two British architects, Maxwell Fry and Jane B Drew. Kahn's influence on the Indian architectural scene occurred in much the same way as Le Corbusier and his colleagues (Lang, 2002).

Exposure to the work of Le Corbusier, Kahn, Pierre Jeanneret, Maxwell Fry and Jane B Drew lead to emergence of a new period of architectural work in India that was highly influenced by these masters (Lang et al., 1997).

Still, there was a variation of 6.1% in the architecture of Indian architects works in comparison to foreign architects' architecture. In order to find out the reason for this change and which major component led to it, a component wise statistical analysis was done. The results of which are as follows-

4.1.2. FORM OF BUILDINGS

An independent samples t-test was conducted to evaluate the influence of form of buildings of foreign masters' architects on the form of buildings of Indian architects. There was no significant difference in scores for foreign master architects' building (M=20.57, SD=1.91) and for Indian architects' buildings [(M=20.04 S.D.=1.4); t(46)=1.118,p =0.269]. The differences in the means was very small (eta squared = 0.026, **percentage variation = 2.6%). (Figure 2)**

Figure 2

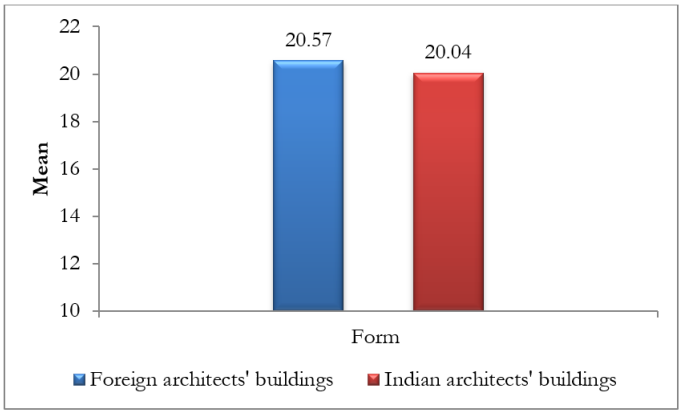

Figure 2 Variation of Means in Form of Buildings

4.1.3. PLANNING OF BUILDINGS

An independent samples t-test was conducted to evaluate the influence of planning of buildings of foreign master architects on the planning of buildings of Indian architects. There was no significant difference in scores for foreign master architects' buildings (M=6.62, S.D. =3.21) and for Indian architects' buildings [(M=6.19, S.D. =2.76); t (46)=0.503,p=0.618]. The magnitude of difference in the means was very small (eta squared = 0.005, **percentage variation = 0.5%). (Figure 3)**

Figure 3

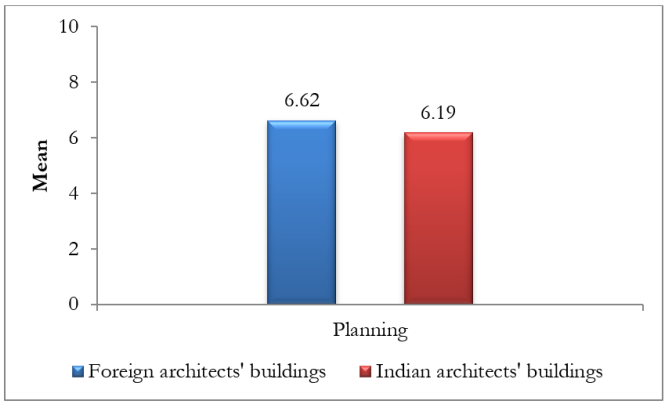

Figure 3 Variation of Means in Planning of Buildings

4.1.4. STRUCTURE SYSTEM OF BUILDINGS

Similarly, an independent samples t-test was conducted to evaluate the influence of structure system of buildings of foreign master architects on the structure system of buildings of Indian architects and there was no significant difference in scores for foreign master architects' buildings (M=10.24, S.D. =3.7)and for Indian architects' buildings [(M=9.19, S.D. =4.25); t (46)=0.90, p=0.373]. The magnitude of difference in the means was very small (eta squared = 0.017, **percentage variation = 1.7%). (Figure 4)**

Figure 4

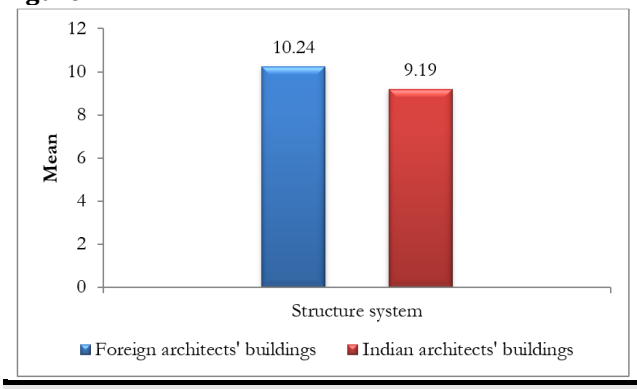

Figure 4 Variation of Means in Structure System of Buildings

4.1.5. ARCHITECTURAL EXPRESSION OF BUILDINGS

The influence of architectural expression of buildings of foreign master architects on the architectural expression of the buildings of Indian architects was evaluated with an independent samples t-test. There was no significant difference in scores for foreign master architects' buildings (M=51.67, S.D. =8.28)and for Indian architects' buildings [(M=49.33, S.D. =8.03); t (46)=0.985, p=0.330]. The magnitude of difference in the means was very small (eta squared = 0.021, **percentage variation = 2.1%). (Figure 5)**

Figure 5

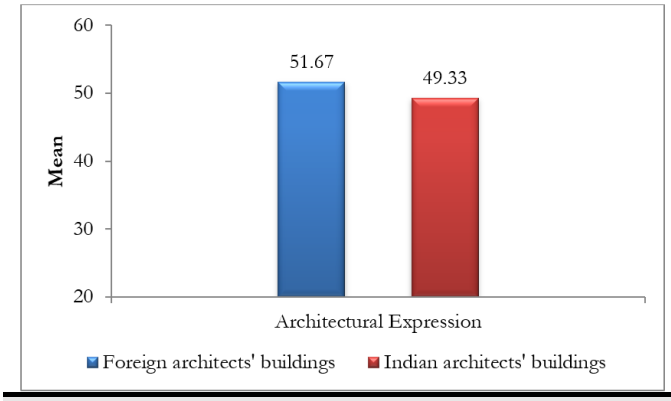

Figure 5 Variation of Means in Architectural Expression of Buildings

4.1.6. ELEMENTS & DETAILS OF BUILDINGS

Evaluation of the influence of elements & details in foreign master's architects' buildings on elements & details in Indian architects' buildings was done by an independent samples t-test which revealed a significant difference in scores of foreign master architects' buildings (M=14.67, S.D.=6.08) and of Indian architects' buildings[(M=10.59, S.D. =6.05); t (46)=2.309, p=0.025]. The magnitude of the difference in the means was moderately small (eta squared = 0.104, **percentage variation = 10.4%). Figure 6)**

Figure 6

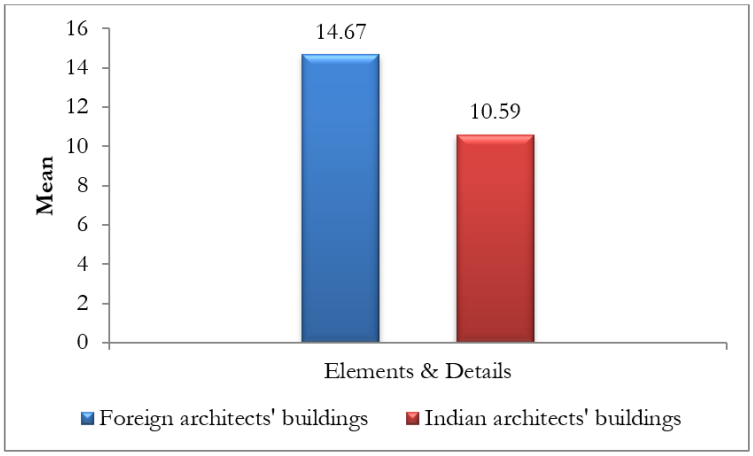

Figure 6 Variation of means in Elements & Details of Buildings

The above results of influence on form, planning, structure system, architectural expression and elements & details show that there was a strong influence on these aspects of Indian architects' buildings except in elements & details. It can also be concluded that the variation of 6.1% in the architecture of foreign master architects' works and their Indian counterparts from 1950-80, was predominantly because of less influence in the elements & details component. This also signifies that Indian architect incorporated the rest of the components of architectural vocabulary of foreign master architects in letter and spirit.

Thus, further detailed analysis was carried out to find out the variations in subcomponents that were responsible for the overall variation of 10.4% in the component of elements & details. Following table gives the results of statistical analysis of all the eight subcomponents (Table 1).

Table 1

Table 1 Subcomponent wise analysis of 'Elements & Details' component (1950-80)

Type	Architects	N	Mean	St. Deviation	t	Sig. (2tailed)	Significance	Eta Squared	%age variation
D1	Foreign	21	1.43	2.181	0.734	0.467	Insignificant	0.012	1.2
	Indian	27	1	1.861					
D2	Foreign	21	3.52	1.834	**2.362**	**0.022**	**Significant**	**0.103**	**10.3**
	Indian	27	2.11	2.309					
D3	Foreign	21	0.52	1.078	0.759	0.452	Insignificant	0.012	1.2
	Indian	27	0.3	0.993					
D4	Foreign	21	2.43	2.441	-0.957	0.343	Insignificant	0.02	2
	Indian	27	3.07	2.218					
D5	Foreign	21	1.48	2.182	0.372	0.711	Insignificant	0.003	0.3
	Indian	27	1.26	1.852					
D6	Foreign	21	0.95	2.012	-0.084	0.933	Insignificant	0	0
	Indian	27	1	1.881					
D7	Foreign	21	1.81	2.272	1.078	0.287	Insignificant	0.025	2.5
	Indian	27	1.15	1.975					
D8	Foreign	21	2.52	2.205	**3.409**	**0.002**	**Significant**	**0.225**	**22.5**
	Indian	27	0.7	1.203					

Note: D1-Roof Garden/Activity area, D2-Ribbon windows, D3-Corner Windows, D4-Crispy cut window openings, D5-Free standing sculpturesque Staircase/Ramp, D6-Rainwater spouts, D7-Presence of roof elements, D8-Sculpturesque entrance, N-Number of Buildings.

The results reveal that the subcomponents - Ribbon windows and sculpturesque entrance showed significant variation and these two were primarily responsible for the overall variation of 10.4% in elements & details component. This signifies that Indian architect reduced the use of ribbon windows and sculpturesque entrance.

This can be attributed to the fact that ribbon windows are not climatically suitable in our country, where heat gain is major cause of concern. This, in turn lead to increase in the use of crispy cut recessed windows for protection from harsh climate. This interpretation is also supported by the statistical finding, which reflects the marginal increase in use of crispy cut window openings by Indian architects in comparison to their foreign counterparts. The reduction in use of sculpturesque entrances can be attributed to the reason that Indian architects were moving towards more simplification, a step ahead from their foreign counterparts (Chhabra, 2020).

5. CONCLUDING THOUGHTS

The architecture of foreign master architects' works in India had a deep impact on the post-Independence Indian architecture as is clear from the statistical analysis that there was only a variation of approximately 6% between the architecture of foreign master architects and that of Indian architects. The influence is very strong in form, planning, structure system and architectural expression. The variation of 6% in overall architectural impact is attributed to a variation of approximately 10% in elements and details component in the architecture of Indian architects in comparison to their foreign counterparts. Further, the detailed subcomponent wise analysis of element & details component reveals that variation in it is attributed to less use of ribbon windows by the Indian architects and increase in use of crispy cut openings with recessed windows for protection from climatic agents. There is also a reduction in use of sculpturesque entrances which can be attributed to the reason that Indian architects were moving towards more simplification, a step ahead from their foreign counterparts. So, the architecture of foreign masters was followed in letter & spirit by Indian architects for almost three decades in post-independence era, till they realized that such kind of universalism in architecture as propagated by theory of Modernism is taking us away from our roots as well as unacceptable from climatic considerations of our region.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

Bagga, S. (2008). The significance of Chandigarh as an Architectural Heritage City of Modernity. Unpublished thesis Doctor of Philosophy. Faculty of Design & Fine Arts, Panjab University, Chandigarh.

Benevolo, L. (1971). History of Modern Architecture (Vol. 2). Routledge and Kegan Paul, London.

Chatterjee, M. (1985). The Evolution of Contemporary Indian Architecture, Architecture in India, Electra Moniteur, Paris.

Chatterjee, M. (1996). Habib Rahman and his times. Architecture Plus Design, 13(2), 22.

Chhabra, P. (2020). 20th Century Indian Architecture : Genesis and Metamorphosis of Modernism. White Falcon Publishing, New Delhi.

Dengle, N. (2015). Dialogues with Indian Master Architects. The Marg Foundation, Mumbai.

Fergusson, J., Burgess, J. and Spiers, R. (1910). The History of Indian and Eastern architecture, vol. 1. John Murray, London.

Frampton, K. (1992). Modern Architecture : A critical history. Thames and Hudson Ltd., London.

Gast, K. (2007). Modern Traditions : Contemporary Architecture in India. Birkhauser Verlag, Basel, Switzerland.

Grover, S. (1995). Building Beyond Borders: Story of Contemporary Indian Architecture. National Book Trust, New Delhi.

Khanna, R. (2008). The Modern Architecture of New Delhi, 1928-2007. Random House India.

Lang, J. T., Desai, M., & Desai, M. (1997). Architecture and independence: the search for identity--India 1880 to 1980. Oxford University Press, USA.

Rahman, R. (1996). Habib Rahman. Architecture Plus Design, 13(2), 19.

Scriver, P., & Srivastava, A. (2015). India: modern architectures in history. Reaktion Books, London.

Serenyi, P. (1985). From Lutyens to Young Indian Architecture : Sixty Years of Housing in New Delhi. Techniques and Architecture, 5(56).

Vaz., J. (1954). Architecture of Bhubaneswar, New Capital, Orissa. Journal of the Indian Institute of Architects. 15(2), 3-4.