Spring 5-4-2018

[Re]Defining Chandigarh

Dhruvee Patel

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[Re]Defining Chandigarh
Request for Approval of Thesis Research
Project Book Presented to:

Professor Ameen Farooq
Professor Peter Pittman

and to the
Faculty of the Department of Architecture
College of Architecture and Construction Management
by

Dhruvee Patel

In partial fulfillment of the requirements for the Degree
Bachelor of Architecture and Honors Program
Kennesaw State University
Marietta, Georgia
Spring 2018
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DESIGN THEOREM

1.0
Introduction

According to the historical records, Chandigarh was occupied by Harappans, one of the oldest civilizations in the world nearly 8000 years ago specifying the importance of cultural and historic meaning that the place of Chandigarh holds in India. It was during the separation of India and Pakistan that the state of Punjab got divided into two different parts and hence, the capital of that time, Lahore went to Pakistan. With the need for a new capital for the East Punjab, the city of Chandigarh was born. The city derives its name from the temple of “Chandi Mandir.” In 1966, due to linguistic problems, the state of Punjab got divided into two parts namely Punjab and Haryana. Thus, Chandigarh became the capital of two states and a Union Territory in India. This research aims to revisit the planning structure of Chandigarh as it is connected to the environment physically, socially, and politically with a built environment that reflects the spirit and time of place in which the people of Chandigarh live. It is about reassessing the city of Chandigarh in terms of vision and the demands of the client, Prime Minister Jawaharlal Nehru and the way it is fulfilled by architect, Le Corbusier and his team.

History of Evolution

New Capital for East Punjab

After the division between West and East Punjab while Lahore went to West Punjab, the East Punjab in India was left with utmost chaos. It was a separation of religion based on land as Pakistan became a country for Muslims and India became one for Hindus adding to the social and cultural chaos in the region. As Kalia (1999) specified, “between 1947 and 1951, 6.2 million Muslims left India for Pakistan and 7.5 million Hindus and Sikhs came to India from Pakistan” (p. 1). Hence, a new capital was needed to rehabilitate refugees along with the displaced Punjab government. The establishment of a new capital was more of a political move since, it was supposed to fulfill deep-rooted psychological needs and ease political political exigencies then facing India” (Kalia, 1999, p. 1). It is evident through this statement that the need was to prove not only to others but also to herself that India can overcome anything and will not let this division affect its people for much longer.

Along with this, the governor of East Punjab noted, “the new capital would be the nerve center of the province, and from it would flow life and activity through the province” (Kalia, 1999, p. 9) indicating how the new capital had to be politically and physically capable of handling the demands of the government and the people. Hence, the next task was to find a site that would be appropriate for a new capital for the East Punjab as a fitting reply to the loss of Lahore, prior capital of Punjab.
Compensate them with land elsewhere but as a matter of fact, the new land might not even be fertile where the existing encumbrances of old towns and old traditions. Let it be the first large expression of our creative In general, Chandigarh seemed cheaper to construct Chandigarh from scratch than invest in building up the cities like Ludhiana and Ambala based on the infrastructure cost and its distance from India-Pakistan border. Two rivulets with Shivalik hills and Himalayas in the background. Chandigarh was compared to other existing selected from an altitude of 10,000 feet because of its landscape, where the city will be situated between government of India is looking for a place which can be a commercial, social, cultural and industrial hub. In this conflict Ludhiana was not included in the final list of the new capital for East Punjab. Fifthly, Ambala had poor with the absence of highly connected road network (Kalia, 1999, p. 7). In addition to this, Ludhiana also had poor in the race of new capital city (Kalia, 1999, p. 7). Fourthly, Ludhiana also had poor (Jullundur) lacked in terms of good climate, communication facilities, and infrastructure hence, got disqualified. Furthermore, it is a natural basin or depression where there is a steady rise in water table for past two de.

Based on the condition of India at that moment, the Prime Minister of India, Mr. Jawaharlal Nehru, said, “in the existing circumstances it is out of question to start planning a new capital for East Punjab… we are at the present moment cutting expendi-
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Albert Mayer and Matthew Nowicki

Due to his prior engagement and familiarity with India, Albert Mayer was chosen as the urban planner for Chandigarh. According to Nehru, the aim was "to utilize [Western technology] and fit it into Indian resources while expressing Indian ideals" (Kalia, 1999, p. 64). According to Nehru, the aim was to utilize [Western technology] and fit it into Indian resources while expressing Indian ideals. Albert Mayer and Matthew Nowicki

Evolution of an Idea

Albert Mayer and Matthew Nowicki

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Albert Mayer was given the commission to design Chandigarh. In contrast to Albert Mayer who focused on the socioeconomic factors like living, working, care of body and mind, and spirit, and circulation, Le Corbusier's approach was to design buildings that represent the culture of the society and yet be modern. "Le Corbusier would not be able to design a city which represents the culture of the society and yet be modern." (Kukreja, 1986, p. 115) Since the city of Chandigarh was to be the capital of the Punjab and Haryana states, it was important to design buildings that represent the culture of the society and yet be modern. The city was to be designed as a prototype city that could be replicated in other parts of India. Le Corbusier would not be able to design a city which represents the culture of the society and yet be modern. "Le Corbusier would not be able to design a city which represents the culture of the society and yet be modern." (Kukreja, 1986, p. 115)

The shape for the assembly hall was inspired by the Buddhist Stupa at Sanchi showing cultural influences from India. "The shape for the assembly hall was inspired by the Buddhist Stupa at Sanchi showing cultural influences from India." (Kalia, 1999, p. 64)

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Factual in nature, context feature water is introduced in the place area which seems to be more like an Eupenese place model rather than an Indian one existing in the latter half of social as well as cultural need. The cityscape perceived from a distance reflects society and culture in Chandigarh. In fact, one of the main arguments of the planners and architects in the city is that it is very hard to find the Capital complex in Chandigarh as it is located outside the grid system and the path leading to it is very narrow. In terms of connecting the buildings with the human scale, the areas in Jaipur do a much better job with their varying heights unlike the areas in Chandigarh. In fact, it is stated, “the unadorned modernist cityscape perceived from one end of the city to another is accentuated even more due to the uniformity of the buildings” (Kukreja, 1986, p. 67) stating this way the cityscape of Chandigarh is undifferentiated. Other than this, the essence of Indian community like the ‘bazaar’ or a market place is missing in the plan of Chandigarh. This is further described by Anand (1986) as he mentions: “at all sectors, ziaars have been separated from the formal buildings, both of which cater to the needs of different types and economic groups of people… [resulting] in a placidation and insularity of social activity…” (p. 105). Moreover, the thing that made the city of Jaipur more suitable to that of Indian city is the inclusion of different schemes from different places without understanding the culture of the region and peoples need. In addition to this, the research alludes the need for social and cultural aspects to be embedded into Chandigarh to be more responsive to the people of the region while becoming a true symbol representing India in the modern times. Was Le Corbusier right in designing Chandigarh? If not then, what should Chandigarh be like? How to redefine Chandigarh? If yes then, in what scale like city, district, or building? Hence, in this manner, the research attempts the need for social and cultural aspects to be introduced into Chandigarh to be more responsive to the people of the region while becoming a true symbol representing India in the modern times.

Conclusion

In general, it seemed like Chandigarh was heavily influenced by the social, cultural, physical, and political aspects of India from its birth to its existence at the moment. One of the questions that arise is if architecture reflects society and culture then, is Chandigarh a successful project or a failed experiment? Should we blindly keep transferring the idiom “Modernism” or should we think about how to actually translate it considering the culture and society of people? Was Le Corbusier right in designing Chandigarh? If not then, what should Chandigarh be like? How to redefine Chandigarh? If yes then, in what scale like city, district, or building? Hence, in this manner, the research attempts the need for social and cultural aspects to be introduced into Chandigarh to be more responsive to the people of the region while becoming a true symbol representing India in the modern times.
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<th>Year</th>
<th>Event</th>
<th>Location</th>
<th>Designer(s)</th>
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<td>City Beautiful</td>
<td>Detroit, Michigan</td>
<td>Egbert Atwater, Charles B. Hovey</td>
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<td>1917</td>
<td>Garden City</td>
<td>Elmhurst, Illinois</td>
<td>Elbert L. Heaton, William J. LeBaron</td>
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<td>1924</td>
<td>Villa Radice</td>
<td>Milan, Italy</td>
<td>Giuseppe Pettazzi</td>
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<td>1928</td>
<td>CIAM</td>
<td>Zurich, Switzerland</td>
<td>Le Corbusier, Han van der Leest</td>
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<tr>
<td>1932</td>
<td>Broadacre City</td>
<td>North Kansas City, Missouri</td>
<td>Frank Lloyd Wright</td>
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<tr>
<td>1932</td>
<td>Villa Radice</td>
<td>Milan, Italy</td>
<td>Giuseppe Pettazzi</td>
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<tr>
<td>1933</td>
<td>Villa Tugendhat</td>
<td>Brno, Czech Republic</td>
<td>Fritz Schumacher, Walter Gropius</td>
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<td>1936</td>
<td>Cité Radieuse</td>
<td>Paris, France</td>
<td>Le Corbusier, Pierre Jeanneret, Jean-Paul Aron</td>
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<td>1949</td>
<td>New Utopian Suburb</td>
<td>Fuller, Michigan</td>
<td>Buckminster Fuller</td>
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<td>1950</td>
<td>Villa Ennio</td>
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<td>1994</td>
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<td>1995</td>
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<td>2000</td>
<td>Ecological Urbanism</td>
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<tr>
<td>2009</td>
<td>Ecological Urbanism</td>
<td>Mohsin Mostafa</td>
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**MODERNISM**

- CIAM Funktionalism / Rationalism

**POST MODERNISM**

- Landscape Urbanism
- Ecological Urbanism

**ARCHITECTURAL MOVEMENTS**

- MODERNISM
- NEOCLASSICISM
- POSTMODERNISM
- CONSTRUCTIVISM

**CHANDIGARH IN GLOBAL CONTEXT**
Chandigarh is the first planned modern city in India as a symbol of nation's faith in the future designed by Le Corbusier in 1951 in the Punjab. Through investigation it became apparent that Le Corbusier proposed design principles for Chandigarh that were already theorized for Bogota in Colombia and Marseille in France following his concept of Radiant village that was never built. His design for Chandigarh was more of a prototype model, which failed to capture the spirit of Indian culture and community, making it harder to navigate and familiarize with the city. If architecture is a reflection of society and culture then, is Chandigarh a successful project or a failed experiment? Evidence can be seen in Sector 1, the head of the city with administrative buildings stretched out on a vast barren plain following the Modular system. It is more like a play of massive sculptural buildings with open isolated voids in the front designed in harmony with human proportional system yet hard for a human to connect to. This thesis is about proposing a new plan for Sector 1 as the head of the city, which is connected to the body of the city in opposition to what Le Corbusier proposed in the administrative area that turns its back towards people in this city. This thesis is more about revisiting and redefining the administrative area of Chandigarh that is more responsive to people. The design intent relies on the works of Balkrishna Doshi and Charles Correa who defined Indian architecture with the modern paradigm.
“ARCHITECTURE is the art above all others which achieves a state of platonic grandeur, mathematical order, speculation, the perception of harmony which lies in emotional relationships. This is the **AIM** of architecture.”

- Le Corbusier
Indian architecture in ancient times was mostly based on Hindu temples. The Indian temple architecture was mostly based on Vastu Purusha Mandala system. It is a metaphysical plan of a building and it is a grid system where the heavenly bodies and supernatural forces listed in the Hindu Vedas are highlighted. It is based on a grid system such as 1X1, 3X3, 5X5, etc. The most common grid structure used are 8X8 and 9X9. It is the most common one among Indian temple architecture. It can also be regarded as it is based on fractal system since, it is a division of squares at certain intervals. The middle portion of the square is regarded as Brahmanastan (Space) or in other words, it can be anything or everything at the same time. The concept comes from the Hindu religion as the God is in the middle and the cosmic universe rotates around it. Hence, in Indian architecture the middle space is reserved for courtyards or gathering spaces where everyone can come together and be social. Some of the elements used in Indian temple architecture are the use of colonnades and court yards creating spaces through rhythm and hierarchy. The same rhythm and hierarchy can be seen in the step wells of Indian architecture.

Figure 1.14: Vastu Purusha Mandala
Figure 1.15: Indian temple architecture massing
Figure 1.13 (to the left): Indian temple at Khajuraho
Figure 1.16: Indian Step Well
Le Corbusier, an artist, architect, urban planner was born in 1887 in Switzerland and died in 1965 in France. Throughout his years, he did several theoretical projects in terms of urban planning. He designed a city called Chandigarh in India in 1951. In his book, The City of Tomorrow and its Planning, Le Corbusier outlines four points that can make it a great city. He claimed that one must decongest the centers of cities, one must increase the density of the centers of cities, one must increase the means whereby traffic can circulate, and one must increase the area of green open spaces (100). These principles are also followed in all his projects whether they are theoretical or built. Along with this, he always stressed on the importance of order and geometry based on certain proportional system to bring order and coherence to humanity. He called non-linear paths as donkey’s pathways which should not be used anywhere since, according to him, man knows where to go and wants to reach a goal. This is very interesting because I have learned so far that some of the observations that people normally do not walk in a straight path and there is no way one can force people to walk in a specific path. This is to say because one might have noticed that a person might at times cross through the grass instead of following the straight laid out path for him to walk on. At the beginning of the book, Le Corbusier starts with the comparison between a town and a city and states, “A TOWN is a tool. Towns no longer fill this function. They are ineffectual; they use up our bodies, they thwart our souls... the lack of order to be found everywhere in them offends us...” (xxi). In contrast, he mentions, “A city! It is the grip of man upon nature. It is a human operation directed against nature, a human organism built for produc- tion and for wars. It is a creation... All the poetry we find in nature is but the creation of our own spirit...” (xxi). It is important to understand his thought process that he was really an advocate for the industrial age and wanted the machine and humans to control everything. For instance, towers are good because it is conquering nature and cities are great because they are built. But in reality, nature will have the ultimate power more than humans to act its own way. Therefore, I think it was a challenge for Le Corbusier to solve the problem where both try to coexist and hence, he proposed to have lots of open spaces in the city. It is very ord- inary manner. Overall, it is a good challenge for me to figure out the way in which I envision a city to be after learning the ways in which Le Corbusier did.
Le Corbusier in his book, *Towards a New Architecture* talks about the basic principles of designing and building at building scale just like the city scale. He begins with the comparison between the architect’s imagination and the engineer’s imagination. Le Corbusier heaps praises on architecture stating, “ARCHITECTURE is the art above all others which achieves a state of plastic grandeur, mathematical order, specialization, the perfection of the harmony which lies in emotional relationships. This is the Art of architecture” (110-111). Through this he gave skill of powers to the architect who can change the lives of the people and make them happy. Hence, he set certain principles that he came up with according to his beliefs and uses them as guidelines as he designs believing that is what people need and can make them really happy. One of them is the regulating lines. According to Le Corbusier, “a unity gives measure and unity; a regulating line is a basis of construction and a satisfaction” (72) meaning everything should be based on order and geometry in a building to create harmony.

Along with his obsession of geometry, proportions, and harmony, Le Corbusier was an advocate of standardization. This is say because he includes, “we must aim at the fixing of standards in order to face the problem of perfection... Architecture operates in accordance with standards. Standards are a matter of logic, analysis and minute study: they are based on a problem which has been well stated” (131). This became one of the principles during the modern movement where in order to build according to the industrial age and mass produce things, lots of standardizations were made. Even to the present times, mostly everything works with basic standards especially at the building scale since, there are still some areas of exploration, individually and creativity at furniture scale and city scale. Personally, it feels like the role of the masses are to follow these standards to create architecture. Moreover, Le Corbusier notes, “the Plan proceeds from within without, the exter- nality is the result of an interior. The elements of architecture are light and shade, walls and spaces” (177) referring to the open floor plan and incorporating nature into the building so that it can blur the boundary between the interior to exterior. In this manner, clear thought process behind the evolu- tion of ideas of modernism can be seen and under- stood through Le Corbusier’s writings even though it could be argued whether one likes it or hates it.
Louis Kahn born on 1901 in Estonia and died in 1974 in New York was an architect. He was one of the key architects of the 21st century. His philosophy in architecture is similar to the Japanese architects who look at the importance of light and shadow while trying to incorporate it in their works as a key element. Louis Kahn took these things into every project with his monolithic and monumental architectural style. His project of designing an Indian Institute of Management in Ahmedabad was a very well-known project which influenced several people in India and across the globe. Like Le Corbusier, Kahn was heavily influenced by Greek architecture as he said, “Greek architecture taught me that the column is where the light is not, and the space between is where the light is. It is a matter of no-light, light, no-light, light” (Schielke) referring to light as an object in a space which needs to be carefully planned as it is going to occupy the space.

Moreover, Schielke mentions Louis Kahn stating, “a plan of a building should be read like a harmony of spaces in light. Even a space intended to be dark should have just enough light from some mysterious opening which is a device to define the space even more than any plan. The space must be defined by its structure and the character of its natural light as a source which holds the hidden balcony or secondary walls, thus concentrating attention on the effect of the light and not on the air.” Through this it is evident that Kahn is intending to say how light and shadow can bring spirit to the space and how arbitrarily it needs to be controlled. Along with this, his interest in working with different materials and studying its strengths in order to work with it is quite commendable. There is one constant in his work and that is filtering through all the site, climatic conditions, but works with his sculptural forms like modernists.

Figure 1.22: Exterior
Figure 1.23: Interior stair at IIM
Figure 1.24: Play of light and shadow
Figure 1.25 (to the left): Interior stair at MIT
Figure 1.26: Looking at the courtyard
Figure 1.27: Arches replicated in facade
Figure 1.28: Arches replicated in facade
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Figure 1.34: Arches replicated in facade
Figure 1.35: Arches replicated in facade
Figure 1.36: Arches replicated in facade
Figure 1.37: Arches replicated in facade
Figure 1.38: Arches replicated in facade
Figure 1.39: Arches replicated in facade
Figure 1.40: Arches replicated in facade
Figure 1.41: Arches replicated in facade
Figure 1.42: Arches replicated in facade
Figure 1.43: Arches replicated in facade
Figure 1.44: Arches replicated in facade
Figure 1.45: Arches replicated in facade
Figure 1.46: Arches replicated in facade
Figure 1.47: Arches replicated in facade
Figure 1.48: Arches replicated in facade
Figure 1.49: Arches replicated in facade
Figure 1.50: Arches replicated in facade
Chandigarh Urban Lab is a studio owned by Vikram Aditya Prakash, son of Aditya Prakash who worked with Le Corbusier on the Chandigarh project. Vikram Aditya Prakash was born and lived in Chandigarh before going to architecture school in USA. He has been currently teaching at the University of Washington and running his studio in India and practicing in USA. This was one of the several projects done by him and his team in Chandigarh.

The design process of the proposed plan for the Rajendra park is shown at the bottom. It is interesting to note how they are trying to connect it to the Indian pattern and somehow trying to relate it back to India and the site. Incorporation of the Chinese philosophy of "Kai-he" meaning Open-Close may make sense due to the program and activities. But it seems like the language gets lost in the translation and the final product seems completely random and unrelated to the site's program. Hence, it would be a challenge to propose a plan for the park which takes into consideration the edge conditions along with the past design and ways to make it better.
An International Competition was held by the Chandigarh government about the empty site in Sector 1, which was originally proposed by Le Corbusier to build a Governor’s palace. But the government did not have money at that point and did not want a palace in that place but liked the design and decided to call it Museum of Knowledge. Now, the government has the money and wants to realize the project.

The presented project on the left was the winner of the Competition. Hence, analyzing the project based on the concept and its worthiness of being in Sector 1. The concept of this project was based on the domino system laid out by Le Corbusier. For instance, the columns in the domino system are replaced by tubes and are rotated to form a central space. This project succeeded in a way that it has kept the spirit of Le Corbusier alive but is that really needed in today’s Chandigarh? Hence, it would be interesting to note whether the Chandigarh government decides to build this realizes Le Corbusier’s dream by building the project that he himself designed.
Balkrishna Doshi born in 1927 in Pune, India is an educator, architect, and urbanist. He started his education in J.J. College of Architecture in India before going to work under Le Corbusier in Paris in 1950. He opened his studio called Vas- tu-Shilpa in 1955 after returning to India. He has closely worked with Louis Kahn during the construction of Indian Institute of Management (IIM) in Ahmedabad. After few years, Doshi got the opportunity to design third branch of IIM in Bangalore. Practicing during the 1960s and working under Le Corbusier for few years, Doshi was heavily influenced by the modern movement in architecture. With the works of Le Corbusier and Louis Kahn in India during 1950s to 1960s and with the aspirations of Indians to keep up with the rest of the world, Doshi very articulately designed to bridge the gap between modernism and ancient Indian principles. As Curtis explains: “Doshi’s quest for an authentic architecture blending old and new, regional and universal, has relevance beyond India. In many other areas of the Third World, architects are grappling with the problem of how best to modernize yet maintain a core of cultural identity.” Doshi tries to connect the modern with the traditional with the help of materials and key principles of modern and traditional Indian architecture. His design are based on climate conditions making it sustainable and easy to fit into the context of the site. In terms of materials, he used concrete as a main material just like any other modern architect but at the same time, he introduced stone and rough blocks of gray granite which was local to the place. He used the granite for walls combined with trellis to create a new vocabulary.
The project is divided into two main buildings such as the academics building and the dormitories. The academics building includes classrooms and faculty rooms whereas the dormitories serves as a place of living for the students on campus. Doshi plays with spaces in terms of interior and exterior while adding spirit with the texture of light and shadows. The spaces are surrounded by interlocking courtyards, interior galleries in the academics building and through walkways and verandahs in the dormitories respectively.

The major influences for this project comes from regional and global scales. For instance, the idea of parasol used in IIM walkways came from Le Corbusier's design of Shodhan House in Ahmedabad. Furthermore, the connection detail of stone and concrete came from Joseph Stein as Doshi was struggling to come up with one. In general, Doshi also used neo-classical colonnade from the Greeks as vertical piers in IIM. In terms of regional, Doshi's influences come from the floor plans of the Indian temples in the South. Some of the references can be seen in the floor plan of the Meenakshi temple and Srirangam temple especially, with the maze-like spaces.

Along with Indian temples, Doshi also got his inspiration from the palace of Fatehpur Sikri in Agra, India built during the Mughal Empire following the Indo-Saracenic style. The key element borrowed from Fatehpur Sikri was the play of courtyards, which became a principle element in Doshi's design connecting different spaces with different programs. Courtyard spaces have been a key feature in Indian architecture over the years whether it is used in residential, commercial or institutional projects. It is much appreciated and celebrated spaces in a building encouraging collaborative and group activities. In this manner, with the use of traditional and global elements, Doshi was able to achieve a design which was analogous to an Indian city, filled with streets, galleries, courtyards, balconies and so on. According to Doshi, “this campus is a flowing river...” which is ordered through a gigantic grid system yet leaves fluid the in-fill spaces filled with courtyards and green spaces.
CHARLES CORREA

Charles Correa born in 1930 in Hyderabad and died in 2015 in Mumbai was an architect, urban planner, educator, and activist. He studied at St. Xavier’s College followed by the University of Michigan and Massachusetts Institute of Technology, where he taught for few years. In 1958, he opened his own practice in Mumbai. Like Balkrishna Doshi, Charles Correa was heavily influenced by modernist masters such as Le Corbusier, Louis Kahn, and so on. Correa similar to Doshi tried to combine modernist principles with traditional architecture. For instance, he was highly impressed by Le Corbusier’s use of concrete to create forms and tried to incorporate that in his buildings but only as long as it pertains to the site.

One of the most interesting things about Charles Correa was his constant approach towards the site in all of his projects. For example, in this project of Jawahar Kala Kendra, a cultural center in the memory of the First Prime Minister of India, Pandit Jawaharlal Nehru, he used the local language of architecture near the site and tried to evoke similar feelings being in this space as being in the city of Jaipur. Along with that he was also paid close attention to the climatic conditions and most likely used traditional materials in his design rather than some particular ones like the modernists did. As can be seen in this project, he uses the red stone that Jaipur is known for, it is called the Pink City because of its material. Hence, Correa adapted that material and used in the building instead of using concrete and trying to make a statement. On a similar note, it was really interesting to note that Charles Correa once made a statement swearing that he will never design a glass building and his projects will follow the concept of “open to sky,” which is evident in all of his work. In urban planning, he would try to stay away from designing high-rise buildings and instead built low-cost mid-rise apartment buildings to better connect to human scale. He also created common spaces within the building for the people to get together and created a sense of community within his projects. This project is a good example of how he articulately creates an exterior courtyard within the building for the people to get together.

Figure 1.46: Looking at the center courtyard space from interior
Figure 1.47: Courtyard space replicating the city in-fill
Figure 1.48: Activities at the courtyard spaces
Figure 1.49: Floor plan of the dormitories
His design for Jawahar Kala Kendra was mostly based on the Vedic mandala system and the city planning of Jaipur. The design of Jawahar Kala Kendra was based on a square grid representing nine planets in the ancient Vedic mandala, but the design changed due to the mountains on the site. Correa started with a nine square grid but rotated one of the squares to represent the city plan of Jaipur. He very cleverly created an entrance space from the rotation of the square. He took one step further than Jai Singh II, the planner of Jaipur and assigned each square its function based on the location of the planet. For instance, he placed theater in the square of Venus since, Venus represents arts in the Vedic system. He also gets the symbols carved on the walls of the square in order for the people with some knowledge of the Vedic system to understand.
The Hyderabad International Convention Center is the largest convention center in India opened in 2006. It houses the largest pillar free hall in the country which is 6,480 sq.m, spreading over 15 acres. One of the key spaces in the convention center is the Central Hall highlighted in orange in the ground floor plan to the right which is 6,500 sq.m, a pillar free hall with the height of 15m including 6,500 seats, which can be further divided into six different smaller halls with the help of moveable walls.

Looking at the floor plans of the convention center, it seems to have a very simple plan. It looks more like a standard design layout for convention center. Especially while looking at the form of the Convention center. It is evident that the architect never really invested any time in trying to come up with a form that represents India and fits to be in that specific country, city or site instead of implementing a very generic modern form to the building. Hence, it would be a challenge to incorporate traditional Indian principles trying to consider the spirit of time and design the Convention center representing India.
Chandigarh is the city located in the northern part of India as a capital of two states such as Punjab and Haryana. It has a total area of 114 sq.km which is around 44.02 sq.mi. It is called ‘City Beautiful’ in India due to ample of green spaces in the city. Some of the biggest tourist attractions in the city of Chandigarh are the gardens and parks. For instance, one of the most visited gardens is the Rock Garden, which features the works of Nek Chand. Nek Chand started to build sculptures from recyclable materials at the foothills of the Shivalik hills near Sukhna lake. His sculptures represent the culture and everyday life of Indian society. Hence, it is highly famous and second most often visited place in India after Taj Mahal. In this manner, even though the city includes the great works of Le Corbusier, Nek Chand is widely known and loved by everyone in the city.

**Figure 2.1:** Area of Chandigarh

**Figure 2.2:** Entrance to the city of Chandigarh

**Figure 2.3:** Nek Chand’s Rock garden

**Figure 2.4:** Plaza in Sector 17
HIMALAYAS
Resulted from the collision of tectonic plates between India and Tibet

SHIVALIK HILLS
Formed from the alluvian deposits through the erosion of the Himalayas mixed with sand, clay, and rocks

ALLUVIAN PLAINS
Created from the erosion of the hills forming land rich for agriculture

KAIMBWALA
A historic agricultural town benefiting from the rich deposits on the soil

SUKNHA LAKE
A man-made reservoir to store the runoff from Kaimbwala, rich in vegetation and wildlife

GEOGRAPHICAL PATTERNS

Figure 2.5: The Himalayas
Figure 2.6: Shivalik hills
Figure 2.7: Alluvian plains
Figure 2.8: Kaimbwala
Figure 2.9: Sukhna lake
**DEMOGRAPHICS**

Figure 2.10: Population Growth

Figure 2.11: Urban and Rural Population Growth

Figure 2.12: Religion distribution in Chandigarh

**CLIMATE**

Figure 2.13: Religion distribution in Chandigarh

Figure 2.14: Annual Temperature distribution in Chandigarh

Figure 2.15: Sunny, Cloudy, Precipitation days
Le Corbusier and his team set certain limitations within the 5 miles radius from the edge of the city of Chandigarh. This zone was later called the "Periphery," consisting mostly agrarian landscapes of villages and farmlands with some forested areas. Some strict limitations regarding the future development, height, and density were placed on this Periphery. This zone was called the Periphery Control Act of 1952. Later, the area was extended to 10 miles radius in 1962. It is interesting to note that the act is in complete opposition to the growth patterns and future prediction on the growth around the city. Hence, the challenge would come in the way of the Chandigarh government whether to follow the Periphery Act or give in to the growth.
Figure 2.23: Unauthorized colonies

Figure 2.24: Density of Chandigarh (people/acre)

Figure 2.25: Perspective Plan of Chandigarh 2031
Using Spatial Syntax analysis, the roads of the city of Chandigarh are analyzed based on its integration and connectivity. For instance, in the axial map of Chandigarh, one can note that V1 and V2 are highly integrated and connected to the other roads and streets, supporting the hierarchy of the roads laid by Le Corbusier. Moreover, the streets become less integrated as they are farther from the main roads, creating a tree-like structure leading to less integration. In terms of vehicular patterns and traffic, it makes sense for the V1 and V2 to be most integrated as people would not typically use these routes to move from one place to another rather than walk on it. In terms of Sector 1, it should be noted that there is less integration leading to opportunities in designing the area in such a manner that it connects the Kansal village at the top and hence, adding more integration to the space.
Particular interest lies in the design and planning of Sector 1 since, that is the Sector specifically designed by Le Corbusier in 1950s. He took upon the task of designing an administrative area in Sector 1, which can be regarded as the head of the city. He includ-ed three key administrative buildings as can be seen in the images below. But interestingly he designed these buildings using human proportional system yet humans failed to connect to such a massive scale. At the same time, in order to maintain the sacredness of the buildings, Le Corbusier left the area in front of the buildings completely barren. This indeed created a deserted place where people do not occupy the space. Moreover, he designed monstrous sculptural modernist buildings in India, in complete opposition to its very rich and vibrant culture. Hence, the interest in exploring the possible programs that can fit into the head of the city and enrich the environment by attracting more people in the space is heightened. Therefore, the site was selected with a passion in exploring the site at district and building scaled due to its historical legacy and current barren conditions.
Administrative area
Rajendra Park
Villages
Landbanking/Unused land
Agricultural land
Residential houses in the City

Figure 2.35: Land use map

Green Cover
Dirt
Concrete Surface

Figure 2.36: Green cover near the site
Figure 2.37: Figure-ground

Figure 2.38: Road map

2km (1.24mi) = 0.77mi² = 495 acres
The question is how to work with edge conditions especially when one is dealing with one between a city and a village. For instance, the section through the border between Kansal and Sector 1 shows the use of “ha-ha” wall so that physically there is a barrier but views are blocked.

Figure 2.39 (to the left): Diagram of site conditions
Figure 2.40: Map noting the edge conditions between Kansal and Sector 1 and Rajendra Park and Sector 1.
Le Corbusier is believed to have worked with 800 m and 400 m squares while designing the Capitol Complex. At the same time, he is believed to have just gone on site and sketched the placement of the building based on the location and how it looked as a skyline with Shivalik hills and the Himalayas as the background. Le Corbusier is said to have called it, "THE QUESTION OF OPTICS." This can lead one to conclude the ongoing debate whether Le Corbusier used modulor system to lay the buildings on the ground of Sector 1 or not.

**Figure 2.41**: Diagram of Modular man with Sector 1 site

**Future vision:**
- To modulate Le Corbusier’s design intent of Sector 1 and make it the head of the city which is responsive to the people
- To propose a better solution to the edge condition between the urban and rural environment

**Future building:**
- To design one of the buildings from the masterplan of the Sector at least to the detail of its form and function
- To propose a new design that translates the term ‘Modernism’ into Indian context
The key to deciding on the program is what does the city of Chandigarh need while taking into consideration what they already have. For instance, according to the diagram about the key places to visit in Chandigarh, it is clear that Chandigarh already has lots of parks. Hence, proposing a new park instead of Rajendra park did not make sense. Additionally, there are also several key museums around Sector 1 which people normally do not visit. This implies that Chandigarh might not need another museum in Sector 1 as the government is planning on doing.

It was important to note the objectives before deciding on the program. The objectives were to modulate Le Corbusier’s design intent of Sector 1 and make it the head of the city which is responsive to the people. It is also crucial to propose a better solution to the edge condition between the urban and rural environment. Finally, design a building from the masterplan of Sector 1 which tackles all the issues presented while taking into consideration about it being part of the ‘head’ of the city.

The program for the project is to have a government building for the City of Chandigarh as mostly all the administrative buildings in Sector 1 are used for the state affairs. Also, design a Sports Complex including a cricket, football, tennis, basketball, hockey stadium for the people. Along with sports complexes, it is also important to include programs that can attract people in the space and have 24x7 use of it. Therefore, government housing for people working in the administrative area and elsewhere along with student housing that is supported by the students going to University in Sector 12. In this manner, there will always be people in the Sector instead of it being dead after office hours or at night.

On a building scale, design a mixed use building including a Convention center serving the business people and Community gathering space serving the common people. It would be more like a Cultural center with programs such as a music workshop, dance workshop, library, art gallery, lecture hall, interior theater, exhibition hall, ballroom, etc. This type of program will help community engagement among business people who can have conferences at the center.

Create public spaces connecting the existing and proposed buildings while stitching the surrounding edges between a village and a city. These public spaces can include forest trails, market spaces, orchards and agricultural lands. In this way, the public spaces will encourage people engagement throughout the day making it safer and more active.
DESIGN PROCESS
Le Corbusier Vision
- Rajendra Park to the left
- Some key administrative buildings on the right including Secretariat, Assembly, and High Court for both the state governments
- Open Hand Monument as a symbol of Chandigarh in Sector 1

Existing Condition
- Helipad with mango orchards and Sports Club building on the left
- Secretariat, Assembly, and High Court for both the state governments
- Government included Reserve Bank of India and Bar Complex for the people of Chandigarh in Sector 1
- Open Hand Monument still the symbol of Chandigarh

Iteration 1
- Existing Le Corbusier building in red
- Densifying the Sector with more program in accordance to the existing buildings
- Trying to bridge the gap between two zones in the Sector such the rajendra park and administrative area

Iteration 2
- Existing Le Corbusier building in red
- Densifying the Sector with more program in accordance to the existing buildings
- Differentiating the zones in Sector 1 while connecting with the market at the top
Figure 3.6: Existing Road System

Iteration 1
- Trying to bring order to the chaotic grid in the Sector
- Extending the grid from the surroundings in order to connect the angular grid at the top with the perpendicular grid at the bottom and vice versa

Iteration 2
- Trying to bring order to the chaotic grid in the Sector
- Specifying three major connections with the surroundings while creating a grid pattern from those angles

Iteration 3
- Trying to bring order to the chaotic grid in the Sector
- Using a fractal system and subdividing the Sector led to a perpendicular grid pattern which can be connected to the entire city
- Increasing and decreasing the density of the grid based on the surrounding grid patterns

Figure 3.7: Iteration 1
Figure 3.8: Iteration 2
Figure 3.9: Iteration 3
GREEN SPACE LAYOUT

Iteration 1

- Green space as a connection between two different zones like the park and the administrative area; hence, the triangle in the middle derived from the intersection of the connecting views of the Sector to its surroundings
- Green space shape derived from the connecting views of the Sector to its surroundings

Iteration 2

- Trying to connect the leisure valley running through the city to the top
- Other green spaces within the administrative area running between the buildings

Iteration 3

- Trying to connect the leisure valley running through the city to the top
- Green space as a connection between two different zones like the park and the administrative area
- Green space shape derived from the connecting views of the Sector to its surroundings
Iteration 1
- Placing the buildings and road system based on the existing condition
- Trying to extend the leisure valley through the Sector with the major green space in the middle
- But seems random without any planning or strategy

Iteration 2
- Placing the buildings according to the existing conditions in the Sector
- Green spaces act as connections between buildings
- But the green spaces act more as a buffer and isolating the buildings instead of connecting them

Iteration 3
- Extending the angular grid at the top of the Sector and connecting it to the perpendicular on at the bottom
- Placing the buildings in its own area as a celebration to their individuality in terms of function
- Extending the leisure valley through the Sector while connecting both the areas
- But it does not seem to provide spaces for future growth

Iteration 4
- Extending perpendicular grid and further breaking it down to connect it to the human scale
- Placing the buildings in accordance to the existing conditions and road pattern
- But the Sector seems divided and isolated in terms of program
Activities
- Encouraging people to occupy the area
- Promoting variety of group activities

Programs
- Promoting diversity with different landuse
- Encouraging public interest

Figure 3.15 (to the left): Masterplan for Sector 1
Figure 3.16: Activities and Programs
Figure 3.17: Children playing in the playground
Figure 3.18: Open Market
Figure 3.19: Family having a picnic in the park
Figure 3.20: Cricket Stadium
Figure 3.21: Government Housing
**Pedestrian Paths**
- Increasing movement within the area
- Providing connections with different buildings

**Vehicular Paths**
- Connecting Kansal village directly to the city
- Giving buildings access to major roads

**Bicycle Path**

**Natural Barrier**

**Street Furniture**

**Productive Landscape**
- Expanding the agricultural land
- Promoting agricultural tourism
- Farmers Market

**Green Cover**
- Increasing plant diversity
- Increasing habitat diversity
- Producing organic crops

**MOVEMENT**

**NATURE**

**Figure 3.22**: Movement in Sector 1

**Figure 3.23**: Tertiary Road

**Figure 3.24**: Quaternary Road

**Figure 3.25**: Primary Road

**Figure 3.26**: Secondary Road

**Figure 3.27**: Nature in Sector 1

**Figure 3.28**: Agriculture Tourism

**Figure 3.29**: Farmers Market

**Figure 3.30**: Mango Orchard

**Figure 3.31**: Animal diversity
Figure 3.32: Species in Sector 1

Species

Figure 3.33: Section of Sector 1 with context

Figure 3.34: Model of Sector 1

Figure 3.35: Section of Forest trail with the use of Native trees
BRAHMA PADA
First belt including the central square field of energy; 9 cells (padas)

DEVVIKA PADA
Second concentric belt; 16 cells (padas)

MAANUSHA PADA
Third concentric belt; 24 cells (padas)

PAISACHIKA PADA
Fourth concentric belt; 32 cells (padas)

Figure 3.36: Vastu Purusha Mandala 9x9 grid
Figure 3.38: First Floor
Figure 3.39: Second Floor
Figure 3.40: Third Floor
Figure 3.41: 3D perspective of the building
Figure 3.42: Section through the core
Figure 3.43: Elevation looking Southwest
Figure 3.44: Elevation looking Northeast
Courtyard

It is one of the most important characteristics of Indian architecture. Generally, it is at the center of the building open to sky for climatic as well as religious reasons. In terms of religion, it traces back to the empty space (Brahman) in the middle of Vastu Purusha Mandala, hence, it is mostly placed in the middle of the building.

Colonnade

Mostly surrounded by open courtyard spaces. It acts as a buffer between open and closed spaces. It adds to the characteristics like rhythm and repetition that is present in most Indian architecture.

Shikhara

It also means ‘mountain’ in Sanskrit. It is mostly present in Indian architecture as highly ornamented and elaborate roof structure. It adds character to architecture which is lacking nowadays. It can act as light wells bringing light into the interior spaces which would be more like a modern version of the ancient roof structure.

Element: Courtyard

Figure 3.48: Ideal courtyard spaces in the building

Figure 3.49: Section of corbel arch with brick as a material

Element: Colonnade

Figure 3.50: Indian temple with Shikhara

Figure 3.51: Plan and perspective of towers based on fractal system of 1/3rd rule creating hierarchy

Element: Shikhara

Figure 3.45: Open courtyard

Figure 3.46: Colonnade

Figure 3.47: Indian temple with Shikhara
DESIGN SYNTHESIS

4.0
visiting and redefining the administrative area of Chandigarh that is more responsive to the people. The design intent relies on the works of Balkrishna Doshi and Charles Correa who defined “Indian” architecture with modern paradigm.

Moreover, the planning of Bogota of Rouen and incorporated that in the planning of Chandigarh. He used the principles of Roman planning system as implemented in the town plan of Chandigarh. Chandigarh was developed primarily as a seat of governance, with the idea that it should be a symbol of the new India.

In 1953, a team of local architects, including Charles Correa under the supervision of Le Corbusier, was commissioned to develop Chandigarh’s planning system. The team incorporated several innovative ideas, including the use of traditional Indian mandala patterns in urban design. This resulted in a city plan that included a series of concentric belts, each containing a different type of development.

The first belt included the central square, which was designed to be a focal point for the city. The second belt contained a series of satellite cities, each with its own set of buildings and infrastructures. The third belt included a series of parks and recreational areas, and the fourth belt consisted of residential areas.

Chandigarh was designed to be a model for modern Indian urban planning, and it has since become an iconic example of how traditional and modern design principles can be combined to create a functional and aesthetically pleasing city.

The planning of Chandigarh was influenced by the works of several architects, including Daniel Burnham, who is known for his City Beautiful movement in the early 20th century. Burnham believed in the importance of integrating art and architecture into urban planning, and his ideas were influential in the development of Chandigarh.

The planning of Chandigarh was also influenced by the works of Antonio Sant’Elia, who is known for his vision of the “Villa Radieuse,” a utopian vision of the future city. Sant’Elia’s ideas were influential in the development of Chandigarh’s modernist architecture.

In summary, the planning of Chandigarh was a unique and innovative approach to urban design, that combined traditional and modern architectural principles to create a city that is both functional and aesthetically pleasing. It has become an iconic example of how urban planning can be used to create a vibrant and dynamic city.

III. CONCLUSION

In conclusion, the planning of Chandigarh was a unique and innovative approach to urban design, that combined traditional and modern architectural principles to create a city that is both functional and aesthetically pleasing. It has become an iconic example of how urban planning can be used to create a vibrant and dynamic city.

REFERENCES


**URBAN SCALE**

- **Concepts**
  - Leisure Valley
  - Nayagaon Village
  - TENNIS STADIUM
  - CULTURAL CENTER
  - VISITOR CENTER
  - CRICKET STADIUM
  - SECRETARIAT
  - GOVERNMENT HOUSING
  - HOCKEY GROUND
  - MARKET
  - Fractal System
  - Roads
    - STUDENT HOUSING
    - BAR COMPLEX
    - RESERVE BANK
    - ASSEMBLY
    - INTERIOR SPORTS COMPLEX

- **Strategies**
  - Encouraging public engagement
  - Promoting diversity with different landuse
  - Programs
  - Promoting variety of group activities
  - Encouraging people to occupy the area
  - Giving buildings access to major roads
  - Connecting Kansal village directly to the city
  - Vehicular Paths
    - Increasing movement within the area
  - Pedestrian Paths
    - Increasing habitat diversity for animals
    - Producing organic crops
    - Preserving existing trees
    - Increasing plant diversity
  - Green Cover
    - Farmers Market
    - Promoting agricultural tourism

**BUILDING SCALE**

- **Elements in Architecture**
  - Presents repeated patterns that are present in the design of different parts of the building
  - Acts as a buffer
  - Mostly surrounded by open courtyard spaces
  - Mostly present in Indian architecture
  - Mostly present in Indian architecture which is lacking in now-a-days architecture as highly ornamented and elaborate

- **Building Scale**
  - Cultural Center
    - Plans
    - Orthographic drawings
  - Elevation looking Southeast
  - Elevation looking Northeast
  - Orthographic drawings of Structure
Let work, Mr. Jawaharlal Nehru said, “...the freedom of India, unfettered by the traditions of the past... an ultramodern city... a city of the future designed by Le Corbusier.” The city of Chandigarh was given to Le Corbusier, a Swiss-French architect, and Jane Drew. While commissioning the project and hence the commission to plan the city of Chandigarh was more of a professional feat of architecture, it is not clear whether Le Corbusier’s design intent relies on the works of Balkrishna Doshi and Charles Correa who defined “Indian” architecture with modern paradigm.

Le Corbusier’s Vision

Chandigarh is the first planned city in the future designed by Le Corbusier, a Swiss-French architect along with Pierre Jeanneret, Maxwell Fry, and Jane Drew. While commissioning the project and hence the commission to plan the city of Chandigarh was given to Le Corbusier, a Swiss-French architect, it is not clear whether Le Corbusier’s design intent relies on the works of Balkrishna Doshi and Charles Correa who defined “Indian” architecture with modern paradigm.

Site Analysis

Strategies

- Encouraging public engagement
- Promoting diversity with different land use
- Promoting variety of group activities
- Encouraging people to occupy the area

Activities

- Giving buildings access to major roads
- Connecting Kansal village directly to the city
- Preserving existing trees
- Increasing plant diversity

Green Cover

- Farmers Market
- Promoting agricultural tourism
- Expanding the agricultural land

Connections

- Arteries
- Lungs
- Heart
- Head

Rhythm and Repetition

- Mostly present in Indian architecture
- Creates a sense of enclosure and privacy
- Creates a sense of enclosure and privacy
- Creates a sense of enclosure and privacy

Colonnade

- Generally, in the center of the building
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside

Open to Sky

- Generally, in the center of the building
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside

Closed Spaces

- Mostly surrounded by open court
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside

Prominence

- Adds character to architecture
- Adds to the characteristics like prominence
- Adds to the characteristics like prominence
- Adds to the characteristics like prominence

Corridor

- Extends the length of the building
- Provides a path for people to move from one section to another
- Provides a path for people to move from one section to another
- Provides a path for people to move from one section to another

Fractal System

- Roads
- Vehicular Paths
- Fractal system

Orientation

- Lobby
- 1st Floor Plan Section
- 1st Floor Plan Section
- Building Scale

Building Scale

- Lobby
- Exihibitions
- Site Analysis
- Historical Research
- Architectural Analysis
- Axonometric
- Section
- Elevation
- Elevation looking Southeast
- Elevation looking Northeast
- Plans

Connections

- Arteries
- Lungs
- Heart
- Head

Rhythm and Repetition

- Mostly present in Indian architecture
- Creates a sense of enclosure and privacy
- Creates a sense of enclosure and privacy
- Creates a sense of enclosure and privacy

Colonnade

- Generally, in the center of the building
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside

Open to Sky

- Generally, in the center of the building
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside

Closed Spaces

- Mostly surrounded by open court
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside
- Serves as a transition between inside and outside

Prominence

- Adds character to architecture
- Adds to the characteristics like prominence
- Adds to the characteristics like prominence
- Adds to the characteristics like prominence

Corridor

- Extends the length of the building
- Provides a path for people to move from one section to another
- Provides a path for people to move from one section to another
- Provides a path for people to move from one section to another

Fractal System

- Roads
- Vehicular Paths
- Fractal system

Orientation

- Lobby
- 1st Floor Plan Section
- 1st Floor Plan Section
- Building Scale

Building Scale
Good:
Through thorough research, I was able to understand the existence of Chandigarh and the history behind its evolution. The research helped me understand the decisions Le Corbusier and other architects made during that period of time while dealing with lots of pressure politically, socially and culturally. It made me understand their viewpoints and thought process behind their work. I was able to comprehend and document the research in concise manner to further help me with the design of Sector 1 and the building I was supposed to design. It gave me a good start at the planning of Sector 1 due to the research since I knew the problem and now had a solution to that.

Bad:
After research, I do not think I was able to apply the knowledge and come to a better solution for the project. I was not able to go further in-depth for the building scale solution to the thesis. I had a vision and wanted to come up with a style that can define ‘Modernism’ in Indian context. But in the process, I seemed to be directly applying the ideas instead of abstracting it. Whether it came to implementing the concept of Vastu Purusha Mandala system or the details of arches. In terms of design, I lacked in many ways and was not able to defend my case against Le Corbusier’s architecture.

Conclusion:
Overall, it was great in terms of the research of the project backed in the translation of the term ‘Modernism’ in Indian context and the ancient Indian architecture. I can research and analyze the entire city of Chandigarh in terms of its existence, evolution and propose a future solution to it in that manner. Sector 1 would just be a first step in the documentation and the study of Chandigarh under the global as well as regional and cultural context.
LIST OF REFERENCES


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