Colour Identity in Architecture

The change in architectural identity due to availability and making of colour

Colour identity in Architecture:

The change in Architectural Identity due to availability and making of colour

Submitted By

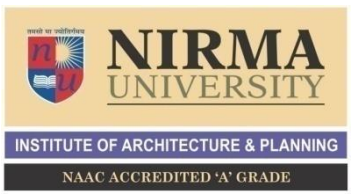
Yesha Jadav

15bar52

Guide

Prof. Jitendra Meghani

June 2020



Institute of Architecture & Planning, Nirma University

Colour & Identity

ORIGINALITY REPORT

5%	0%	5%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Sara Hukmat, Havva Arslangazi Uzunahmet. "The Decorative Orientations in the Mediterranean Architecture and its Influence on the Development of Cultural Sustainability", European Journal of Sustainable Development, 2020 Publication	5%

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		

Declaration

I**, Yesha Jadav, 15bar52**, give an undertaking that this research thesis entitled "**Colour Identity in architecture**" submitted by me, towards partial fulfilment for the Degree of Bachelor of Architecture at Institute of Architecture and Planning, Nirma University, Ahmedabad, contains no material that has been submitted or awarded for any degree or diploma in any university/school/institution to the best of my knowledge.

It is a primary work carried out by me and I give assurance that no attempt of plagiarism has been made. It contains no material that is previously published or written, except where reference has been made. I understand that in the event of any similarity found subsequently with any published work or any dissertation work elsewhere; I would be responsible.

This research thesis includes findings based on literature review, study of existing scientific papers, other research works, expert interviews, documentation, surveys, discussions and my own interpretations.

Date: 20th June, 2020

Name :**Yesha Jadav**
Roll number: **15bar52**
Institute of Architecture and Planning,
Nirma University, Ahmedabad

Approval

The following study is hereby approved as a creditable work on the subject carried out and presented in the manner, sufficiently satisfactory to warrant its acceptance as a pre-requisite towards the degree of Bachelor of Architecture for which it has been submitted.

It is to be understood that by this approval, the undersigned does not endorse or approve the statements made, opinions expressed or conclusion drawn therein, but approves the study only for the purpose for which it has been submitted and satisfies him/her to the requirements laid down in the academic program.

Thesis Title : Colour Identity in Architecture - Change in Architectural Identity due to availability and making of colour.

Student Name :Yesha Jadav
Roll Number : 15bar52

Date: 20th June, 2020

Prof. Jitendra Meghani
Guide & Senior Faculty
Institute of Architecture & Planning, Nirma University, Ahmedabad

Prof. Vinay Shah
Professor and Thesis Incharge,
Institute of Architecture & Planning, Nirma University, Ahmedabad

Prof. Utpal Sharma
Director,
Institute of Architecture & Planning, Nirma University, Ahmedabad

Acknowledgement

Living in this present generation of competition and in race of being different, a special thanks to my 'Dada' who blessed me with a will to follow my instincts. A big thank you my parents who allowed me to follow my instincts in every step of my life and my brother who made me believe strongly into myself.

A huge thanks to my guide prof. Jitendra Meghani for guiding, supporting and reminding me in every discussion to make me move further in right direction. Special thanks to Binita Pandya for helping me and giving me direction.

My loving friends and classmates especially Nikita Gajera, Nupur, Rachita and Meenva for their support and immense discussions. Special thanks to meenva for breakfasts. Milan, Vishesh and Lalit for always giving me practical solutions and boosting me up. Jugal and darshan for asking me constructive questions and showing me a different perspectives and direction with a sip of tea. I would like to thank Vijay for healthy discussions on my skills which always made my thinking more strong. Lastly my fellow companions under our guide - Niyati, Taruna, Meenva and Manvi for being with me and making me happy out of the confusions. To my batch mates - Swati, Ishan, Surbhi, Nikita and Khushbu for taking time and providing me content for my thesis.

Last but not the least my school friends who always helped me and were available whenever I needed in the process of research despite of being in different fields. Special thanks to Tanmay for the long drives and listening to my each every doubt and giving me a perspective and hope to move ahead.

Special thanks to Vatsa and Akshay to help in my Reserach and motivating me during the final submission.

"I underline the study of colour above all"
- Luis Barragan

"Colour in architecture - A means as powerful as the ground plan and section. Or better :Polychromy a component of the ground plan and the section itself."

- Le Corbusier

Colour Identity in Architecture

The change in architectural identity due to availability and making of colour

Abstract

Colour and Identity are elements which are build through vision. Colour is a important phenomena of the natural environmental and manmade architectural set up around us. These qualities of colour are used in architecture which forms a language that becomes an identity.

Identity differentiates the urban surroundings of two different groups, community or culture. Architecture is a part of the identity of each community which carries message, concept and Characteristics which depends on the geography, traditions, manners, insights, knowledge and history.

Colour identity in architecture is experienced through visual perception. It is used in architecture for identification, Classification or distinguishing between places in the visual environment. The colour identity can differ with scale and development through time. Colour Identity earlier and the colour used earlier are different than colour used now. So the paper focuses on the changes in colour and identity and the reason behind the change by analyzing places through concepts of colour theory.

Key words: Colour, Identity, Colour theory, Colour Architecture, India.

Table of contents

Introduction

Architecture is composed of two aspects, one which is tangible - Form, Shape, structure, elements etc. and the other is intangible - Experience, perception, appearance etc. These aspects come from the sensorial interaction that creates an identity or image which connects us. Colour has the ability to communicate through a language that is understood by all. Colour is a sensory perception and it has certain qualities that can be used in architecture to connect with the environment and the people.

There is a wide range of use of colour in architecture followed by different ideologies, choices, different environmental scales and perceptions. With different values and objectives, colour has created a language that can become an identity, for example, the colours used in the cities of Europe, the ancient Greek Polychromy, the works of various architects and designers such as Le Corbusier, Luis Baraggan, Bruno Taut etc.

This paper reflects analyzing on different types of colour identities of places which either lead to identity crises or gave birth to evolved identity by the colour influences, science and development of new technologies and ideas. There is a shift in language and styles in architecture through time. Earlier the identity was based on culture or ideology of group of people which now has shifted into an individual choice leading to Individual identity. For example, the colourscape of the present scenario of any city seems polluted as the colour choices are based on individual choice and not place specific. The research focuses to know the colour difference between different environmental scales and periods by applying the concepts of colour theories in architecture and to know the identity crises

Research Question

- How colour generates identity in architecture?
- What are the changes in Colour architecture with time and development in colour science?
- What is the difference in the colour identity in architecture with different environmental scale and approaches?

Aim and Objectives

The aim of the research is to study colour as identity in architecture and analyze the change in the colour scheme through time in India with the help of colour theory

- To study colour application in different periods and styles in architecture.
- To study the characteristics of colour that generates identity in architecture
- To Study the colour theories to understand the qualities of colour and how they work .
- To analyse the difference in colour identity in different periods with the help of colour theory.

Scope and Limitations

Due to pandemic the documentation is not possible of primary case studies selected. The primary case study is taken as a location possible to visit during pandemic. The analysis of colour is done without considering light, shadow and time of the place when documented. There will be no accuracy in colour configurations as the documentation will be collected from different sources. The research will have to use multiple examples and their analysis to connect to the thesis statement. The analysis can be done only to the cases that has abundant information available online.

The research has a scope of digging deep into layers of environmental scales in the same place. Documenting

and colour mapping of a house, a street, a neighbourhood and the city can give a better understanding of the change and stability in colour identity of a place. Analysis could also include the weather effect on the building which changed the colour through time. The research can be done on the volumes and space in architecture which can make the thesis strong from architecture point of view.

Method and Methodology

To examine the nature of colour identity in architecture the research needs to be done in the history of architecture extracting the information about the architects and movements in colour till now. To understand the difference in colour perception with different scales and ideologies the research follows a multidisciplinary approach for the literature review. Covering multiple approaches connecting the colour study and applying it on the case studies and analysing them will result into a conclusion.

Part I: Literature review

- History of colour in architecture
- Colour as Identity
- Colour theory

Part II: Case study

- Case study selection
- Data Collection of case study
- Literature review on case studies

Part III: Application of study

- Analysis
- Conclusion

The selected case studies will be analysed through the collected photographs. A colour palette for each case will be created by extracting the colour from the photos which will become the base for caring out the analysis.

The analysis will be done under the selected concepts taken from colour theory, material, concepts of colour identity and the environmental scale. The extracted data of each case will lead the research to compare and conclude the research question and will develop a wide discussion on the research by connections and comparisons.

Chapter 01

Understanding Colour and Identity

1.1 What is colour?

The biological function of colour - Orientation
Camouflage
Warning
Identity

Colour can create communication. Anyone can identify colour in his environment. Color is a sensory perception, and as any sensory perception, it has effects that are symbolic, associative, synesthetic, and emotional.

Colour is used is used to symbolize certain values and meanings of specific culture when it comes to Religion. For example, white colour is considered a symbol of purity, Red is considered as a symbol of love as well as danger etc. So different culture symbolizes colour with different meanings.

On the other hand colour also connects people with experience. Humans have a feeling which develops sensations in their body, due to which every person develops their own choices based on the emotion they feel. Certain colour evokes certain feeling which later connects with the people through emotion and experience.

By Frank H. Mahnke

Color is an integral component of our world, not just in the natural environment but also in the architectural setting created by man. Colour has also played a part in the cycle of human evolution. It perceives the world and its colors, and the brain analyses and evaluates what it perceives on an objective and subjective basis. Psychological control, communication, knowledge, and psyche effects are aspects of our processes of perceptional judgment.

1.2 What is Identity?

Identity evolves from **Qualities, Beliefs, Personality** and **Expression** which creates self image, self esteem and individuality according to psychology.

Identity is a collection of material, biological, psychological and cultural signs which distinguish each person, group, population or culture from each other. Culture has layers creating an image.

There are three main cultural components-identities, culture, intent. Community refers to different groups of people with some commonality which adapts change and alignment functions. Goal refers to having experience on the journey which enriches the uniqueness of each community or person and links the roots of their culture-forming identity. (Brahman, 2013)

The first layer of cultural identity has individual or community membership in such fields as Academic, Educational, Financial, Economical, Political, Cultural etc. creating both an individual’s identity and a group identity. These identities are the identities which are most visible and tangible. (Brahman, 2013)

The second layer is the Conscious, but is not dominated by us. Over the lifetime of several generations this layer of cultural identity is established, and any change in it takes several generations. The best example is any community's lifestyle is developed by multi-generation layers and their changes due to their changes in surrounding and environment. (Brahman, 2013)

The third category is the unconscious. It takes long periods of time to establish this order of cultural identity and is stronger for communities with longer historical experience and longevity on ground. (Brahman, 2013)

Identity and Architecture

The identity of culture is not limited to people, language, clothing , food etc. It also includes the urban environment and the environment. Architecture is a part of each community's identity that carries messages, concepts, and features that depend on geography, traditions, manners, insights, knowledge, and history. (Xu J. J., 2016)

Identity is the ability to differentiate one item from another and to recognize it. Identity is the environmental attribute that doesn't change in different circumstances. Features in this environment can be physical-shape, size, decoration, construction style, etc. and it can function and specific activity.

Lynch considers identity to have two major functions. The first function is acknowledgement. In other words, identity gives us the ability to make judgments and helps us understand and predict the environment. The second function is the name of ambient emotional structure.

Stability and Change - Two main Identity characteristics. Identity takes into account social history and historical characteristics that are the results of individual experience. The sense of identity is different in different cultures, because of the contrast between these interactions. (Xu J. J., 2016)

1.2.1 Colour and Identity

Identity is an important factor in the environment for anything. Identity creates an image or a symbol for people to remember something. In architecture the character of a building will impact on the surrounding environment and people creating an identity.

With the impacts of urbanisation and the identity of certain places changes. The stability of holding the identity is lacking with increasing effects of urbanisation. The environments looking more similar and lacking individual character, in terms of architectural style of architecture. (Gorzaldini, 2016)

The image of a place from the point of view of colour can strongly affect the environmental setting. Colour experience is a visual phenomenon which has differentiate and distinguish. For example - Jodhpur or Morocco with the blue architecture blends with the environment, the colourscape of Burano or the cities of Europe stands out in the environment. Colour is not just a visual phenomenon; colour can communicate and can develop a sense of attachment which generated from emotional and cultural parameters. Every place holds a meaning through their social and cultural activities. Colour adds an important dimension and can strongly link to sense of place.

The elements of environment communicate through two different meanings: Perceptual and Associational. The perceptual meanings are the differences that have significance and meaning by differentiation and drawing attention by its visual phenomenon. The associational meaning decodes the meaning of elements by developed attachment towards behaviour, culture, context or

situation. The literature will look three aspects based on the meanings - Visual, Cultural and Environmental.

i. Visual Perspective

Our eye always attract towards the uniqueness of any place through our own perspectives and purposes such as personal, social, place identities, ethics etc.

There are two concepts with common meaning: Sameness and Difference. Colour identity allows places to get unified or be differentiated from surrounding. The visual perception is the immediate reaction of people experiencing a colour image in any place. Through the meanings of sameness and difference one can identify the colour in the environment by the concept - Blend in and Stand out. (Juan Serra, 2012)

Blend in and Stand out

In the concept of blend in and stand out the surrounding context becomes the base for understanding it. The surrounding could be anything such culture, environment, urban landscape etc.

This concept on one hand aims to gain attention by using an opposite or contrasting colour scheme in architecture which makes the place different, unique and make the place stand out. On the other hand it says to harmonise or blend with the existing surrounding, colour implementation attempt to have a similar effect with the existing colourscape by considering the cultural reference. This creates a 'colour attachment' through camouflage effect and 'colour detachment' occurs when the colours is used in contrast to highlight the architecture in environment. The similarity and distinctiveness of colour directs the study to colour theories of colour harmony and colour contrast. (Molanaie, 2017)

ii. Environmental scale

As identity differs from an individual to a group in the society, same way it also differs in different environmental

scale. The architectural features create a difference between small-scale and large scale environments as its own identity. The area of impact of each scale differs. The size and proportion of elements affects the visual perception and also the identity of any particular colour language. For example, a colourful house in a street can build identity in the street but it may not have impact if we look at the identity of the entire city. Similarly a city cannot have impact and value of its identity until it is compared with other places.

To understand the colour identity one needs to know the environmental scale to identify the single colours as a representation of the colourscape. From the details of the building till the scale of city identity can vary or may not. (Xu J. J., 2016)

iii. Cultural Dimension

Cultural identity is a result of the sense of belonging towards the message, concept and characteristic of an individual or a community. It depends on the geography, traditions, values and manners, knowledge and history which is running through several generations. The characteristic becomes stronger through stability which becomes an identity. On the other hand with the influences which destroys the prevailing identity, but at the same time it also builds an origin for new identity. So stability and change are the two main characteristics of identity.

In cultural aspects colour has a associational value. Colour can communicate through symbols and meanings. Colour identity in a place represents the local cultural dimensions. Local colour identity represents the memories and the personal experience of an individual or a community, which do not allow instability or change. Colour as a strong visual element plays a crucial role of enhancing the image of city memories. The colours provide a local environment which increases the beliefs knowledge which then is manifested as identity. (Xu J. J., 2016)

Chapter 02

History of Colour in Architecture

Colour can link the realms of architecture, history and culture through its impacts on experiences, meanings and perceptions. Today, as in the past, colour can be interpreted as representing city-related semiotic recognition, belonging, and qualities.However, by juxtaposing or replacing vernacular colors with global and often contextually meaningful colors or by an architect's subjective choice, the development of architectural materials and representational technology is transforming the color palettes and identities of cities.
Architecture started evolving according to the easy availability of local material which includes natural pigments. Dependency on local materials and environments leads to the evolution of new forms and styles in architecture. The philosophical perspectives and attitudes towards the architectural significance and use of color have undergone transformation over time. With the intervention of time, philosophy, theories, attitudes and technology, there was color transformation in architecture.

Ancient age

Cave paintings as a method of expression.

Traditional architecture

Locally available material with culture playing a major role.

Architectural styles-Isms 19th and 20th ce

Art movements, philosophies, styles and theories

The division of human behavior in which color does not hold a significant role is hard to name. At the same time the language of color is an artistic-aesthetic and functional-utilitarian sign system for men. The first is focused on the meaning of colour, community of colour, and the second-on perception psycho physiological characteristics, reaction to colour. From the level of awareness of the role of color in different areas of life, and the gradual transition from mythological awareness to natural scientific knowledge of colour phenomena nature.

2.1 Ancient age

Since ancient times until now color has been an aspect in the field of architecture and art that has produced styles, trends, theories etc. In ancient times color was used for painting in caves to reflect the Mystical forces, emotions, and tales. Color had no connection to form or aesthetics. People used single color pigments that are naturally available to use multiple colors in the same space.

fig 2.1: Painting from Natural Colour

In ancient times, colors had played a significant role. Even before they settled in houses, ancient people began to paint in caves and became interested in architectural design. Many illustrations have been found on all continents which show how animals in the prehistoric era were crucial for human survival. These cave paintings were produced about 10,000 – 40,000 years ago, during the stone age.

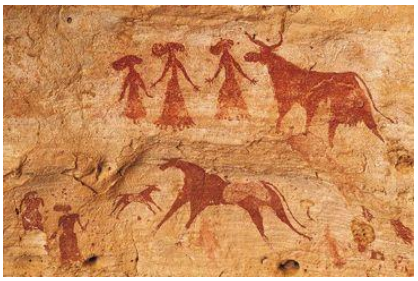


fig 2.2: Cave paintings with animals

The use of colors in ancient times was not only limited to painting. It is believed that many statues and monuments that are colorless today, like the Temple of Aphaia on the Greek island colour has degraded over time, like the degradation of marble or stone. Many of the creations from ancient times like ceramic figurines, temples, and statues were decorated with intense colors. The decoration on architectural elements was done with multiple colours which lead to a style - Architectural polychromy.

Ancient sculptures have been crafted to make them lifelike. Metopes, friezes, and other sculptural elements placed high up on temples were given bright red and blue backgrounds so that the scenes, executed in relief and often painted in lifelike shades, would be more readily visible from the ground when viewed.

fig 1.3: Elements of architecture highlighted with colours

2.2 Traditional Architecture

Traditional or vernacular architecture evolved from the basic requirement of the people, Locally available material for the construction and the climate and environmental factors. People with different mindsets and beliefs are differentiated by their culture. Culture plays a major role in traditional architecture. Traditional architecture reflects the culture of a specific area and people. Colour in traditional architecture is majorly the inherent colour of the material used or the paint on the surface from the material locally available.

"I had been seeing the world in black and white and, when brought face-to-face with India, experienced everything re-rendered in brilliant Technicolor."
-Keith Bellows

Taking India as an example, it is a country with a rich history of architecture with a variety of culture, tradition and religion. Indian traditional architecture comprises majorly of three different building typologies :
Religious building (Temple, Mosque)
Regional houses
Monumental building (Fort, Palaces, Tombs)

In India, colour holds a great importance in every aspect such as religious traditions, mythologies and stories, Festivals , Buildings etc. Colour is a powerful tool to express the culture of the region. In the land of varied culture there are different expressions of colour in every building typology such as :
Inherent colour of material
Colour as a paint on the surface
Mixture of material and colour

There are combinations of material colour resulting in varied colour language and colour schemes. The colour language derived is the result of the reflection of culture of different areas. Another important factor for the colour scheme is the climate.

Colour works as a tool to translate the traditions and art into architecture. As a result the Language becomes the identity of the place.

Inherent colour of material

fig 2.4: Mud houses of Indian Village

fig 2.5: Red sandstone used in Red fort, Delhi

fig 2.6: White Marble used in Taj Mahal, Agra

Colour as a paint

fig 2.7: Blue paint in the Jodhpur, Rajasthan

fig 2.8: Pastel shades in the old city of Goa

fig 2.8: Bright and Vibrant colours of south Indian temples

Mixture of Colour and Material

fig 2.9: Yellow sandstone with Blue paint in the fort of Gwalior

fig 2.2: Mud houses with white paint in the Houses of Kutch

fig 2.11: Mixture of Clay tiles , wood and colour in the traditional Goan

2.3 Colour in Architectural Styles - Isms

From ancient times, the influence of color was valued, from wall paintings to Greek polychromy. Romans were also influenced by polychromy. Due to the environmental factors and less longevity of natural colours the architecture turned into simple monochromatic language. Due to this there was a split of fine arts and architecture, resulting into fading power of colour in architecture.

This split was the result, according to Victor Vasarely, of: (1) The rise of humanism and the search for knowledge that contributed to the specialization of positions in art and science; (2) a new interest in ancient Roman culture and the rediscovery of classical philosophy with its subdued color palette, leading to the perception of medieval color symbolism as hair splitting and, subsequently, to the birth of the idea of 'art work. By refusing color as a representation of a language of the universe, a imaginative Renaissance man was inspired to use naturalistic color to reflect depth and create a three-dimensional illusion to show the world's true colour. Therefore the lavish use of vivid color in architecture, prevalent in the Middle Ages, decreased from the Renaissance onwards.

2.3.1 Neoclassicism

Neoclassical architects of the 18th century adhered to their belief in Greek monochrome architecture and built brown, white or monochrome houses. Neoclassical architecture is distinguished by greatness of scale, simplicity of geometric forms, Greek — especially Doric order — or Roman detail, dramatic use of columns and a preference for blank walls.

fig 2.3: United states Capitol, Monochromatic White architecture

Archeologist Jacques-Ignace Hittorff had developed a new interest in and attention to color in the mid-19th century. In ancient Greek temples and sculptures, Hittorff discovered that the Greek building façades is lined with bright pigment layers reflecting the love of color of the Greeks. This exploration modified a long-held view of Greek architecture's monochromaticity and created a new chapter in colour-use history. In addition, John Ruskin 's thoughts and views had a great influence on 19th-century

architects and artists, and later on the founders of modern architecture, in removing Greek color confusion. The artist's main role, he argues, is "truth to nature." Ruskin introduces seven moral categories in The Seven Lamps of Architecture (1849), which include consideration of colour: sacrifice, truth, power, beauty, life, memory, and obedience; He advocates material honesty, without painting (Ruskin. J 1849).Although he visualizes monochrome sculpture, however, he takes a different approach to architectural color use.

Kazimir Malevich and Piet Mondrian contributed to the use of color in the internal and external built environments through their art among various artists who had an influence on the changing perceptions of the use of architectural colour. Mondrian 's color values influenced primary color collection and the 19th century exclusion of impure colors such as gray.

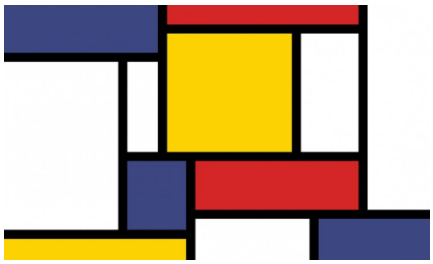


fig 2.4: Piet Mondrain's Art. Use of primary colours

Color became the central visual paradigm presented in Impressionist and Symbolist paintings in the late 19th century, as well as in some architectural designs (Gage 1999). Van Leeuwen describes the Impressionists in The Language of Color as a movement that brought color back to Western art and architecture and ended the "monochrome era."

In the 20th century, attempts at creating a relationship between artists and architects led to the appearance of a few short-lived movements (Durao 2012).In the early 20th century, Art Deco (movement in decorating art and architecture) and Art Nouveau (art and architecture style) saw color as a graphic solution and tended to use single-color themes to support organic forms in the interior.

2.3.3 Art Nouveau

Ornamental art style that flourished in all of Europe and the United States between around 1890 and 1910. Art Nouveau is characterized by its long, sinuous, organic line and has been most frequently used in architecture , interior design, jewelry and glass design, posters, and illustration. It was a conscious effort to establish a modern style, free from the imitative historicism that dominated most of the architecture and design of the 19th century. Spanish architect and sculptor Antonio Gaudi, perhaps the movement's most innovative artist, went beyond line

fig 2.5: Work of Antoni gaudi, Colourful stained glass and the free form

dependency to turn buildings into sleek, bulbous, brightly colored, organic structures.

2.3.4 Modernism

In addition, constructivism, expressionism and neo-plasticism or the movement De Stijl believe in color as a symbol of strong emotional and subjective essences.

Rietveld's Schroder House is a great example of the use of color in this movement, which attempts to emphasize function, create illusion and add a special quality to space (Porter. T 1982).He used non-chromatic (grey, white and black) and chromatic (red , yellow and blue) colours, particularly primary colours, for coloring the windows and supporting balcony girders for the interior and exterior of the house.

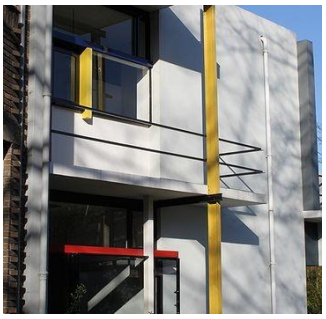


fig 2.6: Schroder House, Rietveld

A few years later it seems that, under De Stijl 's influence, Le Corbusier modified his theory of color, which is clearly shown in his 1931 essay on architectural polychromy. His new belief in the power of color inspired his architecture's use of color, such as Pessac Housing, to emphasize the separation from the outside.

fig 2.7: Pessac Housing, Le Corbusier

The most prominent colourist of the Modern movement is known as the painter-architect Bruno Taut, who was a contemporary of Le Corbusier. He was a strong promoter of color use, amalgamating architecture's logical and social skills by using heavily saturated colors for his designs (Lancaster 1996).He was also the first German architect who successfully used color as a tool for social recognition and communication. His 1915 Berlin Falkenberg housing project, which was known as the Paintbox Settlement, made him a pioneer of the constant color scheme.

fig 2.8: Paintbox Housing, Bruno Taut

For example, Adolf Loos, who was an influential modern European architect, believes the use of any form of decoration is a crime and color is no exception. His perspective was preceded by that of Ludwig Mies van der Rohe, another pioneer of modern architecture, whose aphorism is "Less is more," which culminated in a new

approach to design and color use known as Minimalism. But the importance of colour has not been overlooked by Minimalists. Consequently, even the white of the modern Purist architect was intended to allow the chromatics of the landscape to be seen more strongly in contrast to their architecture in white or glass. Yet Minimalists haven't forgotten the importance of color. Consequently, in comparison to their architecture in white or glass, even the white of modern Purist architects was intended to allow the chromatics of the landscape to be seen more clearly.

2.3.5 Brutalism

The raw architecture of the modernism period. It was a broader regeneration of modern architecture. The movement started by using the raw form of the material used in the buildings are a representation of aesthetics and honesty towards the material. The brutalism was mainly made of raw concrete which reflects the shades of grey. (Lee, 2016)

fig 2.9: Unité d'habitation, Le Corbusier

The monolithic concrete buildings composed of blunt rectangular forms, devoid of colour decoration or symbolism with hulking, inhuman scale. The movement started with Le Corbusier from 1920's architecture comprising of simple cubic forms of raw concrete. Concrete flaunts subtle beauty with a sense of permanency. (Huppatz, 2019)

fig 2.10: Habitat 67, Moshe safdie

After the second world war, with the advent of metal reinforcing, concrete came with strong structures and to a greater expanses - Brutalism became a global phenomenon.

2.3.6 Deconstructivism

Brutalism was developed mainly in the same time than modernism, while by the other hand deconstructivism was a post modern movement.

Deconstructivism emerged in the late 1980's and early 1990's. The style was composed majorly by concepts such as Fragmentation, Redefinition of shapes and forms, Abstract nature, Manifestation of complexity, Smooth structural surface and Exposed material. The style focused on breaking the basic concepts of modernism.

fig 2.11: UFA cinema centre, Coop Himmelbau

Freedom of form was more important than functional concerns.

Deconstructivism like brutalism believed in exposing the material with a more expansive vision of also exposing the structural possibilities of a material. Majorly glass and metal were used in the buildings with the advancement in technology. Same as brutalism shades of grey was the identity in perspective of colour but with different texture. Due to difference in material and form the buildings of deconstructivism look lighter than the buildings of brutalism. Due to the use of glass there was transparency in the form and mass which make the building lighter and not inhuman in scale. (Lansroth, 2015)

fig 2.12: Guggenheim Museum Bilbao, Frank Ghery

Chapter 03

Colour Theory

3.1 Newton's Colour Spectrum

Sir Newton in 1676 Issac, discovered a colour spectrum by analysing the white sunlight using a triangular prism. Newton performed an experiment by passing sunlight through slits which falls on the prism, the ray of white sunlight dispersed into spectral colours. A band of colours from Red to Violet were refracted from the prism. The addition of three colours will again result in a white light.

fig 3.1: Newton's Spectrum Experiment

Later by experimenting more with these colours by dividing and mixing colours with each other he developed a colour theory. As a result he concluded that colour results from light waves with a particular kind of electromagnetic energy.

Newton discovered the colour wheel from the spectrum of colours. The spectrum and the wheel was comprised of seven colours : Red, Orange, Yellow, Green, Blue, Indigo, Violet. These colour are the pure colours according to Newton. Each hue has a specific wavelength and frequency. (Birren, 1970)

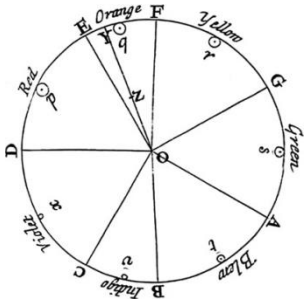


fig 3.2: Newton's Colour Wheel

3.2 Colour Terminologies

After the several research and developments in colour there are some basic technical terminologies every colour theory and system follows.

Primary Colours

Red , Blue and Yellow are the primary colours. Primary colours form the basis for colour theory or colour mixing. The primary colours cannot be formed by mixing other colour.

fig 3.3: Primary Colour

Secondary Colours

Two primary colours when mixed gives a secondary colour.

Yellow + Red = Orange
Red + Blue = Violet or Purple
Blue + Yellow = Green

fig 3.4: Secondary Colour

Tertiary colours

Mixing one primary and one secondary colours yields a tertiary colour.

For example, Yellow + Green = Greenish yellow

Tertiary colour is an equal combination of two colours, left and right in the colour wheel.

fig 3.5: Tertiary Colours

Complementary colours

The pair of colours located directly opposite in the colour wheel are called the complementary colour.

For example, Yellow is a compliment of violet or purple

The complementary colours appears very vibrant and contrasting and draws maximum attention.

fig 3.6: Complementary Colours

Analogous Colours

The combination of colours located immediately adjacent to each other on the colour wheel are called analogous colours. The combination will have on e colour in common.

for example, Yellow, Yellow-orange, Orange

The analogous colours are harmonious in nature, they

blend in and the combination will not appear eye catching.

fig 3.7: Analogous Colours

3.3 Colour Theory by Johannes Itten

Johannes Itten is considered one of the greatest teachers of the art of colour in modern times. He devoted many years into visual, psychological and aesthetic mysteries of colour. Having a profound interest in painting and colour he paid attention to the master work of Goethe, Schopenhauer, Runge of Germany and Chevreul of France.

Itten saw relationship between music and colour and due to this he gave attention to geometrical paintings and its abstract colour expression. (Birren, 1970)

3.3.1 Twelve part colour circle

The primary colours defined with the greatest possible accuracy is placed in an equilateral triangle with yellow at the top. A circle is circumscribed about the triangle and a hexagon is inscribed in it as a result three isosceles triangles are formed on the sides of equilateral triangle. In the isosceles triangle three mixed colours are placed each composed of two primaries. Thus we obtain the secondary colours. Another circle is made outside the first circle with a convenient radius and divided the ring between twelve equal parts. In the ring, the primary and secondary are placed again at their appropriate location. A blank part between every two colour is formed. The blank part is filled with the tertiary colours formed by the primary and secondary colours besides it. The twelve hue are evenly divided having complementary colours located exactly diametrical to each other.

fig 3.8: Colour Circle

The colour circle comprising of all the primary, secondary and tertiary colours form a sequence of colours just like the rainbow on natural spectrum. The colour circle is similar to the colour circle obtained by adding purple between red and violet in the spectral hues. (Birren, 1970)

Based on this itten developed two theories:

1. Colour Contrast
2. Colour Harmony

3.3.2 Colour Contrast

Itten believed that human sense organs can function only the means of comparison. The eye accepts a larger object as long when a smaller object is kept besides for comparison and vice versa. Colour effects and combinations can similarly intensified and weakened by contrasts. Humans perceive contrasts when distinct differences are observed between two compared effects. Thus, white-black, Cold-warm, Large-small, are examples of its extremes, that is the differences are at their maximum degree, such contrast are called diametrical or polar contrasts.

Johannes Itten based on the characteristic of colour effects developed seven colour contrasts, each having unique and different characteristic in visual, expressive and symbolic effect and together they provide a resource of colour design. (Birren, 1970)

1. Contrast of hue

The contrast obtained by the combination of undiluted colour with their most intense luminosity creating a colour vision are described as contrast of hue. As it is clear that Black-white are the extreme opposite of light-dark contrast same way the combination of primary colours - Red, Yellow, Blue is the extreme instance of contrast of hue. At least three clearly different hues are required to obtain a contrast. The intensity of the contrast will as the hues from the three primary are removed. Thus the effect of secondary colours -Orange, Green and Violet is less than Yellow, Red, Blue and same way the effect of tertiary will be even less than distinct.

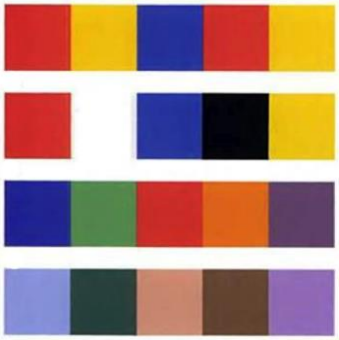


fig 3.9

a. The strongest expression of Contrast of hue.
b. White/Black/Red/Yellow/Blue
c. Colours with greatest Luminosity
d..Same colours with different tints and shades

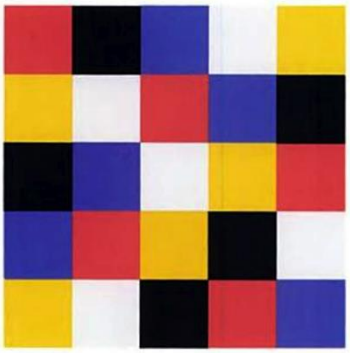


fig 13: Checkboard pattern in Yellow, Red, Blue, Black and White

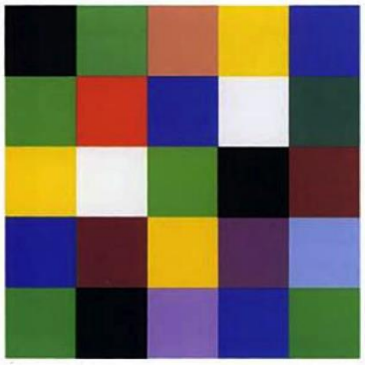


fig 14: Colours with greatest Luminosity with tints and shades, black and white

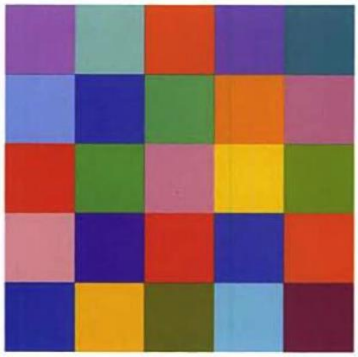


fig 3.11: Colours of greatest Luminosity

White and black are the power full elements in any colour design or composition. When one uses black or white to separate the single colours the individual characters emerge more sharply, but at the same time interaction and mutual influences decreases to some extent. Yellow, Blue and red is the strongest contrast oh hue but the contrast can only be obtained changing the luminosity and through the tints and shades of the colours. (Birren, 1970)

2. Light-Dark Contrast

The polarity of day and night, light and darkness is a fundamental significance in human life and nature generally. Black and white is the strongest expression of light. The effects of black and white are opposite with the shades of gray between them. There is only one maximal black and one maximal white but numerous light and dark shades of gray forming a scale between white and black.

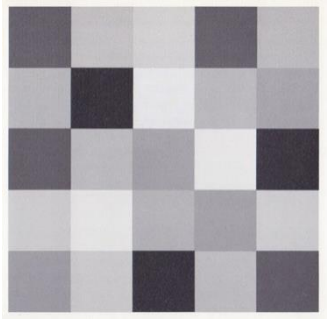


fig 15: Light-Dark composition in Black, white and grays

Gray is a neutral colour and achromatic colour which can be easily transformed into minute modulations of shading. Gray can be influenced by contrasting shade and hue. Any colour can change gray to a complementary colour effect from its neutral, achromatic state. Gray can be mixed from black and white or from yellow, red, blue and white or from any pair of complementary colours.

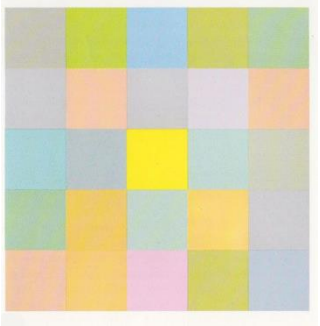


fig 16: Colours of equal brilliance

As we can develop a series of gray from white to black placing the steps evenly without any black or white lines in between differentiating them. Similar scale can be developed for any chromatic colour using black and white. This shades represent the light-dark composition of a particular colour.

Individually we have only considered light-dark contrast in the range of black, white and gray and the evaluation of same in the chromatic colour. But the relationship of chromatic colour to the achromatic colours is far more complicated. Gradations are brilliances of achromatic colours are easily distinguished, and so are those within individual chromatic hue. Difficulties arise when the gradations of different hues are compared.

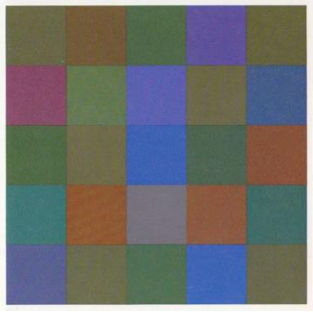


fig 17: Colour of equal darkness

The twelve equi-distant steps of gray from white to black in the first row. The same steps are repeated for the twelve hue of colour circle, in equal brilliances to the corresponding gray. As a result in the fig. it is clear that all pure colour answers to different steps. Yellow to third step, Orange at fifth, red at sixth, violet at ninth etc. As a result the chart shows yellow colour is the lightest colour and violet is the darkest colour. If we observe any horizontal row we can conclude that the brilliance of every

hue is different in the same row. So in the composition of light contrast the brilliance of each hue differs. If we put different hues for same brilliance the hues might loose its radiance. (Birren, 1970)

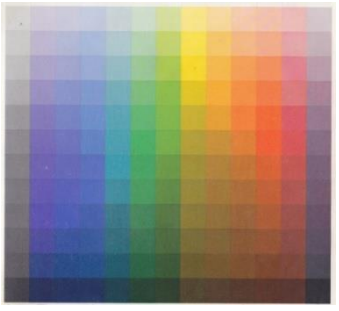


fig 3.15: Twelve steps from gray from white to black, and the twelve hues of colour circle in matching brilliances

3.Cold-Warm Contrast

Red - Orange and Blue - Green are the two poles of Cold -Warm Contrast. The colours yellow, yellow-orange, red-orange, red and red-violet are generally referred as warm colours and yellow-green, green, blue-green, blue, blue-violet and violet as cold colours.

As the ligtest and the darkest are black and white, but the hues between them - the grays represents ligt or dark only when they are placed with contrasted lighter or darker tones relatively, So the oles blue-green and red-orange represents the strongest cold-warm contrast but the hues in between them in the colour circle maybe either cold or warm based on their contrasts with warmer or colder tones. (Birren, 1970)

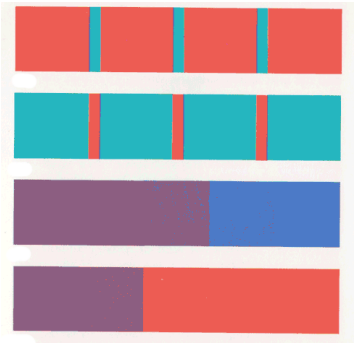


fig 3.16
ab. The strongest cold-warm contrast
c. Red-violet seems warm relative to blue
d. Red-violet seems cold relative to orange

The cold-warm property can be verbalised in a number of other contrary terms :

Cold	Warm
Shadow	Sun
Transparent	Opaque
Sedative	Stimulant
Rare	Dense
Airy	Earthy
Far	Near
Light	Heavy
Wet	Dry

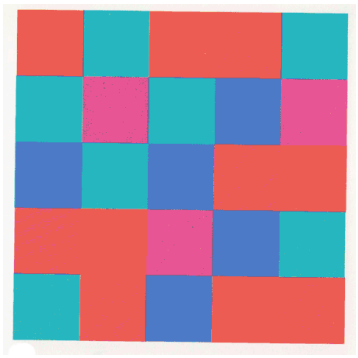


fig 18: Checkered composition of contrasting cold and warm colours

The cold warm contrast has versative expressive powers illustrated by this diverse impressions.

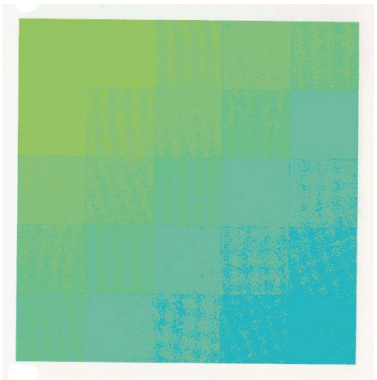


fig 3.18: Cold warm Modulation in green

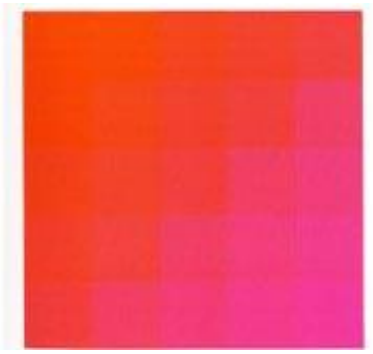


fig 3.19: Cold Warm Modulation in Red

3. Complementary Contrast

Two colours diametrically placed opposite to each other are complementary pair - Yellow-Violet, Blue-Orange, Red-Green. The pigments of two complementary colours when mixed gives a neutral Gray-Black. Adjacently placed two complementary colours show their maximum vividness.

All three primary colours - Yellow, Blue, Red are always present in the pair of complementaries.

yellow, violet = yellow, red + blue
blue, orange = blue, yellow + red
red, green = red, blue + yellow

The eye requires any given colour to be balanced by the complementary and if it is not present, it generates it spontaneously. Complementary colours establishes a precise equilibrium in the eye which becomes the basis of harmonious design.

The complementary pair has its own peculiarities. Thus yellow / violet - extreme light-dark contrast. Red/green - colour having same brilliance. Blue/Orange -Extreme of cold warm contrast. (Birren, 1970)

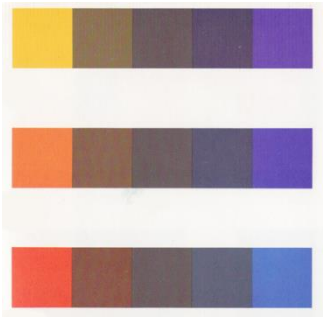


fig 3.20: Mixture bands of complementary pairs

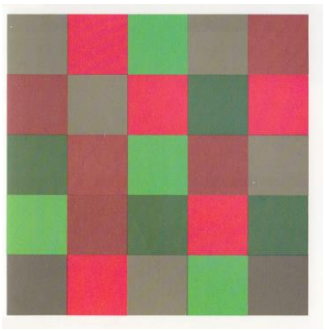


fig 20: Composition of complementary pair Red/green and mixtures

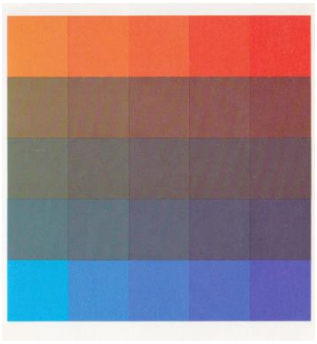


fig 3.22: Mixture square of two complementary pairs

Chapter 04

Case Study

4.1 Selection of cases

After understanding colour identity and history of colour in architecture, Identity changes with time and scale. Colour identity from cave paintings till modern masterworks in architecture has changed not only through scale but also due to certain choices available which developed in each and every period in architecture.

Taking India as a case study and observing different cities that are linked with different periods and established identity.

India

India is a land with diverse culture and regions with rich resources. So the culture and traditions are the blend of environment and religion. Every aspect in religion is symbolised and linked with the regional characteristic and environment. Having this rich and diverse land India was invaded several time in past. The major change happened by the rule of Britishers. So under influence and development, several changes happened and led to the changes in identity in each and every aspect. so the study will take cases which are holding a strong identity in that particular period and analysing the reasons behind that identity.

Periods | 1 Traditional Cities
2 Colonial
3 Post Colonial
4 Contemporary

India has three major building typologies which defines our traditional architecture - Religious building, Regional Houses and Monumental Architecture. These three building typologies defines the identity and roots of architecture in India.

Building Typologies | 1 Religious Building
2 Regional Houses
3 Monumental Architecture

4.2 Analysis

Periods | 1 Traditional Cities
- Jodhpur
- Jaisalmer

2 Colonial
- Goa
- Pondicherry

3 Post Colonial
- Delhi
- Chandigarh

The selected case studies will be analysed through the collected photographs. A colour palette for each case will be created by extracting the colour from the photos which will become the base for caring out the analysis.

The analysis will be done under the selected concepts taken from colour theory, material, concepts of colour identity and the environmental scale. The extracted data of each case will lead the research to compare and conclude the research question and will develop a wide discussion on the research by connections and comparisons.

Concepts | 1 Colour Identity
- Individual Identity
- Cultural/Group Identity
- Blend In/ Stand Out

2 Colour Theory
- Colour harmony
- Colour Contrast

3 Architectural Style
- Material
- Elements in Architecture

4.2.1 Traditional Architecture

Traditional architecture in a true sense is being local or vernacular. Traditional or vernacular architecture used the inherent colour of material or naturally available colours as paint. "Local" is the word for the traditional architecture. Manifesting the regional characteristics in the architecture and building the identity of the place which is rooted and pure.

fig 21: Bhunga House, Kutch

The regional houses shows the colour shades of the culture and art belonging to that place blended with a religious purpose that differentiates the entire country and makes it diverse. Each region holds holds its essence and is evidently seen in the materials used.

The Bhunga house of Kutch uses the Mud and camel dung which is locally available in the region with local craft reflected on the walls with white mud layer and mirrors or patterns painted with natural colours. Similarly in south the traditional houses of Kerala reflects brown by using the Laterite blocks, Clay tiles and wood that is abundantly available in the region. The same colour essence of brown is also found in the regional houses of Leh in northern India made using stone and earth.

fig 4.2: Earth and stone construction in Leh

In the western India, in Rajasthan the cities hold the identity through colours and are known by the name of the colour such as Jodhpur as the Blue city, Jaipur as Pink City, Udaipur as White city etc. Using the stone available in the region and blending the culture and art, the architecture of the cities of Rajasthan is colourful and rooted.

fig 4.3.1 - 4.3.6: Photographs of Jodhpur, Rajasthan

Source: Swati Panchal

Jodhpur, Rajasthan

There are several reasons for using the blue colour in the houses of jodhpur. From religious point of view, the houses belong to the Brahmin community who painted their houses blue to differentiate from other castes, symbolising the colour of lord Shiva. Psychologically and climatically the houses were painted blue to feel cool as Jodhpur is located in Rajasthan with desert area having hot climate.

The houses were painted with limestone and copper sulphate mixed with water. Copper sulphate imparts its rich blue colour making the house a part of cities identity. Limestone is easily available in this region so it became the most convenient option to use it.

As per the colour theory, the colour language is monochrome and easily blends with the sky having the shades of blue. Blue belongs to the colour family of cool colours in the colour wheel or colour circle. The shades of blue differs from each other in every house which creates a light-dark contrast with blues with varied brilliance as per the Itten's theory.

The decorational elements and carving is also painted with same colour of the house which reflects the house as one form or Individual block with no highlights or decoration visually. But the colour of the openings are painted with different colours based on Individual choices. The colour of the openings are majorly done in Green, Yellow, Blue and Brown(Wood - Inherent colour). Openings are the important factors in Indian traditional architecture due to climate. Here colour plays an important role by highlighting the openings using different colour.

The Mehrangarh fort is not painted with the blue colour but it reflects the inherent colour of the red sandstone used in the built form which is available in the vicinity. Due to this the fort holds an Individual and powerful Identity other than regional architectural colour identity. Colours differentiates the power and importance of the fort from the other buildings in Jodhpur.

fig 4.4.1-4.4.5: Photographs of Jaisalmer

Jaisalmer, Rajasthan

Jaisalmer is known as the yellow city due to its extensive use of yellow sandstone. The houses in jaisalmer are not painted, it flaunts the material they used creating an city Identity.

As per the colour theory same as Jodhpur it has monochrome colour language which blends with the area and the land with yellow desert. But overall city stand out and shines under the blue sky, demarcating a strong difference between land and sky. Yellow belongs to the warm colour family in the colour circle or wheel. Thus has a different effect than jodhpur, here the door and windows are majorly left in the inherent colour of wood that is brown, due to this the window and door are not highlighted much. But the intricate carvings and the stone craft of India is merges with the entire form as it is also in the same texture and colour. So the carving also becomes the part of the form rather than a decorational highlight of the built form.

Jaislamer fort have not used any other material or colour different from the regional houses which shows an unified identity and does not differentiate it or impose power to other areas. The only factor that shows the importance and power is the scale of the built form.

So as a conclusion colour has a power to differentiate or distinguish and also can merge all the things creating homogeneous environment. By differentiating it creates an shift in Identity from scale and power.

4.2.2 Colonial Architecture

India got invaded by many people and created architecture of their region and culture from where they belong. The British, Dutch, Portuguese and French people were the main force to rule India. Colonizers came to India in 1600's and ruled moreover 300 years and left prints in the form of buildings and the colonies developed by them to further develop in their absence too.

The architecture during colonial period flourished as an amalgamation of Mughal architecture and Gothic architecture known as Indo-Sarcenic Revival architecture. The expression of identity, power, life-style were imposed on the masses by the rulers.

Trading started happening in India which brought new technologies and development in India. Industrialization and Urbanization took over the traditional methods in architecture which evolved into new building typologies. The regional houses, street culture and simple dwelling started evolving in bungalow style housing. These had an effect on culture and lifestyle. The regional expression and the socio cultural patterns changed due to the change in Architectural style and planning all over the country.

The colonizers started building up their colonies and region and the colour in their architecture was also of their choice, rooted back to their culture and home. For example, the coastal cities of India such as Pondicherry, Goa, Calcutta etc. were the houses are painted with bold colours to help the sailors recognize the region.

fig 4.5.1-4.5.5: Photographs of French colony, Pondicherry

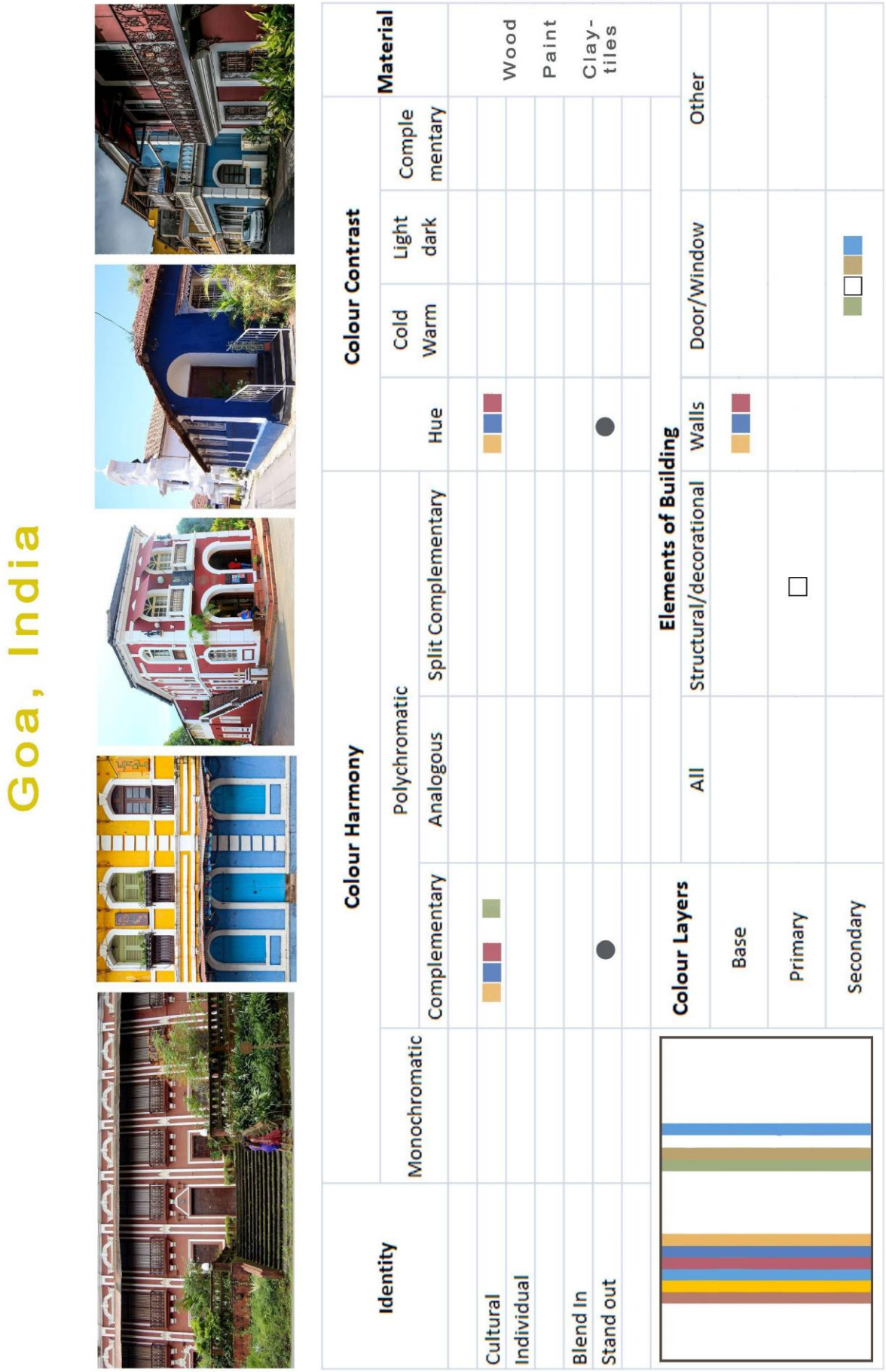


fig 4.6.1-4.6.5: Photographs of Fountainhas, Goa

Goa, India

The costal city with colourful houses with vernacular architecture. Ruled by the Portuguese rulers during the colonial period. Houses painted with pastel shades consisted of organic pigments like ferrous oxide obtained from laterite, yellow from turmeric and the indigo blue with the principal ingredients in paint was the lime wash. Earlier the Goan houses were not painted. Mud was used in the houses and then later with laterite stone. Colouring a house was an individual choice until the Portuguese rule. During the colonization the owner of the house could be fined of the house is not painted.

Portuguese rulers brought their culture into the architecture by painting the houses in colourful pastel shades that would allow the sailors to recognise their region. The colours became dominant during the Portuguese rule in Goa and were widely used in domestic and residential architecture. With the presence of Portuguese rulers in Goa, the local people were exposed to the colour schemes used in Europe. So the houses in Goa has the colour blend of vernacular colour palette amalgamated with the Mediterranean colour scheme

The colour language of Goa is polychromatic, the main three prominent colour used were pastel shades of yellow, Red and Blue from the natural pigments available. Red, Yellow, Blue are the primary colours as per the Newton's theory and thus makes the colour scheme complementary in nature. Each hue used the contrasting hue to each other. The embossed frame around the openings and the pilasters are painted white to highlight it. Here the colour plays the role to differentiate the embossed decorations on each building and having a common white colour in every house which binds them of having an collective Identity in spite of having different solid colour of every house.

The houses of Goa were painted in colour due to an imposed rule by the Portuguese rulers. The rulers didn't allowed to have a house painted entirely in white colour as they believed the white colour as a symbol of purity which belonged to the religious building or churches in the city. Churches were painted entirely in white colour in Goa. These rule was followed by the Goan Christians as well as the Goan Hindus by not painting the house in white colour as part of the culture and tradition.

4.2.3 Post Colonial and Contemprory Architecture

India became independent in 147 and built its path in modern ways and development. Due to industrialisation and urbanisation there was a change in the lifestyle and culture all over India. People started migrating in different countries for advance studies as well as due to trading new technologies started coming in India.

Colour theory came into industry from 1600's when trading started happening in India. Colour theory allowed people to understand and make their own choices in colour combinations. Colour theory opened the gates of industries to develop numerous pigments with different shades. Within few years the the colours were available in the market. People started painting their houses replacing the vernacular exposed material and naturally available pigments.

Due to migration for advance studies architects were influenced from the western culture studying there and evolved with an original style that is amalgamation of western theories and vernacular traditions. Architects were having a variety of material available with a wide range due to easy transportation and trade. Due to this combination of Regional material and modern material was experimented and become a style of post colonial architecture. There was an impulse to hold the roots and accepting the modern world and combining them to develop a newer and developed style in architecture.

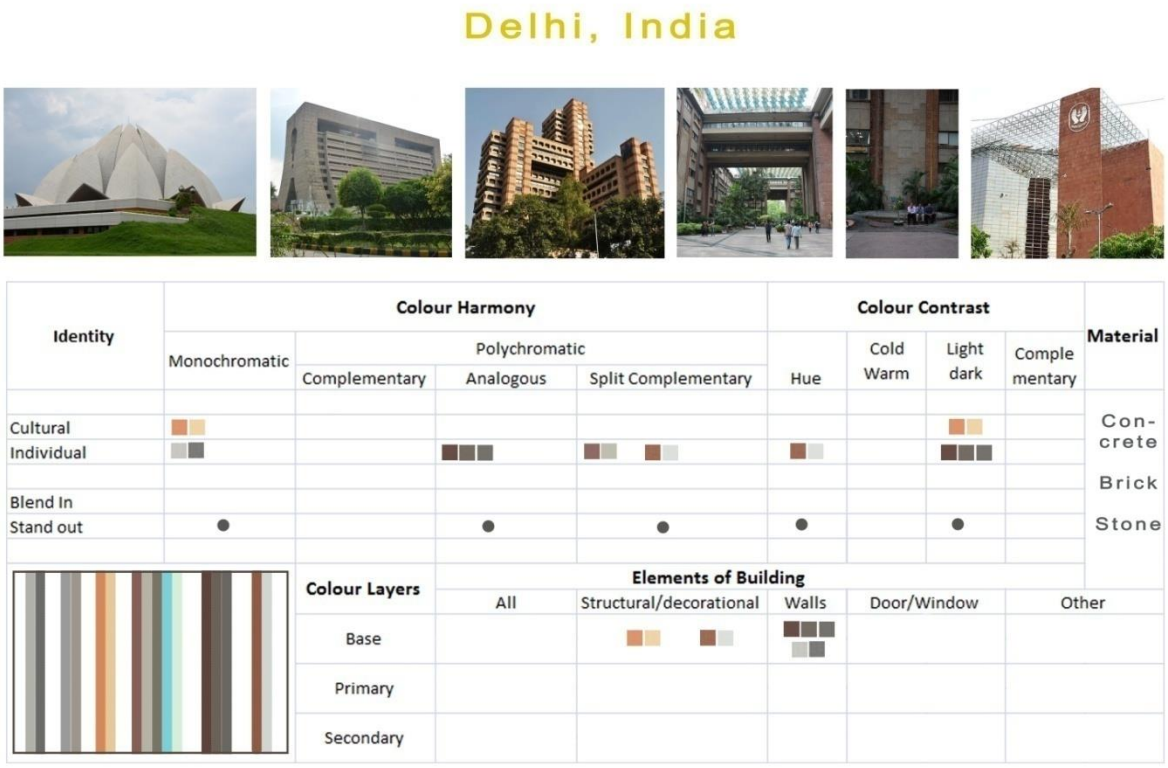


fig 4.7.1-4.7.6: Photographs Lotus temple

Source: Vishesh Bhagia

Delhi the capital of India has rich traditional architectural as well as modern architecture. After the independence the past colonial period was also named as the "Indian Contemporary architecture". For Example, the 'Lotus Temple" famous as an contemporary monument. The past colonial architecture was a blend of vernacular material and modern material and form.

The colour palette from the analysis is in the shades of grey and brown/red, combination of achromatic and chromatic hue.

The architecture is based on the choice of architect to keep it entirely in grey shade or the combination of red and grey. Combination of monochrome and polychrome architecture. The inherent colour of material is reflected in architecture, as the colour of harmony is analogous on split complementary and colour contrast is light-dark contrast or the contrast of the hue. The form is reflected through colour rather than elements in the architecture.

Chandigadh, India

Identity	Colour Harmony				Colour Contrast				Material
	Monochromatic	Polychromatic							
		Complementary	Analogous	Split Complementary	Hue	Cold Warm	Light dark	Complementary	
Cultural									Con-crete
Individual	■	■■■ ■■■■		■■ ■■	■■■■ ■■■		■■		Paint
Blend In	●								Brick
Stand out		●		●	●		●		

Colour Layers	Elements of Building				
	All	Structural/decorational	Walls	Door/Window	Other
Base			■■■■		
Primary		■■■ ■■■			
Secondary					

fig 22: Photographs of Chandigarh, works of Le Corbusier

Source: Vatsa Doshi, Vishesh Bhagia

Chandigarh the planned city in the post colonial era by le Corbusier. He has his own style that expresses his love towards concrete and his interest in polychromy. He built various monumental building in Chandigarh with concrete with a colour of a touch of primary colours highlighting the structure and form of the building.

A base colour grey in every building with bright primary colours in the colour language of Chandigarh and a new architectural style of the post colonial architecture.

The colour harmony is monochromatic as well as with the blend of polychromatic complementary harmony.

The base colour contrast is light- dark contrast of gray concrete and a contrast of hue of all the bright primaries.

The walls and form are highlighted with the gray and colour are highlighted with the help of structure and other elements of the building.

4.3 Comparative Analysis

4.3.1 Junagadh

Junagadh was a walled city ruled by many rulers and has a rich cultural mixture of Buddhists, Jain, Muslim and Hindus. Before colonisation, Junagadh was ruled by nawabs of Muslim babi dynasty and also during colonial period Junagadh became the princely state ruled under nawabs in a alliance with the British Raj.

Earlier the architecture of junagadh comprised of the fort constructed with black granite stone and lime mortar. The port was surrounded by the regional settlement and markets. The settlement was surrounded by a wall with gates from all the sides of the city.

After the alliance with Britishers, development started outside the wall and the on the edge of the wall. Development such as Railway station, museum, schools and administrative buildings to increase the communication and trade. The architecture was a fusion of Mughal and Gothic architecture.

After Independence the Britishers left leaving the development they did. The city started growing outside the wall area and around the railway station. There is drastic change in the pattern of settlements then earlier from the street style houses with attached walls to the architecture turned into a bungalows system with shared compound wall of individual houses.

After the bungalow system a vast change occurred in the form of the apartment system which brought a vast change in the architectural built forms and systems. The occurrence of this change was mainly due to the trade, industrialization that influenced every aspects of the city from culture, architecture and life style.

Traditional Junagadh, India





Identity	Colour Harmony				Colour Contrast				Material
	Monochromatic	Polychromatic			Hue	Cold Warm	Light dark	Complementary	
		Complementary	Analogous	Split Complementary					
Cultural									Sand-stone
Individual									
									Wood
Blend In									Lime-stone
Stand out									
									Paint

Colour Layers	Elements of Building				
	All	Structural/decorational	Walls	Door/Window	Other
Base					
Primary					
Secondary					

Traditional architecture of Junagadh

The regional houses of Junagadh used stone for construction and limestone wash - Blue colour as a paint. Three types of colour was found from the analysis of the regional houses of Junagadh - Yellow exposed stone, Yellow Paint and Blue paint.

Due to this the colour harmony is polychromatic in nature with specific colour used. Blue and yellow being the two evidently used colour, the regional city has a complementary colour contrast. Yellow belongs to warm family and Blue belongs to cool family which makes the contrast of the place cool-warm as per the Itten's theory.

Due to complementary colour contrast, the architecture stands out in the environment. The colour scheme is a heterogeneous harmony.

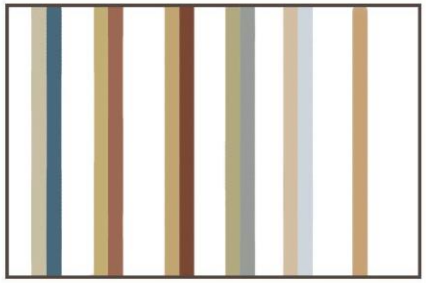
The colour language of Individual Building is such that it highlights the Door and Windows by using different colour. These makes an Individual Building polychromatic in nature. The colour of the window is either blue, green or brown(wood-Inherent colour)

Colonial Junagadh, India






Identity	Colour Harmony				Colour Contrast				Material
	Monochromatic	Polychromatic			Hue	Cold Warm	Light dark	Complementary	
		Complementary	Analogous	Split Complementary					
Cultural	■ ■			■ ■ ■ ■				■ ■	Stone
Individual									Paint
									Wood
Blend In	●								
Stand out				●				●	



Colour Layers	Elements of Building				
	All	Structural/decorational	Walls	Door/Window	Other
Base			■ ■ ■ ■		
Primary		■ ■			
Secondary				■ ■	

Colonial Architecture Junagadh

Junagadh was ruled by Muslim babi dynasty and not Britishers, so it do not have much impact on architecture. The construction was a blend of Mughal and Gothic architecture. The mausoleum built in Junagadh is a fusion of gothic and Mughal architecture.

So there was a change in architectural style and form, but there wasn't any drastic change in the colour scheme. The yellow colour still continued in this period with a combination of reddish-brown hue. The elements in the building were highlighted during this period with a different colour than the base colour.

The base colour is yellow and the primary colour vary from red, brown and blue. The monumental building are exposed stone while the other residential and commercial buildings were painted in cream and yellow shades.

Yellow -Brown and Yellow-Blue makes a pair of split complementaries and has a complementary colour contrast in an individual building. But the overall region blends in well in the shades of base colour.

Post Colonial Junagadh, India

Identity	Colour Harmony				Colour Contrast				Material
	Monochromatic	Polychromatic			Hue	Cold Warm	Light dark	Complementary	
		Complementary	Analogous	Split Complementary					
Cultural									Paint
Individual									Glass
									Wood
Blend In	●						●		
Stand out			●	●	●				

Colour Layers	Elements of Building				
	All	Structural/decorational	Walls	Door/Window	Other
Base					
Primary					
Secondary					

Post Colonial Architecture in Junagadh

With the changing architecture through development and influences the use of colour in the built form also changed. Post colonial period had new choices in colour with the availability of artificial pigments.

The colour language was monochromatic as well as polychromatic, based on the individual identity of the houses the owned. The polychromatic harmony included analogous as well as split-complimentary schemes.

The colour contrast also varies from house to house. In polychrome scheme its majorly the constant of hue which makes the identity stand out. On the other hand, the monochrome scheme is majorly the contrast of light-dark which merges well making the identity well blended.

The colour used are mostly dull or pastel colours. The elements in the buildings are highlighted with this combination of dull colours. The base colours is of walls followed by the structural elements highlighted with different colour and again the secondary layer of the windows and doors with different colours or shades.

Present Junagadh, India

Identity	Colour Harmony				Colour Contrast				Material
	Monochromatic	Polychromatic			Hue	Cold Warm	Light dark	Complementary	
		Complementary	Analogous	Split Complementary					
Cultural									Paint
Individual	■■■□■		■□■	■■ ■■■			■□■	■■	Tiles
							■■□■		
Blend In	●						●		Glass
Stand out			●	●				●	

Colour Layers	Elements of Building				
	All	Structural/decorational	Walls	Door/Window	Other
Base	■■■■ ■				
Primary				□	
Secondary					

Present Architecture of Junagadh

Presently due to new development s and technologies, there is a wide range of colours and their shades available for the people to have an exact colour they want. But through the influences and trends the choices of colour changes which results in the change in the colour schemes. Due to this there is a wide range of colour combination seen in the city reflecting their individual choices.

The shades of gray combined with one chromatic colour is the new scheme widely used in the present architecture. Even now the colour schemes are seen in wide range from monochromatic Grays to polychromatic shades. But the use of gray and whites is widely seen in present architecture.

Colour is used to highlight the form of the building with solid colours without any details. The colours are also reflected through different materials such as glass and tiles other than colour.

Chapter 05

Conclusion

5.1 Colour In Architecture

5.2 Change in Colour Identity

5.3 Scale and Colour Identity

5.1 Colour in Architecture

From the analysis of the cases from different periods there is change in colour palette due to trading and Industrialization. We can conclude two different periods that shows the change in palette - Colours Before Industrialization and Colour after Industrialization.

Before Industrialization the colour in the architecture used were naturally available pigments or the inherent colour of the material. In the early period the colour palette seems earthy and consisted predominantly the shades of Red, Brown, Yellow, Beige, Grey. This colours are the inherent colours of the Stone and mud available in India.

After the invasion the colour palette became more vibrant and diverse. The colours are derived from the colour theory. Colour theory gave opportunity to industries for developing artificial pigments and it resulted into numerous colour shades. This provided wide range of palette for people to choose.

5.2 Change in Colour Identity

The rooted cultural Identity played a vital role for the colour Identity in Architecture. Colour was used as a symbolism in Architecture or to differentiate two places or built forms. Earlier colour was selected or used as a group Identity having a religious or climatic purpose. Temples, Forts and regional houses in a same city has different colour identity to differentiate themselves from each other. Temples and Forts may have same Identity as both were constructed with Stones available in India. But they differ with the form. For example, Churches in Goa were painted entirely white but the forts were exposed stone construction while the houses were painted colourful. Here even the colour language differs as Forts and churches are built and painted entirely with same material or colour. While the residential and domestic built forms used multiple colours to highlight different elements in the building.

After Industrialisation colour became an Individual choice or instincts. Colour was used to portray an Individual Identity in the surrounding neighbourhood to be different

from every one. There is an urge to stand out and have an Identity. Colour was used to show the personal choice of owner or the architect. There was a blend of vernacular colour palette and Global colour palette. Architects started blending material or colour from both the palette to hold the roots from where we belong to stay together with the new developments. But they still has a choice to follow any palette. For example, Charles Correa in his works always used regional material with modern techniques and form, majorly having a red and earthy shades in his work. At the same time and period Le Corbusier used Concrete and with primary colours selected from his own colour theory. So both have have an Individual Identity as an architect but Correa had roots connected with regionalism and Corbusier had roots connected with his instincts and style developed by himself.

5.3 Scale and Colour Identity

Earlier, the system of any city was ruled by one king and followed by the people living in that city. So there are forts and palaces build all over India with a huge scale compared to the regional houses. So the scale and the building typology is similar in entire India. Similarly like scale, Colour is also one factor that holds similarity in the forts of India. Almost all the forts were constructed with stones available in that particular region. The stones available in India are in the shade of Red, Beige, yellow, gray or black. The Monumental architecture in India have different Identity than their respective regional coloured housed to stand out. The forts collectively creates a National Identity. So there are layers in the same city having regional and national identity. The colour scheme of the residential settlement houses is at regional level, which is different in every city. But the colour scheme of the Forts, Palaces or religious building is formed at national level.

Earlier the colour identity in India was limited in National level. After Industrialization, trading started in India which exposed India to the world. Due to Influences and development people were exposed to the colour schemes of entire world which gave rise to have a global Identity by using certain methods, materials and techniques. New material came to India due to industrialization - Concrete, Steel and glass. Architecture turned into Shades of Gray or the blend of achromatic gray with the vernacular colour

scheme of India. Glass, steel and concrete is used highly in the present era of architecture everywhere. The monumental architecture now holds a global Identity. Opposite to this the colour identity also shifted to Individual level. People have a variety of colour shades available so they paint their houses with colours of their choice holding an Individual Identity. These neither has relation with culture, region or development but totally holding an importance of personal choice. As a result there is colourscape of the overall city seems to be without any purpose or random, holding no strong Identity at regional level.

Bibliography

Birren, F. (1970). *Itten-The elements of colour.* New York : Van Nostrandreinhold Company.

Brahman, Z. T. (2013). Effective Factors in Shaping the Identity of Architecture. *Department of Architecture, Zanjan Branch,Islamic Azad University, Zanjan, Iran* .

Caivano, J. L. (2006). Research on color in Architecture and Environmental Design: Brief History, Current Developments and Possible Future. *Color research and application* .

Colours of Goa . (2015). *N Expression Architecture* .

Gorzaldini, M. N. (2016). The effects of colours on the quality of Urban Appearance . *Vocational college of Alzahra, Mazandaran, Iran* .

Huppatz, D. (2019). Brutalism- Hoe to love a concrete beast . *The conversation* .

Juan Serra, Á. G. (2012). Colour Composition Features in Mordern architecture . *Color Research and Application* .

Lansroth, B. (2015). Deconstrctivism in architecture . *wide walls* .

Lee, P. (2016). Brutalist Architecture- What does it really stand for? *wide walls* .

Molanaie, E. (2017). The effects of colour on Urban Beautification and Peace of Citizens . *Department of architecture, Sanandaj Branch, Islamic Azad University, Iran* .

Nainwal, R. (2018). British colonial Architecture. *Education, Slide share* .

Nangia, A. (2020). Post colonial India and its Architecture. *Boloji* .

Rupali Gupte, R. M. (2004). Architecture and contemprory Indian identity. *Bard Studio* .

S., S. (2019). Color in Traditional Indian Architecture—An Inquiry into the Color Family of Reds. *Chakrabarti A. (eds) Research into Design for a Connected World. Smart Innovation, Systems and Technologies, vol 135. Springer, Singapore* .

Schindler, V. M. (2012). Polychorme Environments at the centre Pompidou in Paris: The works of France and Michel Cler, Architect-Colour Consultants .

Serra Lluch, J. (2013). Three colour strategies in architectural composition. *Colour research and application* .

Xu, J. (n.d.). Colour Identity as Representation: A semiotic Approach . *School of Arts, Loughborough University* .

Xu, J. J. (2016). How Colour defines local identity: A comparitative case study of London and Shanghai. *Loughborough University, UK* .

Younis, H. A. (2012). Color Contrast an Architecture Formation Style . *International conference on transport civil, Architecture and environment engineering* .

Colour Identity in Architecture

Yesha Jadav
15bar52
June 2020