ARCHITECTURE OF NEW MOSQUE- A DESIGN PROPOSAL OF MOSQUE IN CONTEMPORARY INDIA

F. Deeba¹ and Sr. Asst. Prof. I. C.V. Sagar²

1. B. Arch 4th Yr. Student, Faculty of Architecture & Planning, Apjaktu, Lucknow. 
2. Assistant Professor, Faculty of Architecture & Planning, Apjaktu, Lucknow.

Abstract

This study examines the parameters to analyze the form of local mosques in 21st century India. Since the advent of Mughals in India, mosque architecture has been immensely celebrated due to the fact that many inventions happened in building techniques and styles. Till today it has continued, though implicitly, and has been absorbed in the architecture of mosques which are mostly locally built. This is evident from their forms, especially, replicating those arches, minarets and domes. So, in this scenario, the question is what should be the form of local mosques in contemporary India when Islamic countries like Bangladesh, despite regarded as a developing country, is building creatively innovative and modern mosques? To respond to the question, local mosques built after the 1970s in India and Bangladesh are selected based upon their funding, year of construction, number of occupants, and built-up area. They are analyzed according to parameters of the form of mosques deduced from the literature study. According to results after analysis, it is found that there is a high grade of religious symbolism that is still prevalent in India unlike in Bangladesh. Besides, there is no participation of local people in mosque construction as well as in design with no interaction with the architects and clients who are involved in the process. The idea of Postmodernism and its features seems to have no role when local mosques in India are analyzed.

Introduction:

All the religions that exist around the world have religious symbols that contribute to their architecture. This has continued over the years in the same or different ways. Soon after modernism was introduced in architecture, there was a surge among architects, clients and people to accept the changes that it bought in terms of appearance. This had a different interpretation when the religion of Islam was considered. As we know, the mosque is one of the greatest and noteworthy visual illustrations of Muslim religious identity across the globe, but it is still following the same, old and conventional methods in its architecture without any significant development. Talking about India, because it is the area of consideration for this dissertation, the condition was far less improved. Since Postmodernism came to existence, people were not participating to elevate the status of Muslim identity and relying on architects for its building who lacked consciousness towards its design and construction. It is prevalent today where mostly locally commissioned mosques are built. Clients rely on architects and demand modern mosques.
without any clarity in their imaginations while architects simply replicate the traditional elements like dome, minarets, and arches in the mosque without any understanding of local construction techniques and aspirations of local people. This results in conventional and old looking forms of mosques which neither reflects local architecture nor modernity. It is a peculiar and eclectic style of architecture with onion domes and green color that maligns the true essence of form and its function. Hence, this paper focuses on finding out the form of mosques in 21st century India built by local communities. It will help an architect and layman to understand necessary parameters that are needed and must be followed to achieve a form that follows ideas of local people as well the architecture. It will help in motivating architects to create innovative and rational forms without alienating them from the built forms in the vicinity. The objective will be to understand the parameters required to analyze the form of mosques in India, based on which selected cases will be studied. After that, issues will be identified based on which design solutions will be recommended.

Significance
1. The findings will redound to the benefit in the arena of architecture by helping in proposing form of mosques in 21st century India.
2. The findings will also help to focus on variables that create opportunities for innovation and new ideas when designing mosques in India at present time.

Problem
1. Local mosques are being designed by replicating traditional elements like domes, minarets and arches.
2. No modern intervention and development are taking place i.e. easily identifiable and recognizable form of mosques are being produced.
3. There is lack of interaction among local people, architects and clients.

Need
1. To address the issues that prevail in defining the form of local mosques which are being built in 21st century India. Results will help in finding the parameters that will govern the form of mosques in contemporary India keeping the issues in consideration.
2. To change preconceived notion of mosque of being a symbol of Muslim faith, its function as a place for offering prayers and conventional methods of replication achieve their desired form.

Why Mosques?
• Only local mosques are being constructed in India with no recent developments while measures that are implemented are not being acknowledged.
• As a result, elements of mosques are only being replicated with implementation of conventional design features, thus producing an eclectic form.
• It helps to direct as a representation of Islam as well space for social gathering, teaching and learning.

Methodology: -
Form in Architecture
Form is a vital characteristic of any composition, in architecture. It not only affects the perception of an individual who sees it but also used to convey meanings with it. According to (Bacon, 1974), he states:

“Architectural form is the point of contact between mass and space … Architectural forms, textures, materials, modulation of light and shade, colour, all combine to inject a quality or spirit that articulates space.

The quality of the architecture will be determined by the skill of the designer in using and relating these elements, both in the interior spaces and in the spaces around buildings.”(Ching, 1943, p. 33)

Hence, form is a vast word which has number of meanings- (a)Form can denote an apparent appearance that may be recognized when an individual perceives it (b)It may also advocate to a condition in which about things act in order to be seen.
**RESEARCH QUESTION**

- What are the parameters that will govern form of local mosques in contemporary India?
- How will these parameters be implemented?

**DATA REQUIRED**

- **Factual data** in form of pictures, architectural drawings and illustrations.
- **Textual data**

**METHOD OF DATA COLLECTION**

- **Participant observation**
  Visitation to a mosque in Allahabad for live study. Record of data in form of plans, section and self-clicked pictures.

**METHODS OF ANALYSIS**

- **Thematic Analysis**
- **Textual analysis**
  a) Analysis of selected examples using a selection criterion formed on basis of literature study.
  b) Analysis on basis of following parameters:
    - Shape
    - Size
    - Colour
    - Texture
    - Orientation
    - Scale
    - Proportion
    - Articulation
    - Light
    - Transformation
    - Formal collisions of geometry
    - Axis
    - Symmetry
    - Hierarchy
    - Emphasis
    - Balance
    - Harmony
    - Large portal
    - Courtyard
    - Pool
    - Prayer hall
    - Mihrab
    - Minbar
    - Qibla wall
    - Minaret domes

**PRIMARY SOURCE OF DATA**

**SECONDARY SOURCES OF DATA**

- **Existing data**
  a) Pictures, architectural drawings were analyzed.
  b) Collected from books, research papers internet websites and live study.
  c) Selected the data according to selection criteria based on:
    - Type of funding,
    - year of construction,
    - number of occupants & area.
Parameters to analyse form in architecture
According to (Ching, 1943), form can be described as a term that has the ability to depict references to “internal structure and external outline” along with the attitude that has the ability to provide unity to the whole composition. Therefore, following points can be analyzed to study any form irrespective of its type or function.

Shape
Distinctive outline or “surface configuration” of a specific form is termed as shape. It is the primary aspect by which a form is categorized and identified by us.

Size
The “physical magnitudes of length, width, and depth” of any form is termed as its size. These dimensions govern proportions and scale, determined by its size comparative to other forms.

Color:
It is an experience of “visual perception” and light that is defined by an individual’s observation of “hue, saturation, and tonal value” seen on an object. It is also a property that “distinguishes a form” from its setting also affecting the “visual weight of a form.”

Texture
It is defined as the “tactile” and visual characteristic specified to any surface by virtue of its shape, size, proportions and organization. It also controls the degree of reflection or absorption of incident light by a surface, which is perceived by the one seeing it.

Position
It is defined as the location of form comparative to its setting or as “the visual field” within which it is seen.

Orientation
It is defined as the “direction of a form” concerning ground plane, another forms, or to the individual looking it.

Visual inertia
It is defined as a “degree of concentration and stability of a form.” It is dependent on geometry of form in addition to its orientation with reference to the ground plane, gravitational pull, and line of sight of individual seeing it.

Scale
It is always determined by its size comparative to supplementary forms in its context.

Proportion
Proportion discusses the relationship of one part to another part of a same composition.

Rhythm
Defined as reoccurrence or reappearance of architectural elements that establishes a rhythm.

Articulation
Articulation is defined as treatment of surfaces to define form. The differential treatment of edges, corners, windows and visual weight of a form contributes to articulation of form.

Light
Form is perceived liable on the light conditions in which it is viewed.

Transformation
Whatever forms are seen around are a result of transformation of primary solids that exist. The variations which are created by the management of one or more than one magnitude or by “the addition or subtraction of elements” that define its character can be termed as transformation.
Formal collisions of geometry
When two or more forms contradictory in geometry collide with each other’s borders, the resultant will have some “visual dominance” reflecting those geometries. Hence this phenomenon is termed as formal collisions of geometry.

Axis
It is defined as an imaginary line defined by two points about which forms are organized in symmetrical or asymmetrical manner.

Symmetry
It is defined as a balanced allocation and organization of equivalent/equal forms on either side of a separating plane or, line or about an axis or center. This line can be imaginary or physical.

Hierarchy
It is defined as an articulation of forms and spaces corresponding to another forms or spaces in an organization with respect to size, shape or position.

Balance
It provides visual stability to the form by placing elements constituting the form in balanced manner with respect to its colour, texture and shape.

Emphasis
It is created when one or more elements are used to convey virtual dominance or supremacy by colour, size, texture, shape etc.

Harmony
It is defined as a property of sameness or belonging of one element with another. It can be achieved by unity or variety. Unity in terms of colour even though variety is present due to shapes; unity in terms of shape but variety due to colours. In both ways, there is harmony among design elements.

Figure 1:-Parameters to analyze form in architecture; Source: Author
Origin of mosques
Many historians and scholars believe that Islam originated in Middle eastern lands. In Qur’an and hadiths, there is no reference of how a mosque must be constructed or what should be its form. “There is no prescription for a mosque in the holy text in the Qur’an”- says Akel Ismail Kahera associate professor at the University School of Architecture in Texas(Dickinson, 2012). The only recommendation mentioned is how one must pray while facing towards Mecca. Mosques that we see today are a result of constant change that took place since it was first built due to climate, economy, power, materials and building technique, number of occupants, socio-cultural factors etc. Initially, Arabs were nomads in which everything that they owned had to be portable. At that time when Islam was gaining prevalence, only “a square area marked by a line-formed area for communal prayer.” The prayer completed only by fulfilling basic requirement of facing the direction to Mecca. At the start, they were opposed to the idea of building because of their nomadic lifestyle. But as the time passed and Islam gained prominence, the followers increased and a need for a shelter arose among the people. The, then, Caliph was advised to openly practice their religion and, thus, he ordered the construction of a congregational space which began to be known as Mosque.(essays, 2018)

“A mosque or masjid (in Arabic) is a place where a Muslim prostrate and perform their obligatory prayer. The word masjid in Arabic comes from the verb ‘sajada’ which means to prostate.”(A Suratkon, 2019, p. 1)

Evolution of mosques
Concept of a mosque
The definition of mosque is the simplest to understand like other vernacular structures in terms of their form. A congregational area which may or may not be open, used for social and religious gatherings where people collect to offer obligatory prayer after the caller calls prayer.

The mosque contains a demarcated space, which is roofed and 1/3rd of which is open to sky. Spatial organization of mosque depends upon proportion of open with respect to covered space. The open space is generally a courtyard called sahn, where the Prophet(pbuh) and his companions used to collect for prayers and social activities. The covered space is known as the prayer hall which is defined by qibla wall, minbar, mihrab and high ceiling. Most importantly, this z of prayer hall must always face the direction to Mecca.(essays, 2018)
Concept of Mosque
A congregational space came to be known as Mosque.

What was the change?
According to outlines established by Hasan Uddin Khan, five typologies of mosques have been developed in the Islamic ecosphere. (IMDAT AS University -of -Notre -Dame, 2006) From figure 6 it is clear that form of mosques changed around the world change in climate, economy, power, function, area, number of occupants and materials.

“Hypostyle hall with flat roof” or sometimes with one or more smaller domes as evident in Arabian and African examples and early Anatolian mosques.

Buildings having a “large central space, covered by a huge dome” laterally supported by weight of half-domes, which are most common in the Ottoman style, or “having pyramidal pitched roofs” as evident in examples from Indonesia.

The arrangement of an “iwan (vaulted hall)” placed on either side of a symmetrically divided enormous and centrally located rectangular courtyard as seen in Iran as well as in Central Asia.

The “triple-domed mosque with large courtyard” acting as a large public place for gathering and congregational prayer which is a typical feature of Mughal architecture in India.

The complex enclosed by walls, inside which pavilions are located in bounded spaces that are found in China.

Why was the change?
Despite common features, such as mihrabs and minarets, there is a history of diverse regional styles that accounted for enigmatic differences in the colours, materials, and ornamentation of mosques. This varied from region to region depending upon: Scale of the building, number of occupants, area available, economy, power, need, climate. (essays, 2018)

Difference is seen because of
variety of secular functions at different locations; symbolic values; expression of identity by different communities.

Additions were done due to
Social, climatic, cultural, political, economic conditions that resulted in forms as seen in Figure 6.

Consistency was maintained only in
Orientation and the way an individual offers the Namaz, spatial organization- a large prayer hall which is orientating towards Mecca. Function, spaces and requirements besides this were subjected to change. (Alamiri, 2017)
Parameters to analyse form of mosques
In addition to general parameters required to analyze any form, following are the elements of mosque architecture and furnishings. (Frishman & Khan, 1994) and (Renata Holod, 1997)

**Portal**
It is the entrance gateway to any mosque. It acts as an element to differentiate between a spiritual sanctuary and urban life. It is often celebrated by extravagant ornamentation and scale.

**Courtyard**
An open to sky space known as *sahn* which is surrounded by colonnades and arcades.

**Pond/ ablution area**
It is a feature which is most often seen in the middle of a courtyard in mosques. The purpose is to use it for ablutions (or *wudu*) before prayers and it can sometimes be purely decorative/ non-functional.

**Prayer hall**
It is a roofed hall to accommodate worshippers for congregation prayers. The size is completely governed by number of worshippers and climate. The space definition of a prayer hall is credited to columns (hypostyle hall), wall (qibla wall and minbar), roof (dome), windows (clerestory windows).

**Qibla wall**
The prayer hall should consist of a wall that must face Mecca i.e.to the west.

**Mihrab**
At mid-point of Qibla wall, a niche is created to indicate the direction of prayer for the worshipper. Its form is stimulated by Roman niche, from the time when people started ornamenting it.
Minbar
Also called as pulpit, is a raised platform at the right to mihrab, where the imam stands for khutba (oration).

Kursi
It is a low height podium on which Qur’an is kept while the person deployed, reads and recites verses from Quran.

Dikka
A wooden podium of single storey which is positioned in line with mihrab, reached by stairs which is attached to it.

Maqsura
It consisted of raised platform with protective screening during olden times.

Minaret
The tower used by muezzin to call for prayer besides its function to act as a landmark thus acting as focal point of area in which mosque is located.

Dome
It was invented much later to make the prayer hall look grand and feel more magnificent. It was added much later to endorse a comfortable environment for worshippers.

Arches
A building technique to create openings, often created to support long span systems. In Islamic architecture, arches hold a special place. They can be seen heavily ornamented as in mihrab, fenestrations and niches. Architecturally, they act as a scaling element.

It is important to note that not all the elements mentioned above contribute to form of mosques, for example, dikka, minbar, kursi, Maqsura. They have been considered only as a minor parameter as it contributes as an element of mosques. Similarly, parameters like, qibla wall, arches, dome, minaret, mihrab, courtyard, prayer hall, portal and ablution area are the major parameters that contribute to form of mosques. Hence, they are thoroughly analyzed.
Introduction of postmodernism in design of mosques around the world

Postmodernism style of architecture had a profound influence on a lot of young architects and wealthy clients. Since it was adopted much later than it started, history of destruction and war developed a surge to create new while still connecting to the history/ old. This helped in creating awareness among the stakeholders and renew their cultural identities. According to (Khan, 2008), countries arose with idea of creating new when world was experiencing war, distribution and everywhere identification played an important role. This helped in modernising but it was not rooted to history, hence, postmodernism evolved as a solution. The idea of Postmodernism was to create buildings that relate to context as well (but not something very usual) which might become cause of a bigger problem. It was easy to use familiar elements for creating similar forms of mosques which is very usual as it is in many mosques around the world (from Indonesia to North America). But architects, who were promoting postmodernism, relentlessly tried to convince that the expression is secondary, and qualitative identity is important. Henceforth architects tried to achieve balance between old and new rationally by taking references only to get inspiration and not to duplicate or recreate history.

![Postmodern Architecture concept diagram](image)

Figure 8:-Key points of postmodernism

How are mosques being designed in the world? From 1970s- present

When we examine the present scenario, certain things are quite alarming. According to (Fethi, 1985, pp. 52-63) the tradition and vernacular culture of building any built structure is dying. It is becoming nothing but merely an exception in today’s construction when a structure complies with the norms of traditional and vernacular architecture. Earlier it was on interaction of builders and craftsmen and people but now it has become the product of “machine aesthetics” based on universal system of clients, architects and contractors.

Result:-

As a result, the forms of mosques that is being developed exhibit a different characteristic which does not look to be in coherence with the local architecture and lacks participation of people. Lack of consciousness in design of mosques has led to long-lasting consequences which needs immediate attention. Ihsan Fethi further, in his article “The Mosque Today” mentions the following

1. The product is eclectic, or is easily identifiable (because of the form it achieves, elements used as symbols).
2. Or the result is either standardized, stereotyped building devoid of any “valid symbolism”. Generally, developing a form which categorizes a style that is completely irrational or duplicate. (Fethi, 1985)
3. Lack of governance leading to carelessness in designing of mosques.
4. Due to lack of architectural guidance to municipality and contractors leading to hybrid mosques which are strongly eclectic in nature.
At present, forms of mosques are products of only certain ideas and methods that are conceived by specific people and they are products of the machine world accelerated by technology. Thus, enabling us to look into miscommunication that exists among local people and those who are responsible for building it.

Since late 19th century, mosque acts as a freestanding monument occupying a whole city block, primarily because of the fact that the urban fabric around which it is situated has started to westernise. Even though it may look like a mosque but on in-depth examined, it appears to be unusual as if alienated from the surrounding context. Truly stating, urbanisation has greatly affected its function as a spiritual and social centre as well as on its architecture. (Fethi, 1985)

**Trends leading to forms at present**

No matter how much the word has developed, religious symbolism seems to hold its stance and continue to have a place in some or the other ways. Elements like prayer hall, domes, minarets and arches seem to have undergone modern interventions while elements like courtyards, ablution area have been either reduced or neglected depending upon need and alternatives designed. As far as design principles are concerned, they are prominent as many architects are conscious enough to incorporate them in order to make a composition achieve visual balance. It has been analyzed by Hasan Uddin Khan that in present forms of mosques, certain characteristics are either missing or not worked upon. This can be seen in disappearance of outer wall and gateway. Besides that, demarcation from profane to sacred is lost because either courtyard is omitted or its size has shrunk over time. Minarets are being used not because of some architectural importance but only for the sake of using it and to depict religious symbolism. Dome without any valid symbolism and architectural importance even though some architects have tried to incorporate them with modern techniques for intake of light and air to create dramatic prayer halls as in Faisal Mosque, Pakistan; Yesil Vadi Mosque, Turkey; Baitur-rauf Mosque, Bangladesh, Shahporan Masjid in London. According to (Khan, 2008)Canadian- Pakistan architect Gulzar Haider speaks of mosque architecture without obvious and explicit traditional elements. But when people are taken into consideration they expect domes and minaret so that it can be perceived as a mosque. Hassan Uddin Khan continues to mention that people’s perception has a primary role in the form of mosques. He quotes certain examples with reference to people of China and Indonesia regarding how they interpret the forms of mosques. He continues to mention that dome of a mosque built in 2000s in China is used as a sign of presence of Islam. It had no relation with interior of the mosque. The community is so conscious that dome and minaret is required such without which the definition and form of mosque will be incomplete.

By above discussion, the inference that can be drawn is that it is not always about a building but rather about people, region and place to which that buildings belongs.

**How are mosques being designed in India? (From 1970s- present)**

India was invaded by a Persian ruler, who belonged to a region where the monumentality of mosque was celebrated, in order to showcase their power. Similar ideology transferred in India when landmarks started to build. As the economy of the kingdoms strengthened, kings started offering mosques to the people. This means that people were given, they were not involved. Having stated that, climate also played a major role in mosque development in India.

According to (Renata Holod, 1997), the development of mosques has been categorised by the author under five heads named as: “personal patronage, the state as client, commission by local government bodies, mosques for public and commercial institutions, local community projects.” This helps in vivid understanding of development of the forms of mosques in terms of scale and its funding. He further mentions that as far as India is concerned, local community projects are being undertaken in large numbers because people belonging to wealthy class are not taking steps to contribute in mosque development. This behaviour leads to not so intimidating scale, which is acceptable also, because monumental mosques can never bridge the gap of lack of association which exist among the people Muslim community. Besides, it also depends on power and stable economy. Further, it depends upon the architects as well i.e. on their ability to design. Here, people’s consent is not addressed and design is based on architect’s memory of a typical mosque while introducing his ideas.(Renata Holod, 1997, pp. 183-184)

Hence, this is a gap that exists forcing the development style in local community projects to be called Pan-Islamic architectural style which involves recognizable and universal features which are eclectic in nature that sometimes alienates such places of worship from their context.
How are mosques being designed in Muslim countries? (From 1970s-present)

Postmodernism started as a style against the idea of modernism, urging architects not to eliminate the use of conventional and traditional elements and contextual elements in design of the built form. Similar ideology was accepted in design of mosques worldwide to renew the expression when world was experiencing war and separation. According to (Rabbat, 2012, pp. 8-11), postmodernism in Muslim countries concretized articulation of ideology that saw ISLAM as an identity. Islamic countries till 1940s were dominant and had no influx of development. But after discoveries of oil in the Gulf region, there was a surge to modernize the country through architecture. In this case, the only option was mosque through which they were able to represent themselves as independent states. The Arabs already had deep religious and conservative outlook. This led to contemporary yet visually recognizable Islamic Architecture of mosques.

Hence, 1980s became the decade of identifiable Islamic Postmodern architecture in the Islamic world. Inference- Under constant control of Arab merchants and community, architects were still relying on traditional elements and religious symbols. International firms were coming up and they were dip into awe of Postmodernism and produced “loud and formalist composition.” The forms produced were modernised in terms of materials and construction techniques.

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How are mosques being designed in Muslim countries? (From 1970s-present)

According to Islam & Noble (2011), Hinduism and Buddhism were two great religions. Followers of these two religions developed their buildings based on religious aspirations. But after Muslim invasion different architectural approaches started to flourish because of invention in building construction and technology. An important factor that needs recognition is People’s Participation in mosque building and construction. After partition of Bengal, gave opportunities for new developments. Due to these two types of mosques are known to have been built in Bangladesh: a) Mosques erected by people, b) Mosques erected by trained architects.

Mosques erected by people have the following features: a) Community wise, b) Added their sense of building, c) Their needs were fulfilled irrespective of power, d) brought down the scale of mosques to human scale. Mosques erected by trained have the following characteristics: a) They are more inclined towards form and space, b) More concerned on scale of the structure.

Selection criteria for Bangladesh

The reason behind taking Bangladesh is that it has been greatly influenced by Postmodernism and has a history of people being actively involved in mosque building much before Postmodernism unlike other countries in Indian subcontinent. Mosques are generally of varying scales i.e. from intermediate to low scale. South East Asian countries have not been taken because they have a hot and humid tropical climate throughout the year unlike in Bangladesh and India. Besides that, the contemporary mosque are mostly state funded and nationally funded projects leading to large scale mosques. According to scope of the dissertation, only local mosques will be studied since in India, most mosques are locally funded leading to low scale of mosques.

Recent developments in mosques of Bangladesh

James Steele and Ismail Serageldin in their book “Architecture of Contemporary Mosque” explains that the Mosque architecture of Bangladesh is not an impressive style or large-scale architecture as in North India, Iran, Iraq, Egypt,
Turkey, Syria etc. Even though it was, to some extent, sympathetic to its local climate, tradition and self-expression. What Bangladeshi people achieved, may not be a great style, but its construction principles were sound, appearances were original. The close relationship with the Bengali hut can hardly go unnoticed which was peculiarly suitable to the climate and the purpose for which it was intended. It is clear that technologically and culturally nobody can live in segregation. Without passionate respect and deep roots in one’s own culture and the heritage of the people, it is not probably possible to sustain a creative life.

According to (M.Ahmed, 2006) Bangladesh, having the distinction of being the home to the highest density of Muslims per square kilometre in the world, has been known for its contribution to the world cultural heritage, especially, with regards to mosque architecture. Further, Michael Snyder explains in an article for New York Times, the perceptible and impalpable characteristics of contemporary mosques in Bangladesh. He mentions that prayer spaces are designed in order to be connected to climate and light comes in from all sides. People design their own mosques here in times wherever it is required. This is because many times it happens that funding is done in stages; therefore, it is not possible for it to be constructed in single slot of time. People often participate in designing, construction work helping masons with construction, materials and other site related works. When Eastern Bengal mosques i.e. present-day Bangladesh is considered, mosques there, were centre of civic life. With this he continues to mention that this change happened after the Sufi missionaries arrived in 13th century. Starting from 13th century till 16th century, Bengali Sultanate mosques in brick are left in Bangladesh as landmark and trendsetters in Bangladesh. When Mughal reign ended, the country was left with several structures built by them i.e. till the end of 18th century. But vernacular architecture of Bengal was credited to mangroves, shifting soil, thatched roof, storms, mud and bamboo, open sided pavilions. All these elements succumbed to extreme climate of Bangladesh leaving only strong structures behind. As far as form of a mosque is concerned, they were rigid, with very less light in the interior, sometimes many pavilions were constructed, especially during Sufism. They used local materials with less monumental mosques. All these characteristics have been incorporated with no or slight modifications with same proportions and scale to design the contemporary mosques. However, this country seems to look like a modern invention. After tragic war of 1960s it came out as a new and developing country. This is due to increase in their economy coming from the textile industries. Bangladesh won independence in 1971. Michael explains that during that time, the country had a different but austere custom of mosque architecture that “relied on Turkish domes, beaked Mughal Arches and Arab minarets.” This was easily named as a shorthand of Pan-Islamic. It remained consistent for long time but there was a problem. The issue that persisted is that it was never in concurrence with Bengali people itself. But robust, modernist tradition of building in Bangladesh started when architect Mazharul Islam, who was trained in America, invited many Western architects including Louis I. Kahn. When these architects started to inspect, “traditional and nature-oriented forms,” began to be found. This discovery stimulated these architects to get inspired by them and amalgamate these features with modern ideas to create postmodern structures. The result was that Brick as a material gained prominence while concrete was used to build simple and inexpensive structures. (Snyder, May 9, 2019)

Result:-
This country has plethora of ideas in terms of modernism and postmodernism for architects to imbibe. Since Bangladesh has been formed, the roots are in Modernism and Postmodernism which has been inculcated in local architects as well. Hence, whatever new ideas they have, it eventually gets mixed with modern concepts. As far as mosques are considered, spaces were religious at that time and modern movement of building was secular. This gap was filled with help of economy of the country which progressed because of textile industries. So, most mosques, that are being built are given as charity by wealthy merchants on private lands by public commissions as well as their money. According to (Snyder, May 9, 2019) when military government ruled the country from 1975-1991, most mosque projects were commissioned by those rulers so they were designed for political resolutions and used a discounted symbolic language thus laden with great deal of religious symbolism and religious extremism. Architecture of these mosques are now being raised around Modernist aesthetic but early mosques of this type were not built with secularist instinct. Nevertheless now, in last 20 years, patrons and architects that are hired have brought this secularism in religious sphere when world is trapped in irrational extremism. The results are the most inventive and aesthetically pleasing radical designs that surpass these irrelevant ideologies.

Prayer hall by Louis I. Kahn in Parliament Complex in Dhaka (1982)
According to (Snyder, May 9, 2019, pp. 1-3) the importance and impact of the architecture of Dhaka Assembly Hall by Louis. I. Kahn has also been emphasized. He mentions that when Louis I. Kahn started the design of Dhaka Assembly Hall in 1962, he made sure that a prayer hall must be included, which later became the most celebrated
The design of a prayer hall across the globe. The author explains some of the characteristics of Dhaka Assembly prayer hall that resembles features of Postmodern architecture style. A lofty cube, with its corners inserted into huge hollow cylinders acting as columns, thus defining prayer hall. The prayer hall is actually a large study room with an area convertible to prayer hall, with sunlight entering the interior and creating dramatic experience. Eight high and huge circular windows twisted about its corners, the “continuations of their arcs spreading into the hollow columns” like flying buttresses. Direct sunlight enters in through hollow columns and spurs over concrete slab that were hand casted. Triangular squinches as used in construction of domes, angle up from the corners, just to give a glimpse as if dome is about to begin which does not really seem to happen. Instead of dome, Kahn used octagon, an approximation to dome and the most eternal representation of Islamic architecture, over the floor of assembly hall which is a “vaulted octagonal structure” rising 117 feet over a space dedicated to assembly employees. The assembly hall is majestic in contrast to which the mosque is contemplative. By this type of architecture, without any doubt, it would take years in Bangladesh to build such a religious space as inventive as it could be.

![Figure 11: Interior view of Prayer hall and qibla wall.](image1)

![Figure 12: Interior view of Prayer hall.](image2)

![Figure 13: Interior view of prayer hall in Dhaka Assembly hall designed by Louis I. Kahn.](image3)
Parameters of form of mosques built by local communities in contemporary India

1. Shape
2. Size
3. Colour
4. Texture
5. Orientation
6. Scale
7. Proportion
8. Articulation
9. Light
10. Transformation
11. Formal collisions of geometry
12. Axis
13. Symmetry
14. Hierarchy
15. Emphasis

These parameters will be used to analyze form of mosques of selected case studies and live study.

Inferences from literature study

1. Postmodernism has been an important concept in determining form of mosques around the world by discarding the practice of using traditional and conventional elements in form of mosques.
2. Mosques around the world are either standardized, or stereotyped building devoid of any “valid symbolism”. These mosques differ from each other by the type of funding, area of land, number of occupants, year of construction, climate, and socio-cultural factors.
3. However, climate and socio-cultural factors provides rather similar forms extending to wider regional borders whereas type of funding, area of land, number of occupants, and year of construction are the factors that will result in greater deviation in form of mosques.
4. Bangladesh has plethora of ideas in terms of modernism and postmodernism for architects to imbibe.
5. There is no participation of people in building and designing of mosques in India unlike Bangladesh.

Selection criteria for Case studies & Live study

- TYPE OF FUNDING
- YEAR OF CONSTRUCTION
- AREA OF MOSQUES
- NUMBER OF OCCUPANTS

Figure 14:- Selection Criteria Of Case Studies And Live Studies.
Selection Criteria

Type of funding
As found, from the literature most mosques that are being constructed are locally funded mosques i.e. by the local people. Hence, in order to find the type of mosque which should be built in India, we need to study locally commissioned mosques.

Year of construction:
Since the research is limited to the time of postmodernism hence, mosques that are/were built in 1970s- present, have been studied.

Area of mosque
According to area, the form of mosques changes and most mosques that are being built, cater to comparatively smaller number of people, due to lack of space and lack of money. Hence only those mosques are studied whose area is <=1000 square meters.

Number of occupants
The number of occupants or worshippers in today’s scenario, are preferring to pray at home but this is not the case everywhere. Number only increases during Friday, congregational prayer. Hence only those mosques are studied where maximum people on Fridays are approximately <=1500 worshippers.

Case Study: Baitur Rauf Mosque, Dhaka, Bangladesh
Country of origin: Bangladesh, City: Dhaka
Client: Sufia Khatun
Design: 2005-2006
Completed: 2012
Architect: Marina Tabassum
Primary Construction material: Bricks
The selection criteria of the mosque are on basis of following points:

Locally commissioned project
This mosque was a dream project of the architect’s grandmother who donated land and funds for construction of this mosque. Later due to insufficient funds construction stopped, but local people started donating funds and it got constructed. The construction got completed in stages due to funding issues. As far as local people are concerned, they provided help to the architect in designing the mosque by checking the process and helping in execution work.

Year of construction
Since this mosque started in 2005 i.e. after postmodernism, hence this mosque is taken.

Area of mosque
The area of mosque is 750square meters because of land available.

Number of occupants
Normal days-450; Fridays: 800-900 men, and sometimes 10-12 women.
Case Study: Chandgaon Mosque, Chittagong, Bangladesh
Country of origin: Bangladesh,
City: Chittagong
Client: Faisal. M. Khan
Design: 2005
Completed: 2007
Architect: Kashef Mehboob Chowdhary
Primary Construction material: Concrete
The selection criteria of the mosque are on basis of following points:
Locally commissioned project
This mosque was patronised by a wealthy merchant who wanted a modern mosque. Charity funds were started, hence there was sufficient money.

Year of construction
Since this mosque started in 2005 i.e. after postmodernism, hence this mosque is taken.

Area of mosque
The area of mosque is 1000 square metres because of land available.

Number of occupants
Normal days- 300; Fridays: 800-900 men, and sometimes 10-12 women.

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Figure 21 Ground floor plan
Figure 22 East facing view of entrance

Figure 23 Sections
Figure 24 Interior view of prayer hall and qibla wall

Figure 25 Interior view of prayer hall, Source: (Chandgaon mosque, n.d.)
Figure 26 View of courtyard with oculus, Source: (Chandgaon mosque, n.d.)
CASE STUDY: Mosque- E-Haji Abdur Rauf, Malegaon, India: -
Country of origin: India
City: Malegaon
Client: Haji-Abdur Rauf
Design: 2011
Completed: 2016
Architect: Arif Shah
Primary Construction material: Terracotta bricks

Locally commissioned project: This mosque was patronised by a wealthy businessman of this city. After his death, his sons escalated the project. The project is unique in its own city as this city is known as “city of mosques” with many mosques built from 20th century and onwards.

Year of construction: Since this mosque started in 2011 i.e. after postmodernism, hence this mosque is taken.

Area of mosque: The area of mosque is 900 square metres which was bought by the patron.
Number of occupants: Normal days- 450; Fridays: 1000 men, and no women, even though a mezzanine floor is dedicated to them.

Figure 27: Ground floor plan, Source: (NBZ Malegaon mosque, n.d.)

Figure 28: First floor plan, Source: (NBZ Malegaon mosque, n.d.).
Figure 29:- Section AA’ Source: (NBZ Malegaon mosque, n.d.)

Figure 30:- Interior view of first floor, Source: (NBZ Malegaon mosque, n.d.)

Figure 31:- View facing south and main road, Source: (NBZ Malegaon mosque, n.d.).

Figure 32:- Interior view of prayer hall, Source: (NBZ Malegaon mosque, n.d.).
Figure 33: Entrance portal facing North, Source: Invalid source specified.

Figure 34: Entrance corridor during classes, Source: (NBZ Malegaon mosque, n.d.).

LIVE STUDY: Abu-Bakr Mosque, Allahabad, India:
Country of origin: India
City: Allahabad
Client: -
Design: 2000
Completed: 2002
Architect: -
Primary Construction material: Bricks & Concrete

Locally commissioned project:
According to local people, client was a rich contractor, who had bought this land to construct a mosque in order to make the area (which was undergoing development that time) to become a known spot for people of Muslim community ad to mark a residential territory.

Year of construction:
Since this mosque started in 2000 i.e. after postmodernism, hence this mosque is taken.

Area of mosque:
The area of mosque is 900 square metres which was bought by the patron.

Number of occupants:
Normal days- 450; Fridays: 1500 men, and no women.
Figure 35: View of Abu-Bakr Mosque, Allahabad; Source: Author

Figure 36: Interior view showing Qibla wall, Abu-Bakr mosque, Allahabad; Source: Author

Figure 37: Ground floor plan, Abu-Bakr Mosque, Source: Author

Figure 38: First floor plan, Abu-Bakr Mosque, Source: Author

Figure 39: Section AA’, Source: Author.

Figure 40: Interior view of Prayer Hall; Source: Author
Figure 41: Interior view of entrance corridor Source: Author.

Figure 42 Prayer hall facing east Source: Author

Figure 43: View of hall during prayer; Source: www.google.com, n.d.

Analysis and Inferences:
Table 1: Analysis Table, Source: Author
| PARAMETERS | BAITUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAUJ-ABUR RAUF, MALEGAON, INDIA | ABU-BAKR MASJID, ALAHABAD, INDIA |
|------------|--------------------------|-------------------------------|---------------------------------|-------------------------------|
| SHAPE      | History of Prophet's mosque | History of Prophet's mosque in | History of Prophet's mosque in     | History of Prophet's mosque in   |
|            | Geometric simplicity is emphasized by the architect | Geometric simplicity is followed in the mosque | Geometric simplicity is followed in the mosque | Geometric simplicity is followed in the mosque |
| COLOUR     | Due to the use of local materials, the mosque has a earthy feel | Due to the use of local materials, the mosque has a earthy feel | Due to the use of local materials, the mosque has a earthy feel | Due to the use of local materials, the mosque has a earthy feel |
| TEXTURE    | The texture is intricate and detailed | The texture is intricate and detailed | The texture is intricate and detailed | The texture is intricate and detailed |
| LIGHT      | A mix of natural and artificial light is used | A mix of natural and artificial light is used | A mix of natural and artificial light is used | A mix of natural and artificial light is used |
| ORIENTATION| The mosque is oriented towards Mecca | The mosque is oriented towards Mecca | The mosque is oriented towards Mecca | The mosque is oriented towards Mecca |

Table 2: Inference Table, Source: Author
Figure 44: Study of Shape, Colour and texture of Mosques, Source: Author.
Figure 45: Study of light, orientation, and transformation of Mosques, Source: Author
Table 3: Analysis Table, Source: Author.

| PARAMETERS | BAITUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABU-BAKR MASJID, ALAHABAD, INDIA |
|------------|---------------------------|-------------------------------|----------------------------------------|----------------------------------|
| SIZE       | Solid and bold geometry with distinct volume decreasing as the punctures increase in contrast with similar mosques where less light is present. | Pot of hand determined size of mosque, thus determining no of occupants. | Volume is in compliance with number of worshippers. | Pot of hand determined size of mosque, thus determining no of occupants. |
|            | Much of the roof is free from light. | This is also due to fact that client might have demanded to concentrate on the volume of the mosque. | The visual dominance is built into the mosque. | Maximum height attained is of 12 m. |
| SCALE      | Most modern mosques built before this mosque were of relatively low height maximum reaching 8-9 m only. Also, height of context buildings is also taken into consideration. | Maximum height achieved is of 12m in order to match with skyline around with number of mosques in vicinity. | Maximum height attained is of 12m. | Indoor design is concerned with respect to human. |
| PROPORTION | PLAIN proportion is visible when rectangle is divided into equal squares with openings on human scale to maximise the visual aesthetics. | PLAN is symmetrically divided along prayer hall with one side landscape and other side built up. | Overall architecturally, proportion does not seem to create aesthetic effect in the composition. | Aircraft is in compliance with human scale. |
| ARTICULATION | Rotation is done so that qibla wall faces west. | Planes are so arranged in order to make mosque as a part of the street and bungalow mosques. | Planes are articulated in simple manner without any unique interior circulation. | Aircraft is in compliance with topography. |
| SITE       | All available space within the mosque is utilized fully. | Aer a of area is designed into a quadrilateral, height restrictions are determined by the height restrictions. | Site is helping to accommodate the skyline by obstruction from past even though not much clear in terms of cutouts that are used. | Aircraft is in compliance with the site. |
| SCALE      | Client's demand of the size is to have all the space utilized as efficiently as possible. | Achieved with help of minimization and simple geometry with height matching with context. | Achieved with help of minimization and simple geometry with height matching with context. | Achieved with help of robust cutouts devoid of any ornamentation with respect to context. |
| PROPORTION | Proportion is achieved by clear lines and height of mosque with respect to humans. | Proportion is achieved by clear lines and height of mosque with respect to humans. | Proportion is achieved by clear lines and height of mosque with respect to humans. | Proportion is achieved by clear lines and height of mosque with respect to humans. |
| ARTICULATION | Planes are acting as the element of the prayer hall as a symbol. | Planes are acting on the plane and acting as the element of the prayer hall as a symbol. | Planes are acting as the element of the prayer hall as a symbol. | Planes are acting on the plane and acting as the element of the prayer hall as a symbol. |

Table 4: Inference Table, Source: Author

| PARAMETERS | BAITUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABU-BAKR MASJID, ALAHABAD, INDIA |
|------------|---------------------------|-------------------------------|----------------------------------------|----------------------------------|
| SIZE       | All available space within the mosque is utilized fully. | Aer a of area is designed into a quadrilateral, height restrictions are determined by the height restrictions. | Site is helping to accommodate the skyline by obstruction from past even though not much clear in terms of cutouts that are used. | Aircraft is in compliance with the site. |
| SCALE      | Client's demand of the size is to have all the space utilized as efficiently as possible. | Achieved with help of minimization and simple geometry with height matching with context. | Achieved with help of minimization and simple geometry with height matching with context. | Achieved with help of robust cutouts devoid of any ornamentation with respect to context. |
| PROPORTION | Proportion is achieved by clear lines and height of mosque with respect to humans. | Proportion is achieved by clear lines and height of mosque with respect to humans. | Proportion is achieved by clear lines and height of mosque with respect to humans. | Proportion is achieved by clear lines and height of mosque with respect to humans. |
| ARTICULATION | Planes are acting as the element of the prayer hall as a symbol. | Planes are acting on the plane and acting as the element of the prayer hall as a symbol. | Planes are acting as the element of the prayer hall as a symbol. | Planes are acting on the plane and acting as the element of the prayer hall as a symbol. |
**Figure 46:** Study of Size and Scale of Mosques, Source: Author
Figure 47: Study of Proportion in plan, sections and elevation of Mosques, Source: Author.
ARTICULATION (Refer Table 3, 4, and Appendix-I: Table 2)

Edges and corners

- Corner is dilute for light to enter from lightwells created at the corners.
- Edges are so perceived to create a pavilion like space. Instead of column, wall planes act as rectangular columns.
- Corner is eliminated and offset by inclined plane to create a backdrop wall washed by sunlight.
- Typical corner as done in simple rectilinear forms.

- Rotation is done so that qibla wall faces west.
- In order to get it, a circle is inserted so that, it fits but many negative spaces are created.
- Planes are so joined in order to depict mosque as a pavilion as done earlier in old Bangladesh mosques. They don't really meet rather arranged in such a way so as to define required shape.
- Planes are following site lines along with lines creating in orienting prayer hall towards Qibla. Corners are splayed at 45 degree with an offset to create area for light to enter.
- Planes are articulated for intrusion of light similar to one of techniques used in Postmodern architecture of Louis I Kahn and other architects.
- Outer façade is more porous for light to enter while inner facade is filled with openable windows.

Dhaka Assembly Hall designed by Louis I. Kahn

Louis I. Kahn used hollow cylindrical columns area a light regulating structural member with perforated

Figure 48:- Study of Articulation of Edges & Corners in Mosques. Source: Author.
Figure 49: Study of Surface Articulation in Mosques, Source: Author.
Table 5: Analysis Table, Source: Author.

| PARAMETERS       | BAITUR RAUF MOSQUE, DAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGON, INDIA | ABU BAKR MASJID, ALAHABAD, INDIA |
|------------------|---------------------------|-------------------------------|-------------------------------------------|----------------------------------|
| PORTAL & ARCHES  | No pointed arches because of postmodernism's rejection of traditional Islamic forms. | No pointed arches because of postmodernism's rejection of traditional Islamic forms. | No pointed arches because of postmodernism's rejection of traditional Islamic forms. | The idea of arches is followed because of lack of knowledge about the movement. |
|                  | It has a low, flat roof. | It has a low, flat roof. | It has a low, flat roof. | Architects might not have been aware of postmodernism. |
|                  | No secondary arches. | No secondary arches. | No secondary arches. | Clients demand might have influenced it. |
|                  | Recessed windows. | Recessed windows. | Recessed windows. | Religious symbolism is given importance from faith. |
|                  | Decorative elements. | Decorative elements. | Decorative elements. | Architectural elements are highlighted. |
|                  | Courtyard is in a rectangular shape, in line with the main axis. | Courtyard is in a rectangular shape, in line with the main axis. | Courtyard is in a rectangular shape, in line with the main axis. | The offset area is used as a courtyard which creates a sense of depth. |
|                  | It is a large, open space. | It is a large, open space. | It is a large, open space. | The offset area is used as a courtyard which creates a sense of depth. |

Table 6: Inference Table, Source: Author.

| PARAMETERS       | BAITUR RAUF MOSQUE, DAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGON, INDIA | ABU BAKR MASJID, ALAHABAD, INDIA |
|------------------|---------------------------|-------------------------------|-------------------------------------------|----------------------------------|
| PORTAL & ARCHES  | No influence by postmodernism. | No influence by postmodernism. | No influence by postmodernism. | No influence by postmodernism. |
|                  | Low, flat roofs. | Low, flat roofs. | Low, flat roofs. | Low, flat roofs. |
|                  | Recessed windows. | Recessed windows. | Recessed windows. | Recessed windows. |
|                  | Decorative elements. | Decorative elements. | Decorative elements. | Decorative elements. |
|                  | Courtyard is in a rectangular shape, in line with the main axis. | Courtyard is in a rectangular shape, in line with the main axis. | Courtyard is in a rectangular shape, in line with the main axis. | The offset area is used as a courtyard which creates a sense of depth. |
|                  | It is a large, open space. | It is a large, open space. | It is a large, open space. | The offset area is used as a courtyard which creates a sense of depth. |
PORTAL & ARCHES (Refer Table 5, 6, and Appendix-I: Table 3)

No arches have been used. Two entrances: One on south facade and other on west facade. In total 7 entrances are there with width of 920*3150mm.

Recognisable features are discarded.
Approach to Postmodernism in Bangladesh mosques has affected architect’s ideology.
Familiarity with context is considered. Inspiration from Louis I Kahn mosque in Assembly building.
Low, wide rectangular openings reflect idea of minimalism.

No arches have been used. Rectangular openings on the facade. Main entrance faces the courtyard in the east. In total 8 entrances are there measuring 25m*2.3m.

Recognisable features are discarded.
Approach to Postmodernism in Bangladesh mosques has affected architect’s ideology.
Familiarity with context is considered.
Inspiration from Louis I Kahn mosque in Assembly building.
Low, wide rectangular openings reflect idea of minimalism.

No pointed arches because of postmodernism ideology of creating new amalgamated with old.
Skilled labour not available. Construction cost increases. Portal is kept simple with half pointed arch pattern on the east iron gate.

Architect’s interpretation of modern intervention resulted in no use of arches.
Direct use of symbols has been discarded- Religious symbolism is not used.

The idea of arches is followed because of lack of knowledge about the movement. Architect might not have been aware of postmodernism. Clients demand might have dominated. Religious symbolism is given importance than quality.

Religious symbolism used to treat facade and openings.
Architect’s and client’s interpretations
Lack of idea of postmodernism.

Figure 50: Study of Portals & Arches in Mosques, Source: Author
Figure 51: Study of Courtyards in Mosques. Source: Author.
**POND/ABLUTION AREA** (Refer Table 5, 6, and Appendix-I: Table 3)

**Baitur-Rauf Jame Mosque**

Ablution area is equipped with water but no pool is present. Rainwater drainage channels are provided running around the prayer hall.

No distinct use of water for aesthetic indicates its temporariness. Rainwater channels when filled make space appear to float. Smaller details can bring out change. Since a dedicated space for ablution is given, hence need is fulfilled.

**Chandgaon Mosque**

Ablution area is located in the forecourt and not in the masjid.

No distinct use of water for aesthetic indicates its temporariness. Since a dedicated space for ablution is given, hence need is fulfilled.

Function is important rather than aesthetic and repetition of tradition.

**Haji Abdur Rauf Mosque**

Ablution area is located in the courtyard on the east side with semi-circular water pool. Circular seating is fixed along the circumference for people. POOL radius measures 3m from wall of prayer hall.

Due to lack of space, pond and ablution is combined to form a functional space. Ablution faces prayer hall but courtyard is treated as a less important space.

**Abu-Bakr Mosque**

Ablution area is raised by 450mm on platform located along the northern side of boundary wall with marble flooring.

A small platform for ablution shows less space left for this function in order to occupy large number of worshippers in the prayer hall.

Ablution area is kept minimal and functional representing architects' consciousness to fulfill needs rather than using it as a symbol to replicate which was done in earlier mosques.

**Figure 52:** Study of Ablution Area in Mosques, Source: Author.
3) Prayer hall is inspired from pavilions used in Sufi architecture of East Bengal. The amount of light entering is also less as compared to rest three prayer halls.

2) Prayer hall is conceived as a pavilion and has a porous treatment of façade for maximum intake of light and air.

3) A fully open prayer hall is created using trabeated framed structure. Mezzanine floor is supported by 4 columns that form the aisle.

4) Prayer hall is divided into 3 aisles using columns inspired by halls built in Mughal Architecture. These columns take the support of the slab above.

**Figure 53:** Study of Prayer Hall in Mosques, Source: Author.
**DOME** (Refer Table 5, 6, and Appendix-I: Table 3)

**Baitur-Rauf Jame Mosque**

No dome is present as architect followed idea of minimalism with less importance to religious symbolism in her design.

Religious symbolism is discarded.

Approach to Postmodernism in Bangladesh mosques has affected architect’s ideology. Familiarity with context is considered.

Inspiration from Louis I Kahn mosque in Assembly building.

**Chandgaon Mosque**

Dome is present but treated differently. Proportions are similar to domes used in earlier mosques in Bangladesh. It does not intimidate human scale and mosque.

Presence of dome with such dimensions so as not to be visible with human perspective indicate its importance for light rather than religious symbolism.

Interpretation of architect to achieve concept is important.

**Haji Abdur Rauf Mosque**

Dome is present but treated differently. Proportions different from what were being used in local and conventional mosque and it does not dominate the composition.

Presence of dome to be visible with human perspective indicate importance to look same but dominate skyline with modern idea.

Interpretation of architect to achieve concept is important.

**Abu-Bakr Mosque**

Onion shaped dome with a slight modification is present with similar treatment as domes in other local mosques shows lack of consciousness of architect as well as client and people.

Direct religious symbolism is used in terms of dome with no proper aim and its use.

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Figure 54:- Study of Dome in Mosques, Source: Author.
**Figure 55:** Study of Mihrab & Minaret in Mosques, Source: Author
Table 7: Analysis Table, Source: Author

| PARAMETERS | BAITUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABOU BAKR HASEEB, ALAHABAD, INDIA |
|------------|---------------------------|-----------------------------|-----------------------------------------|----------------------------------|
| **KURSI**  | It should not have been considered by the architect. It is more subjective than related to form of mosque. | It is not related to form hence, a variation is done by creating niches of 300/300mm or 200/300mm to keep the books. | It is not related to form hence, a variation is done by creating niches on lower part of pillars wall for the books. | It is not related to form hence, a variation is done by creating niches on lower part of pillars wall for the books. |
| **DHAKA**  | Previously it was used for kings (now such activities is not present). Other local mosques do not follow the trend. | Since local mosques have not been focusing on diwak, this mosque has also not used it. | Since local mosques have not been focusing on diwak, this mosque has also not used it. | Since local mosques have not been focusing on diwak, this mosque has also not used it. |
| **MINBAR MHIBAS** | The ideology insisted on equality and simplicity. Also demonstrated no demand of kings. Treatment of plaques wall and minaret design discarded in theme and concept of the architect. Arab is a necessary element of mosques to indicate orientation. | Minbar is simply defined, again following ideas of minimalism. It is made out of same material to create uniformity and indistinguishable. Arab is also indicated use of colour and texture, which is feature of minimalistic modern architecture. | Minbar is defined by a right-angled square which is not involved by a modern design. Could be due to imitator demand, to create contrast of materials, since wooden homes, thus also have been used due to ease of availability. Arab is present as it is an essential element but with a modern design. A semi-circular with oblique square pattern in white is created. A contemporary essence in minbar is present. | Minbar is eliminated in this mosque. Due to demand, variation i.e., a temporary platform in provided which may be used sometimes. Due to the architectural treatment. Only one is kept to define imam's position. Minbar is defined by 3 niches or arches different from the ones used in windows to create contrast. Another feature treated by architects is to bake wall as backdrop receding out from pillars wall in order to enhance it. |
| **MAZGURA** | It is used to popularize the architect, followed ideology of nationality and modern concept of mosques. Modern mosques built before it used contemporary ideas of not using minara. | Since local mosques do not follow the trend hence, it has no importance to form of mosques. Also it has no importance to form of mosques. | Since local mosques do not follow the trend hence, it has no importance to form of mosques. Also it has no importance to form of mosques. | Since local mosques do not follow the trend hence, it has no importance to form of mosques. Also it has no importance to form of mosques. |

Table 8: Inference Table, Source: Author

| PARAMETERS | BAITUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABOU BAKR HASEEB, ALAHABAD, INDIA |
|------------|---------------------------|-----------------------------|-----------------------------------------|----------------------------------|
| **KURSI**  | It is a simple architectural and client's desire to include it as it does not affect form of mosques. | It is a simple architectural and client's desire to include it as it does not affect form of mosques. | It is a simple architectural and client's desire to include it as it does not affect form of mosques. | It is a simple architectural and client's desire to include it as it does not affect form of mosques. |
| **DHAKA**  | It is not necessary that all traditional elements are followed. Those that full needs of contemporary users only those are considered. *Needs of user group is important.* | It is not necessary that all traditional elements are followed. Those that full needs of contemporary users only those are considered. *Needs of user group is important.* | It is not necessary that all traditional elements are followed. Those that full needs of contemporary users only those are considered. *Needs of user group is important.* | It is not necessary that all traditional elements are followed. Those that full needs of contemporary users only those are considered. *Needs of user group is important.* |
| **MINBAR MHIBAS** | It is new concept and client's demand to include it as it does not affect form of mosques. | Minbar is merged with lines using same material to increase connection with minara. | Minbar is used according to demand of imam and its availability. | Minbar is eliminated in this mosque. Due to demand, variation i.e., a temporary platform is provided which may be used sometimes. Due to the architectural treatment. Only one is kept to define imam's position. |
| **MAZGURA** | It is new concept and client's demand to include it as it does not affect form of mosques. | Minbar is used according to demand of imam and its availability. | Minbar is eliminated in this mosque. Due to demand, variation i.e., a temporary platform is provided which may be used sometimes. Due to the architectural treatment. Only one is kept to define imam's position. | Minbar is eliminated in this mosque. Due to demand, variation i.e., a temporary platform is provided which may be used sometimes. Due to the architectural treatment. Only one is kept to define imam's position. |
| **MINARET** | *Religious symbolism is discarded as it is added as a decorative element.* | Minbar is used according to demand of imam and its availability. | Minbar is eliminated in this mosque. Due to demand, variation i.e., a temporary platform is provided which may be used sometimes. Due to the architectural treatment. Only one is kept to define imam's position. | Minbar is eliminated in this mosque. Due to demand, variation i.e., a temporary platform is provided which may be used sometimes. Due to the architectural treatment. Only one is kept to define imam's position. |
Table 9: Observation Table, Source: Author.

| PARAMETERS | BALTRU RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGON, INDIA | ABU-BAK MASIJD, ALAHABAD, INDIA |
|------------|---------------------------|-------------------------------|----------------------------------------|-------------------------------|
| FORMAL COLLISIONS OF GEOMETRY | Square is used to obtain cubic, accommodate space and essentially to achieve desired form. | Rectangles divided into squares to accommodate space andexcluding same to achieved desired form. | Square is rotated to have spacious function as a prayer hall. | Square is taken and divide into spaces using columns. |
| AXIS | Diagonal and bent axis is present | Straight axis is created. | Bent axis is created from north and south. | Bent axis is created from north and south. |
| SYMMETRY | Bilateral symmetry is present. | Bilateral symmetry is present on line perpendicular passing through rechare and parallel to north. | Bilateral symmetry is present on line perpendicular to play well and passing through minbar. | Bilateral symmetry is present on line perpendicular to upline and passing through minbar. |
| HIERARCHY | Form is in hierarchy with context w.r.t its colour and size. | Hierarchy is achieved by colour and no ornamentation. | Hierarchy is achieved by colour and no ornamentation. | Hierarchy is achieved by size and no ornamentation. |
| BALANCE | Symmetrical balance is achieved by size and number of objects. | No use of balance as prominent design principle is seen. | No use of balance as prominent design principle is seen. | No use of balance as prominent design principle is seen. |
| HARMONY | Harmony by nature is created. | Harmony by nature is created. | Harmony by nature is created. | Harmony by nature is created. |
| EMPHASIS | Present and is created by use of colour and texture. | Present and is created by use of colour and texture. | Present and is created by use of colour, texture, and material. | Present and is created by use of colour, texture, shape, and size. |

Table 10: Inference Table, Source: Author.

| PARAMETERS | BALTRU RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGON, INDIA | ABU-BAK MASIJD, ALAHABAD, INDIA |
|------------|---------------------------|-------------------------------|----------------------------------------|-------------------------------|
| FORMAL COLLISIONS OF GEOMETRY | FUNCTIONAL AND SYMBOLIC REQUIREMENTS accentuates a form. | FUNCTIONAL AND SYMBOLIC REQUIREMENTS accentuates a form. | FUNCTIONAL AND SYMBOLIC REQUIREMENTS accentuates a form. | FUNCTIONAL AND SYMBOLIC REQUIREMENTS accentuates a form. |
| AXIS | VISUAL CONNECTION can be enhanced with help of this principle. | VISUAL CONNECTION is easy in order to connect instantly enhanced with help of this principle. | VISUAL CONNECTION can be enhanced with help of this principle. | VISUAL CONNECTION can be enhanced with help of this principle. |
| SYMMETRY | Design principle which is important for religious spaces. | Design principle which is important for religious spaces. | Design principle which is important for religious spaces. | Design principle which is important for religious spaces. |
| HIERARCHY | If it is used to obtain concept of mosque to stand out among other structures in vicinity. | If it is used to obtain concept of mosque to stand out among other structures in vicinity. | Architect wanted the mosque to stand out. | Architect wanted the mosque to stand out. |
| BALANCE | Visually balanced structure is designed using this principle. | Visually balanced structure is designed using this principle. | Lack of conscious design approach for composition to look balanced. | Lack of conscious design approach for composition to look balanced. |
| HARMONY | By material and selection of scale it is in harmony with other structures. | By material and selection of scale it is in harmony with other structures. | Lack of conscious design approach. | Lack of conscious design approach. |
| EMPHASIS | Emphasis is achieved by using brick which depicts minimalism. | Emphasis is achieved by using white colour and perforations which depict. | Acc to architect’s concept to achieve visual emphasis by minor to dominate skyline of city. | Acc to architect’s concept to achieve visual emphasis by dome and also to dominate skyline of city. |
Figure 56:- Study of Formal collisions of geometry and Axis in Mosques, Source: Author.
Symmetry (Refer Table 9 & 10)

Radial symmetry is present as a design principle, thus dividing spaces in equivalent areas. Design principle which is important for religious spaces.

Bilateral symmetry is present, thus dividing spaces in equivalent areas. Design principle which is important for religious spaces.

Bilateral symmetry is present dividing spaces in equivalent manner. Design principle which is important for religious spaces.

Bilateral symmetry is present up till the mezzanine area. Design principle is important for religious spaces.

Bilateral symmetry can be seen due to almost equivalent spaces on either side of axis. Design principle is important for religious spaces.

Figure 57: Study of Symmetry in Mosques, Source: Author.
Conclusions and Recommendations:

Result:
The focus of this dissertation was to find what would be the parameters to determine form of mosques in India when we look at it in today’s scenario. The independent variable that were studied are: Large portal, Courtyard, Pool, Prayer hall, Mihrab, Minbar, Qibla wall, Minaret, Dome (triple/single), Arches, Shape, Size, Colour, Texture, Orientation, Scale, Proportion, Articulation, Light, Transformation, Formal collisions of geometry, Axis, Symmetry, Hierarchy, Emphasis, Balance, Harmony. The variables that govern the form of local mosques in 21st century India are required to be determined from this dissertation. Research that was undertaken comes under observational research. So, primarily based on observations, this dissertation aimed at finding the desired outcome.

Two mosques from Bangladesh were studied to understand how a country, whose architecture has its roots based on modernism and postmodernism, treat its mosque, which is an important symbol, that retains the identity of being an Islamic country. Similarly, two mosques from India were studied to understand how are local mosques being treated here. The study was based on the point mentioned above. On analysis of mosques and literature surveyed in Bangladesh and India, following points have been deduced:

Shape: Simple and bold geometries especially squares, rectangles and circles, have been used. Extruding them into robust forms have created compositions that respond to context- Inspiration from Modernism and Postmodernism which has been indirectly imbibed in them by works of architect Louis I Kahn. While in India as in case of Haji Abdur Rauf Mosque, architect has used squares, rectangles, triangles and circles to create abstraction and depict interpretation of postmodernism. Instead, in Abu-Bakr Mosques, architect has used cuboids only - Inspiration from Modernism and Postmodernism but use of their ideologies superficially.

Colour&Texture: In Baitur Rauf Mosque, material was used in its pure form. The architect has used exposed brickwork that mimics the structures in vicinity - Ideology of Minimalism. While use of brick or concrete in Indian local mosques is due to economical construction ethics, or to fulfil architects’ aspiration to create a stand-alone feature. Thus, using available material with no intervention to make systems durable and long-lasting. Exceptionally, in Abdur-Rauf mosque- brick is used in pure form because the architect wanted the mosque to stand out among other mosques which were present in the vicinity. He may or may not have used the Minimalist technique.

Light: There was a primary application of natural light with variation in different spaces by designing bold and simple windows. Indirect lighting systems like light wells, screens and for direct lights, using large opening on ceilings or on walls were mostly used. This reduced openings on façade with less ornamentation thus making it bare and simple- Ideology of Minimalism. For example, in Baitur-Rauf Jame architect has created prayer hall as a silent and dimly illuminated space inspired by the Bengali architecture of mosque in which less light is allowed to penetrate inside by use of fewer openings in façade.

Use of natural light for maximum light intake either by indirect or direct source of sunlight is seen in both mosques of India. This resulted in a maximum number of openings, very often repetitive - Traditional method façade treatment for intake of light. In Abdur Rauf mosque, indirect light infiltrated through angled corners, slits in dome, and jaali screens but a repetition of conventional elements was seen in Abu-Bakr mosque with monotonous use of arches throughout the façade.

Orientation: It is a primary factor that is taken care of in all four mosques that have been studied. In Baitur Rauf Jame Mosque and Chandgaon Mosque, Qibla wall is oriented towards west perpendicularly. Where the western edge of site did not coincide with Qibla wall, as in Baitur Rauf Mosque in Bangladesh, the square was rotated with help of cylinder to create a Qibla wall perpendicular to west. Similarly, in Malegaon Mosque, where the prayer hall was rotated so that Qibla wall was perpendicular to west. Hence orientation of Qibla wall towards west is preferred.

Transformation: In Bangladesh mosques, pure forms have been used with openings in such a way that their identity is not lost. For example, use of cuboid in Baitur-Rauf Jame mosque and Chandgaon Mosque. Thus, the composition was subtle and easily perceivable. Here- Transformation retains identity of form. While in India, additive transformation of cube or cuboid often times change the overall perception of form and it rather becomes complex. For example, transformation in Haji Abdur Rauf mosque is additive but abstract was complex and not
clear to perceive. Similarly, in Abu-Bakr Mosque where simpler transformation was seen, even though it is additive. Here - Transformation does not retain identity of form.

**Size:** It is another significant factor that govern the form of mosques and also the image that is perceived by the people. For instance, in Baitur-Rauf Jame Mosque and in Chandgaon Mosque, area, type of funding and context primarily governed their sizes - Context played an important role. Unlike in Bangladesh, importance was given to number of occupants besides funding and area while the context was neglected - Context was considered but number of occupants governed majorly.

**Scale:** The scale of Baitur Rauf Mosque and Chandgaon Mosque is intermediate i.e. 7 and 5 times respectively due to limited funds, area of plot, and context. Their design was primarily influenced by religious needs which is reproduced in the scale. Similarly, the scale of Malegaon Mosque and Abu-Bakr Mosque is intermediate due to limited funds and area available. Type of funding, need, context, and area govern the scale of the mosques. However, it is more dependent on context as it helps in determining how a form will be perceived by an individual.

**Proportion:** Architects of Baitur Rauf Mosque and Chandgaon Mosque were conscious enough to use proportion to achieve aesthetic quality and unity in their designs. While architects of Malegaon Mosque and Abu-Bakr Mosque did not take proportion in account to achieve aesthetic quality and unity in their designs.

**Articulation:** It is found to be an important factor governing the form. Edges and surface articulation were applied in both the mosques of Bangladesh, to achieve a creative form. Internal edges and corners are articulated so that light could be penetrated, while exterior surfaces were left unadorned with no or less openings - Influenced by Postmodern architecture. Similar articulation of edges and corners could be seen in Haji Abdur Rauf Mosque, where the architect has used jaali screens, minimal horizontal bands on exterior façade and corners in interior were left unmet for light to penetrate. However, in Abu-Bakr Mosque, none of this was present - Less influence by Postmodern architecture.

**Portal & Arches:** This is an imperative factor that influences the image of mosques perceived by the people. No use of arches in any of the mosques of Bangladesh. Moreover, minimal rectangular openings were designed - Inspiration from minimalism and postmodern architecture. On the contrary, in Malegaon mosques arched gateways were designed while openings were kept rectangular and minimal. While in Abu-Bakr mosques, arches were used in abundance i.e. in exterior as well as in interior - Design influenced by conventional elements.

**Courtyard:** Architects and local people in Bangladesh have taken climate as a primary design consideration thus included courtyards and windows with double walls for protection from harsh climate specifically in case of Baitur Rauf Mosque - Response to climate. In contrast, architects do not seem to consciously incorporate climate-responsive features like courtyards even though they are present in the design as in Haji Abdur Rauf Mosque in Malegaon as well as in Abu-Bakr Mosque in Allahabad - Lack of conscious response to climate.

**Pond/ Ablution area:** Inclusion of an ablution area is mandatory with proper seating and water facility. Both in Baitur Rauf Jame Mosque and Chandgaon Mosque, a proper area was defined with seating and water facility. Although in the former it was located within the building while in the latter it was outside, accessibility should be easy. In Haji Abdur Rauf Mosque, ablution area was combined with pond with an easily accessible location while it was not maintained in Abu-Bakr Mosque - Negligence towards functional requirements.

**Prayer hall:** Concept of prayer hall in Baitur- Rauf Mosque as well as in Chandgaon Mosque has been derived from pavilions built in the 13th century that existed there - Inspiration from History. In contrast, concept of prayer hall in Haji Abdur Rauf Mosque and Abu-Bakr Mosque has been derived from the primitive hypostyle halls that existed in India - Inspiration from History with no modern intervention. For example, in Abu-Bakr mosque, the prayer space with a hypostyle hall is recreated more simply.

**Mihrab:** Although it does not chiefly influence form of mosques, but to define a prayer hall, it is an important factor. In Baitur- Rauf Mosque, a vertical slit was used to indicate Qibla wall while in Chandgaon mosque, difference in texture and colour of material defined the mihrab. Similarly, in Haji Abdur-Rauf Mosque, mihrab is
defined by a semi-circular niche with a textured surface, while in Abu-Bakr Mosque, it is defined by three columns forming an arcade. Hence, **design of mihrab is open-ended.**

**Dome & Minaret:** Domes, minarets and arches are not necessarily used without any function. **Religious Symbolism is discarded.** For example, in Chandgaon mosque, architect Kashef Chowdhury has used dome in such a way that it acts as a pocket to capture light and send it inside. Large oculus in courtyards cause the space to glitter during the day. While domes, minarets and arches in Abu-Bakr Mosque are necessarily used without any proper function. Dome used in Abdur Rauf mosque is intervened by slits to bring in light. Minaret is also used with openings in triangular and rectangular shapes with a curved top inspired by African vernacular Architecture. **Religious Symbolism is used blindly with different features to fulfill their design ideas.**

**Formal collisions of geometry:** In Baitur rauf Jame Mosque, the architect has used circle and square to create a pavilion, while in Chandgaon mosque, squares offset at a distance were used to create pathways and prayer hall area. There is a variety of how simplest geometries could be articulated to generate creative forms. **Cohesive and diverse use of geometries.** While in Haji Abdur Rauf Mosque and Abu-Bakr Mosque, no such articulation was found. Instead a square is simply transformed into a framed cuboid. **Non-cohesive and similar use of geometries.**

**Axis, Symmetry, and Hierarchy:** In Baitur Rauf and Chandgaon Mosque, architects have strategically used these design principles to create an aesthetically pleasing and visually balanced forms. They were helpful in organising spaces, enhancing visual weight and making distinguishable volumes that are easily perceived. In contrast to this, Malegaon mosque and Abu-Bakr mosque did not have visual weight or aesthetically pleasing compositions in terms of axis, symmetry and hierarchy, although in Malegaon mosque, the architect has used brick to create hierarchy. Similarly, in Abu-Bakr mosque, visual balance did not appear to play a crucial role.

**Emphasis, Balance, and Harmony:** These three design principles are clearly visible in form of material, colour, shape and organisation of spaces in Baitur- Rauf Mosque as well as in Chandgaon Mosque. Architects have used these principles to create visually balanced forms. In contrast to this, mosque in Malegaon and Allahabad have unconsciously used these to create the forms.

**Participation of people:** Baitur Rauf Mosque as well as Chandgaon Mosque in Bangladesh were locally commissioned which enabled people to interact with architects. The fund often times had local people as contributors, thus reducing overall scale and cost of construction as funds were limited. **People's Participation can be seen.** In India, both the projects were locally commissioned but people demand and aspirations were not catered by architects. There was **no participation of local people. Only wealthy clients can afford money for construction and people are not involved rather they do not take interest.**

**Role of Religious extremism:** Baitur Rauf Mosque and Chandgaon Mosque have been treated as secular and modernist spaces in Bangladesh, hence they have received wide appraisal for the quality of spaces within. **Religious extremism is discarded.** While mosque in Malegaon as well as in Allahabad is as religious today as it was before with no reforms in the quality of its spaces- **Religious extremism is not discarded while people’s acceptance for new cannot be seen.**

In addition to this, minbar, Maqsura, kursi, and dikka do not play a significant role in the form of mosques. However, minbar is a mandatory requirement used as a furniture made out of various materials, and designs.
From analysis and results, following points can be concluded for the form of local mosques in **India**:

1. **Shape:** Mostly rectangles are taken into consideration. This is due to ease in planning and construction. However, this does not adhere some modernist approaches in which squares are being used to create spatially cohesive interior spaces.

2. **Colour:** Use of shades, tints, and tones of green is most common and is done to symbolize mosque in Medina. Besides this, white colour is often used to simplify visual perception of the form. However, this does not enhance the aesthetics rather make it more conventional and mundane.

3. **Texture:** Heavy to low ornamentation is seen in terms of floral patterns on walls and interiors which is outdated. This is due to replication of older mosques and mosques which are around. However, it adds to the construction cost and also the originality of form vanishes.

4. **Light:** This factor is extremely important and is required to be assessed as daylighting is not adequate in these places. Fenestrations have been provided but poorly designed and only for decoration. Most mosques rely on artificial lighting.

5. **Orientation:** Since it is a functional requirement, hence it is not modified in any way. Qibla wall faces west.

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**Figure 58** Figure showing points of difference in forms of Mosques in India and Bangladesh; Source: Author
6. **Transformation:** The transformation is a typical use of cuboid or cube, topped with a hemispherical dome and slender minaret. It is a typical transformation with no visual weight and balance. This might happen because of insufficient knowledge on architect’s part.

7. **Size:** In India it majorly, depends upon type of funding, area of the plot and number of occupants. However, context is not considered.

8. **Scale:** Mostly all forms of local mosques are of intermediate scale. However, it is not an issue. The problem arises when context is not taken into consideration, which changes the overall perception of form.

9. **Proportion:** Proportion as a design principle is not followed. For example, on analysis of two mosques, the ratio of each space was not equal. This is due to insufficient knowledge of architect. Thus, it results in visual imbalance of the form in elevation, section and plan.

10. **Articulation:** Typical edge articulation is prevalent while surface articulation is dominated by archetypal repetition of windows with less or no influence from Postmodern architecture.

11. **Portal & Arches:** Pointed arch is an element that is present in almost all the local mosques. It is in form of windows, gateways or simply façade treatment. Due to lack of tolerance for new and association with old with no modern intervention, the overall form becomes monotonous and mundane, besides increasing cost of construction also.

12. **Pond/ Ablution area:** No pond is provided but sometimes an ablution area is provided which is in a dilapidated condition located in corners. Even though a pond is provided, it is not enough to have a dual effect or function.

13. **Courtyard:** Either courtyard is omitted or used present with ratios of 1:0.6 or 1.6:1 (x/y). These ratios indicate that insufficient proportions of courtyards are being designed for any type pf climate in India and are being omitted due to lack of space available. Hence, absence or shrinkage of courtyards in mosques leads to uncomfortable environment for the users.

14. **Prayer hall:** Architects take inspiration from history by using columns as used in hypostyle hall, however, there is lack of visual connectivity between levels. There is no progress in structural advancement or uniqueness. They are not well lit and properly ventilated.

15. **Dome (triple/ single):** Mostly single onion shaped and bulbous concrete domes are used with no proper function. Height varies from 5-7m with diameter ranging from 8-10m. The widespread use of domes is due to adherence to religious symbolism and lack of tolerance among people to accept something new without a dome.

16. **Mihrab:** It is mostly defined by using different textures, colours, patterns or elements to a conventional niche, which is inspired by conventional mibrab designs, at the centre of Qibla wall.

17. **Minaret:** They are used only for accentuating the skyline with no function except for installing the loudspeakers. Height varies from 8-12m. The widespread use of minarets is due to adherence to religious symbolism and lack of tolerance among people to accept something new besides a minaret.

18. **Formal collisions of geometry:** Either a square or rectangle dominates the plan due to association with typical shapes because of ease in planning and construction. However, this leads to a mundane form that lack any diverse spatial organisation and modern approach.

19. **Axis, Symmetry, and Hierarchy:** These three ordering principles are crucial for a form to have visual weight. However, none of these seems to have an effect on form of local mosques, both internally and externally. Thus, there is no visual weight in the form of mosque. This might be due to lack of design consciousness from the architect’s part of design consideration.
20. **Emphasis**: Emphasis on bulbous, concrete domes, used only for sake of symbolism, with no function and high minarets upto 12m with no importance except for accentuating the skylines, emphasizes the forms of local mosques and creates an obvious image for an individual.

21. **Balance and Harmony**: There is lack of visual balance and visual weight due to absence of balance and harmony created by colour, texture and size. Eventually, the form does not correspond to the context.

22. **Participation of people**: There is no role of people due to lack of interaction among architects, clients and local people. This creates a chain of duplicate forms with lack of uniqueness in the design.

23. **Role of Religious extremism**: It is widely prevalent in local mosques. Hence, people are accustomed to perceiving mosques with domes and minarets. Therefore, architects are unable to design forms without involving religious symbolism, thus, preventing them to attempt radically creative forms and spaces.

**Design Recommendations**:-
As far as design is considered, no one can comment on what the outcome would be as it depends on site, region, climate, soil conditions, design brief. Since the output in these cases cannot be derived but the approach that should be taken to achieve an architecturally creative and innovative design, can be stated. From the derived results, it is important that issues that are present in mosques which are built as a locally commissioned project, are acknowledged. below are qualitative recommendations based on the parameters analyzed:

1. Whenever such projects are undertaken, the client, architect, and local people must be involved and made to interact amongst themselves. Hence, this becomes a duty of the architect to understand the user group and the brief. It must be a democratic approach to the design of such mosques.

2. Architects get an advantage to examine antiquity of a place and also the history of architectural styles of mosques that resulted in different forms that ever existed in those regions. They get to know the vernacular language of forms of not only mosques but also other structures and learn about the local construction technique involved which would, if incorporated in their design innovatively, help local people to know about the past. People will be able to connect between ancient and contemporary. How a form is perceived depends on how architects interpret the vocabulary of forms of a mosque as a sacred space.

3. Local people and clients must be aware of what exactly they expect the mosque to look like. As it contributes to an image of that place, hence visual weight that a form should have to be perceived as an identity lies in the hands of both architect and local people, who must constantly guide the architect to achieve a desired form.

4. Locally available materials must be used to decrease construction costs. Their implementation must be in such a way as seen in examples of mosques in Bangladesh. This will not only help the form to be in a hierarchy with other structures in the vicinity but also make a sustainable mosque. Construction techniques might be modern along with structural systems while forms will be modern in their overall appearance as well. This leads to the idea of minimalism where architects have used materials in their pure characteristics to achieve visually appealing and modern buildings.

5. When minimalism is applied to spatial volumes then building forms completely change. Forms are reduced to either hybrid of old and new, or simpler forms that are easily perceived without any complexity. Simpler is the design, more easily it is perceived. Objects must be treated to create balance and harmony. Balance can be created by shapes that are bold and pure and also by using colours which balance rather than alienate mosques from its context.

Further, below are quantitative recommendations based on the parameters analyzed:

**Shape:**

a) A **square or rectangular** shape is satisfactory. However **square can be used adequately** as it reduces wastage of spaces and accommodates the required areas easily as compared to circle, triangle or pentagon etc.

b) This also depends on size of the plot but efforts must be made to use simple and bold geometry.
**Colour & texture:**

a) According to results, bright colours should be avoided keeping the sanctity of space in mind as well as surrounding structures. Colour and texture are characteristics of the type of finish and material.

b) It is advisable that locally available materials must be used and in their pure form that helps in reducing cost and also helps in response to climate.

c) **Ornamentation should not be used.**

d) **Red bricks, bricks made out of fly-ash can also be used as a substitute to normal bricks for construction.** Perhaps concrete can prove beneficial if used in an alternative manner, for instance, in combination with other constituents like sawdust resulting in materials such as timber crete which requires cheap labor as well.

**Light:**

a) **Importance must be given to the use of natural sources of light rather than artificial light.** This helps in cost reduction and achieve effective user experience.

b) When minimalism is taken into consideration to design the form of mosques, fewer perforations will be used in the exterior. Hence daylight from a skylight, lightwells, jaali screens must be implemented.

c) Considering the scale of the mosque, openings in the exterior must be decided accordingly. For a prayer room of 4-4.5m in height, lintel must be at 2.5m to 3m for the venturi effect to take place.

d) Skylights, jaali screens, courtyards, and lightwells must be used to penetrate daylight in the interior.

e) According to (holmes, 2014)minimum lux should be 150lux so that people can see each other properly with less use of artificial luminaries.

**Orientation:**

a) No site is ideally a square or a rectangle with no perpendicular cardinal points. Orientation of Qibla wall to the west is important in mosques which cannot be changed, therefore while orienting the spaces, **one wall of prayer hall must face the west with entrances on any of the remaining three sides as per the design.**
Transformation: The transformation of geometries should not be such to make compositions look complex. Mostly subtractive and additive transformation will help form of mosques to retain their identity as dimensional transformation might lose identity, thus making an alienated form, unless consciously, sensibly, and radically implemented.

a) Additive transformation and subtractive transformation must be implemented to such an extent that the identity of form used should not be lost.
b) Since minimalism teaches the use of pure forms without losing identity, hence additive and subtractive transformation will help in achieving that.

Size:

a) For a maximum of 1000 worshippers, total built-up area of 800-1000 sq.mt can be designed.
b) The maximum area will be occupied by prayer hall which shall be a square measuring 20m*20m.
c) To accommodate this area, levels can be generated which can demarcate spaces, but the total height should be greater or equal to 8m.

Scale:

a) The scale of mosques should not intimidate the human scale; hence it should be a maximum of 5-7 times the human scale.
Proportion: Proportion as a design principle has a great deal in architecture. Many theories have been formulated to achieve proportion but the overall idea is to achieve visual balance and unity in forms. Especially in the case of mosques where traditional elements like traditional domes and conventional minarets have sometimes overruled this idea due to bad designs. But a mosque with such elements, designed proportionately with as many volumes as it can have (without diluting sanctity of mosque), an upright form can be achieved.

a) From the analysis, it can be seen that proportion in local mosques in India unlike those in Bangladesh and historical Indian mosques.
b) Recommended ratios are 1:1, 1:2 such that the ratio of all dimensions is equal.
c) The objective is to have proportionate spaces, thus helping in achieving a proportionate composition.

Articulation:

a) Surface articulation depends upon openings on the exterior and material/finish used.
b) With very less or no ornamentation, less opening on the façade, the overall form appears rigid. Similarly, texture will depend on materials used and their type of finish.
c) Edges and corners must be judiciously designed when indirect sources of daylight are concerned.

Portal & arches:

a) Portal form the entrance to mosques.
b) Unlike historical mosque, it need not be highly decorated or huge.
c) It should be enough to fulfil the need of allowing 3-4 people to comfortably pass through it.
d) It is advisable to decrease or discard the use of religious symbols such as arches in portals or windows.
e) For a prayer room of 4-4.5m in height, lintel must be at 2.5m to 3m for the venturi effect to take place.
Courtyard: Climate is also one of the primary design considerations. In India, when we look back in history, many mosques had undergone tremendous changes in courtyards and their treatment of façade. This was majorly due to climatic conditions. In many mosques, for example those in Bengal, courtyards were introduced for ventilation and air penetration. Instead, mosques built in Gujarat, did not include a courtyard because of the hot and arid climate throughout the year. Climate determines whether there will be opening or light wells or wind towers or indirect light sources which ultimately affects forms of mosques.

a) It is advisable to have a courtyard in a mosque as it not only serves as a transition from profane to sacred but also as a gathering space and acts as an extension when the number of worshippers increases.
b) Besides that, it benefits in generating a comfortable environment by allowing sunlight, and air to enter.
c) It helps in cross-ventilation. Courtyard ratio should be either 1:1, 1:1.5, or 1:2.

Figure 65 Design recommendation for courtyards in mosques; Source: Author

Pond/ ablution area:

a) Ablution area need not be highly dominant and should have proper seating platform with water facility for people to perform ablution.
b) It must be located before going inside a prayer hall. For regions where water ponds help in evaporative cooling to create comfortable environment, it is advisable to use them.

Figure 66 Design recommendation for possible location of ablution area in mosques; Source: Author

Prayer hall: When designing mosques in India, architects need to know that it is a secular country unlike Bangladesh which is an Islamic country. Despite this fact, Bangladeshi architects have created some of the most creatively and radically secular mosques. The credit goes to Louis I. Kahn, who by his design of prayer hall in Dhaka Assembly Hall, has created one of the finest of prayer halls in the world. Such an approach must be involved in India also where Muslim identity is important rather than religious symbolism.

a) As mentioned earlier, it should be either a cuboid or cube which may be supported on columns, or arch or load-bearing structural system depending upon construction technique followed.
b) For 1000 worshippers it is advisable to have a prayer hall measuring 20m*20m with a height of 8m for ventilation and providing comfortable interior space. This may be divided into ground floor and first floor or a single floor with a mezzanine for women.

c) A column-free space is preferred for free circulation, visual clarity, and fewer obstructions in movement.

d) Play of light and shadow should be incorporated for enhanced experience of users.

Figure 67 Design recommendation for prayer hall; Source: Author

Mihrab:

a) Mihrab is an important element of a mosque even though it does not primarily affect the form of a mosque.
b) Mihrab should be as simple as possible and can be defined with the help of texture, light, colour, material, or geometry.

Figure 68 Design recommendation for Mihrab; Source: Author

Dome: Domes and minarets were invented earlier with unique construction techniques, hence lasted for a longer time period. Similarly, even if they are used today while defining forms of mosques, they should not overpower the form rather complement it. Here emphasis, as a design principle, comes into the picture, which element requires maximum visual weight to develop mosque identity for that region. Emphasis can be created by using bold geometries, using bright colour, change in its development style, for example traditional to minimalism, use of shadow, and natural light by creating perforations or opening in ceiling or walls.

a) The use of religious symbolism like domes shall be reduced.
b) This is because it increases the cost of construction and is not well designed as seen in today’s scenario in form of small domes put over minarets in an eclectic manner.
c) Using it as a religious symbol will only signify its existence unless used as a skylight, or for ventilation to serve any purpose.
d) Even if they are used as an element, they should not dominate the whole composition, thereby keeping in essence with the contemporary architecture of mosque and its function.
Minaret:
   a) It is a religious symbol that has dominated forms of mosques for thousands of years.
   b) But now, its function has reduced to merely a symbol.
   c) Hence, it should not be used unless it has a function other than calling out for prayer.
   d) Height of the overall form must not be intimidating for other structures in vicinity.

Overall idea is to create such a form which do not emphasizes on traditional elements, and the idea of religious symbolism and extremism but on how it can contribute to the image of any city. In India, where secularism is deeply rooted, this architecture is not evident to have a clear identity although it is can be found throughout the entire country. Forms, thus, derived would be modernist and will not be called as Pan-Islamic shorthand or stereotyped for using familiar forms or replicating forms that are present. This will completely change the perception of sacred space for not only Muslims but people from other religions as well.

Conclusions:-
This dissertation aimed at finding the parameters that will govern the form of local mosques built by local communities in contemporary India and recommending what should be the form for such mosques. This is done by analyzing selected examples from India as well as Bangladesh based on parameters deduced from the literature study. The examples were selected, based on the type of funding, year of construction, number of worshippers, and built-up area. Mosques built after the 1970s were considered. The results show that there is a lack of modern approach and use of Postmodern style of architecture due to less/no contribution of local people and lack of interaction among architects as well as clients with regards to design and construction of mosques in India unlike in Bangladesh. Hence, recommendations include a low scale of mosques with less/no use of religious symbolism with elements inspired from history and intervened with a minimal and modern approach in coherence with site and climate, thus, condemning any kind of replication. Besides, the participation of local people is also a major aspect that has been recommended together with interaction of local people with architects as well as clients through questionnaires, interviews. This dissertation further contributes to giving an insight into what is the major concern concerning the development of local mosques in today’s India as well as suggesting how the form of the local mosque in India should be, keeping the secularism of country in consideration.

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### Table 11: Observation Table, Source: Author

| PARAMETERS | BATTUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABU-BAKR MASJID, ALAHAHABAD, INDIA |
|------------|--------------------------|-------------------------------|-------------------------------------------|----------------------------------|
| **SHAPE**  | Primary shapes like square and circle are used. | Primary shapes like square, circle, and rectangle are used. | Primary shapes like square, circle, from gate and rectangle are used. | Primary shapes like square, circle, and rectangle are used. |
| **COLOUR** | Beige and orange, characteristic of Herbert A. Brains are visible. | White colour is the overall colour widely used in the project. No other colour is used. | Red brick wall have been used. Colour bricked are in mix of red and white. | Yellow wall have been used. Colour wall have been used. |
| **TEXTURE** | Texture is coarse and grainy due to exposed brickwork. | Texture is smooth in appearance and rough when touched due to pale. | Texture is coarse and grainy in appearance due to exposed brickwork. | Texture is smooth in appearance and rough when touched due to white painted walls. |
| **LIGHT**  | Indirect light is used in form of past light, light, and light. Light is also used. | Diffused light in form of past light and from dome in the proper hall. | Indirect light from past light. | Direct light from past light. |
| **ORIENTATION** | Glass wall is made of glass of 13 degree from wall as a farsala north west. | Glass wall is made of glass of 13 degree from wall as a farsala north west. | Glass wall is made of glass of 13 degree from wall as a farsala north west. | Glass wall is made of glass of 13 degree from wall as a farsala north west. |
| **TRANSFORMATION** | Regular courtyard is used which is paved with cyclical volume. | Two volumes of angular cubes that are placed together. | Sense of enclosure of different areas. | Composition of cubes is united together. |

### Table 11: Observation Table, Source: Author

| PARAMETERS | BATTUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABU-BAKR MASJID, ALAHAHABAD, INDIA |
|------------|--------------------------|-------------------------------|-------------------------------------------|----------------------------------|
| **SIZE**   | Volume of building is 12m x 12m x 6m. | Volume of building is 10m x 10m x 4m. | Volume of building is 12m x 12m x 6m. | Volume of building is 8m x 8m x 4m. |
|            | Smaller square is 14.75m x 14.75m. | Smaller square is 10m x 10m. | Smaller square is 12m x 12m. | Smaller square is 8m x 8m. |
| **SCALE**  | Relatively lower than most mosques. Approx 1/3 times the human scale. | Relatively lower than most mosques. Approx 1/3 times the human scale. | Relatively lower than most mosques. Approx 1/3 times the human scale. | Relatively larger than most ancient mosques. Approx 1/3 times the human scale. |
| **PROPORTION** | Proportion of mosque is in proportion with human scale from exterior as well as from interior. | Proportion of mosque is in proportion with human scale from exterior as well as from interior. | Proportion of mosque is in proportion with human scale from exterior as well as from interior. | Proportion of mosque is in proportion with human scale from exterior as well as from interior. |
| **ARTICULATION** | Acc to plan, a circle seems to be inscribed in a square of Exactly 20M x 20M. | Acc to plan, a circle seems to be inscribed in a square of Exactly 20M x 20M. | Acc to plan, a circle seems to be inscribed in a square of Exactly 20M x 20M. | Acc to plan, a circle seems to be inscribed in a square of Exactly 20M x 20M. |

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All planes are meeting straight angles. The edges are either straight or curved and are connected with each other. Vertices are left to be open interstices.
Table 12: Observation Table, Source: Author

| PARAMETERS          | BATTUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABU-BAKR MASJID, ALAHABAD, INDIA |
|---------------------|---------------------------|-------------------------------|------------------------------------------|-------------------------------|
| PORTALS & ARCHES    | No arches have been used;  | No arches have been used;     | Ttutar arches are used in jalis window   | Ttutar arches are used in jalis |
|                     | two entrances: One on  | rectangular openings on the   | with lintel height of 350 mm. Two centred | window with lintel height of  |
|                     | south facade and other on   | facade. Main entrance faces  | 350 mm. Two centred arches are used for  | 350 mm. Two centred arches   |
|                     | west facade. In total 7    | the courtyard in the  | as doors. In total 8 openings are there | arches are used for doors.    |
|                     | entrances are there with   | rectangular openings on the   | to enter the mosque with entrances on  | as doors. In total 8 openings |
|                     | width of 192'-6" x 13'-6". | facade as well as   | norm and south acting as main entrances. | are there to enter the mosque |
|                     |                            | outside. In total 8   | Interior height is 3m.                   | with entrances on north and    |
|                     |                            | entrances are there  |                            | south acting as main entrances. |
| COURTYARD           | 8 vocks created by rotation| Circular void of diameter 1m | Instead of courtyard there is a fore- | Circular void of diameter 1m   |
|                     | of smaller square crete   | is created in the entrance   | court of the entrance surrounded by    | is created in the entrance    |
|                     | courthounds.              | court in the entrance.       | high boundary wall of 3m.               | court in the entrance.        |
| POND/DUSUCTION      | Abduction area is scarped  | Abduction area is blocked   | Abduction area is blocked in the court- | Abduction area is blocked in  |
| AREA                | with water but no pool is  | on the east side with semi- | hound in the courtyard on the east side | the courtyard on the east side |
|                     | present.                  | circular water pool. Circular | with semi-circular water pool. Circular | with semi-circular water pool. |
|                     | Rainwater drainage channels| voidings one fixed along    | voidings one fixed along the     | voidings one fixed along the  |
|                     | are provided running around | the circumference for   | circumference for people. | circumference for people.     |
|                     | the prayer hall.           | people. FOCL India measures | FOCL India measures 3m from wall of | FOCL India measures 3m from    |
|                     |                            | 3m from wall of prayer   | prayer hall. | prayer hall. |
| PRAYER HALL         | square prayer hall measuring | Prayer hall measures 13'9" x 11'1" | Prayer hall measured 13'9" x 11'1" in | Prayer hall is preceded by an arcaded |
|                     | 14'7' x 11'7' x 10'7' a | in plan, divided into two   | plan, divided into two parts. | corridor with depth of 9m and   |
|                     | present which is separ-   | parts. Entrance hall measuring 13'9" x 11'1" | frontal wall is 12'3". | length equal to prayer hall. |
|                     | ated by two square by light | main hall with maxima- | main hall is 12'3". | Prayer hall is 12'3" in length |
|                     | walks. Perceived as a pass-| meaing measuring 13'9" x 11'1" | main hall is 12'3". | and 8'3" in length. |
|                     | aged on a position supported | in plan, divided into two parts. | main hall is 12'3". | Prayer hall is 12'3" in length |
|                     | by 8 peripheral RCC columns.| | main hall is 12'3". | and 8'3" in length. |
|                     | RCC columns have been used. | | main hall is 12'3". | Prayer hall is 12'3" in length |
| TRIPLE DOME/SINGLE  | Dome is present but in a different way. | Dome of diameter 4m construc- | Dome of diameter 4m constructed from | Dome of diameter 4m constructed from |
| DOME                | Diameter is 13" but is decorated in new shape thus bringing in light through wall. | ted from centre of prayer hall is present | centre of prayer hall is present | centre of prayer hall is present |
|                     | Height is 2'6" from floor. | Height is 2'6" from floor. | | Height is 2'6" from floor. |

Table 13: Observation Table, Source: Author

| PARAMETERS          | BATTUR RAUF MOSQUE, DHAKA | CHANDGAON MOSQUE, CHITTAGONG | MOSQUE-E-HAJI-ABDUR RAUF, MALEGAON, INDIA | ABU-BAKR MASJID, ALAHABAD, INDIA |
|---------------------|---------------------------|-------------------------------|------------------------------------------|-------------------------------|
| KURSI               | No kurn present except niche are created at west wall to keep books. | No kurn present except niche are created at west wall to keep books. | Kurn is present for keeping the QURAN. | Kurn is present for keeping the QURAN. |
| DIXCA               | No dikkas is present. | No dikkas is present. | No dikkas is present. | No dikkas is present. |
| MINBAR/MINHRAB      | Minbar is present. Imam stands in front of all worshipers, thus leading the prayer. | Minbar is present. Imam stands in front of all worshipers, thus leading the prayer. | Minbar is present. | Minbar is present. |
|                     | Light is used to mark (a) wall identifies weight of material in west of prayer hall. | Light is used to mark (a) wall identifies weight of material in west of prayer hall. | Minbar is in form of raised platform with three steps with tier of 100mm. | Minbar is in form of raised platform with three steps with tier of 100mm. |
|                     | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. |
|                     | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. |
|                     | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. |
|                     | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. |
|                     | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. |
|                     | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. | 3 steps with tier of 100mm. |
|                     | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. | Minbar is in form of raised platform accessible. No separation of imam with madr is present. |