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# A LIVING STRUCTURE: FUNDAMENTALS OF HINDU TEMPLE ARCHITECTURE

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**Abstract:** Hindu temple architecture is known from the earliest time in the world as per Hindu philosophy. Various ancient Hindu texts like Epics, Puranas, Vedas, Mayamata, Brihat Samhita, etc. inculcates the subject called Vastu. The key source for the Hindu temple architecture is derived from the magical geometry i.e. *Vastupurusha Mandala*. The structure of the temple building acts as a single human body. It is a metaphysical philosophy which deals beyond the reality. The *Vastu* plays a vital role during construction of temples and building structures. The formation of any ancient Indian structures is possible due to some guidance in terms of units which can be evaluated and fixed easily by the help of traditional system of measurement. The importance of traditional measurement unit is framed rigidly in the paper for understanding the geometry of the structures with better perception.

The main objectives of the research paper are (1) to study the architectural geometry from its origin and its measurement unit, (2) to explore the evolution of *Vastushastra* and its types, (3) to analyse the interlinkages between the *Vastupurusha Mandala* with temple building and temple with *Purusha* (human being). Hence this research paper is a unique in its own way for describing the architectural design pattern of Hindu temples in a systematic manner.

At last but not least the proposed findings and conclusion of the research paper based on the *Vastushastra* is that the evolution of the concerned ancient building structures can be easily determined on the basis of traditional measurement system. The magical diagram can be taken into account in various fields from architecture to planning level with sustainable approach. Through achieving the certain objectives help to depict the way of designing, constructing and planning any Hindu temple structures at present scenario in a confined manner.

**Keywords:** Hindu Temple Architecture, Vastupurusha Mandala, Geometry, Traditional, Measurement.

## 1. Introduction

Any living creature's need a house for taking rest and enjoy the entire life span. Human beings get two types of energy i.e. the first type of energy can be called as internal energy that comes from their chromosomes and genetic inheritance as well as from cultural and beliefs while the second type of energy is known as external energy that comes from food, water with natural interaction. During the construction of the house the energy within the house is conserved and become static due to lack of any activity inside it. And after construction of the house the energy get mobilised due to involvement of certain activity taken place by people. According to Winston Churchill, "*people shape building and the building shape them"*.

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"A tiny structure like a temple or a home, compared to a large universe, is constructed as a miniature version, a microcosm, of the greater universe, the macrocosm" (Carolus Chess, 2011). Likewise, Hindu temples in India follow the same concept as the residential buildings. The newly constructed temples require *Pranapratistha* (breath giving ceremony) process in order to agitate the static energy into live form. From ancient time it is seen that the cultural and traditional growth of a region is governed by the Hindu temples. Hinduism is considered as a holistic term and it does not deal about theology. The Hindu culture give importance to the location of the building structures as well as activity take place by the people based on their needs. The term *Vastupurusha Mandala* is widely used as it deals the architectural geometry which can be taken into consideration while constructing the temples. "*Vastu* turns every building into a holy space befitting its occupants". *Vastupurusha Mandala* acts as a strong platform for growth and development of every aspect of the life from micro level to macro level from human being to building structures. Each and every living creatures and building structural element begins with a point (*bindu*) and collapse again into point (atom/*bindu*).

## 2. Materials and Method

The research paper is highly subjected to a qualitative research. The formation of this research paper is based on the collecting information from various sources in the form of books, journals, conference proceedings, etc. However, some other sources like internet based materials provide important key elements in determining and collecting information for preparing this research paper.

## 3. Discussion

Every structure has one common sensation called a point or a *bindu* or an atom which is found during the construction as well as during demolition. A point or a *bindu* depicts a powerful meaning in terms of microcosm and macrocosm level and widely related with Hindu temples rituals. Simply it can be said that a *bindu* is the connecting point of spirit and matter. A *bindu* is composed of material of speech and has pure principle i.e. *tattva*. A *bindu* possess multi – dimensional character. While the other term *bija* can also act as the *bindu* i.e. origin from where life begins which acts as an essential element of life. Everything in the world comes from a point and after their life span it goes again to the same point. In case of living creatures especially human beings evolve from the embryo to new born baby due to interaction (amalgamation) of semen and ovum i.e. male and female reproductive cell respectively which can be termed as *bija*. The growth of the baby starts from the umbilical cord in terms of a navel or a point. So a *bindu* acts as a drop of life – giving substance has a dynamic nature, which persists even in its nature. It is a unit of consciousness. Since it is known to be a microcosmic unit from which everything evolves. It is the synthesis of matter, space and time, shining as the very life of them but transcending them as the spirit (Vatsyayan, 1988). Point is the ever – pulsating point which is considered to be the source and the abode of rest for everything.

According to Rawson Hindu temples are considered as *Yantra* where it resembles as a nucleus of the visible and knowable energies (Gandotra, 2011). Hindu temples are considered

as an auspicious place for celebrating all kinds of rituals by the devotee. The structure of the temple building act as a single human body. For example, in case of the *garbhagriha* of the Hindu temple and central portion of the building plot are known to be the place or womb of *brahman* which is generally left open as courtyard or as dark space as *garbhagriha*. It is to be considered as the linkage between cosmos and man (*purusha*). The womb of *brahman* is indicated as sacred & peaceful place with energetic powers. The nutritional values of Brahman's womb are highly energetic and helps to generate all forms related to it. Collectively, the central place where main deity is worshipped is known as *Brahmasthana*. It is very sensitive area because it is the heart of the body of the *purusha* or a building or a temple. If anyone hurt the heart of the body, then it is considered that it hurts the whole body.

*Purusha* is derived or formed through the navel of the *Brahman*. *Purusha* is fully composed with various parts or limbs which provides better functionality in terms of action, worship, etc. If any organ or limb is missing in the body of *purusha* then it affects or hinder the quantity and quality of the work in terms of an activity. The shape and size of any physical form of the complete *purusha* which may be human body, trees and plants, and any other living creatures on the earth has its own characteristics and can be considered as a universal model and measure. *Purusha* can be also related with site, ground plan and temples. According to Stella Kramrisch the temple can be resembled as the place of interaction between microcosm and macrocosm i.e. *purusha* and universe. *Purusha* can be referred as a little world on the basis of his or her body appearance in the form of idol placed in the temple while universe deals at large scale i.e. galaxy or a temple complex where all devotee worship at the centre.

The existence of *atman* is present everywhere from body of the *purusha* to spiritual energy. So atman has the property of form and formless, tangible or intangible and immortal in nature. It has tendency to free from all aspects i.e. apart from sensory and motor organs. It cannot be split into parts further. "The self (*atman*), which is free from evil, ageless, deathless, sorrow less, hunger less, thirst less, whose desire is the real, whose conception is the real" (Vatsyayan, 2003). It can be visible through intellect (*budhhi*). It can be understood easily through the pictorial term which is as follows:

***Figure 1 A lighting Candle (Source: Adapted from Internet)***

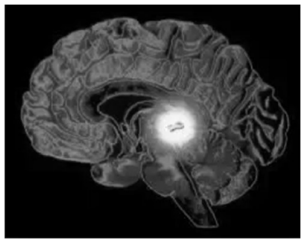

***Figure 2 Enlightened Mind (Source: Adapted from Internet)***

From above figure it is clearly seen that intellect or *budhhi* acts as the candle and brain as the room where *atman* can be seen easily without any hindrance. The body of *purusha* has been composed of only one *atman* with three different layers which are – the enjoyer (*bhokta*), doer (*karta*) and transmigrant soul (*samsarin jiva*).

*Atman* is covered with an envelope called *Deha* or *Sarira*. *Sarira* acts as a sieve which helps to collect all types of impurities from the entire functional organs. *Sarira* can be also called as *ksetra*, *anga*, *murti, deha, tanu, kalvera, vapu, vigraha*, etc. *Sarira* is considered as the city of Gods having nine doors which includes openings – two ears, two eyes, two nostrils, a mouth, an anus, and a generative organ. *Sarira* is mortal as well as organic in nature and can decay easily. Actually *Sarira* is made with five principle ingredients (*bhutas*) – *agni, aakash, jal, vayu* and *mitti*. The formation of body is complex and vital process which are discussed elaborately below:

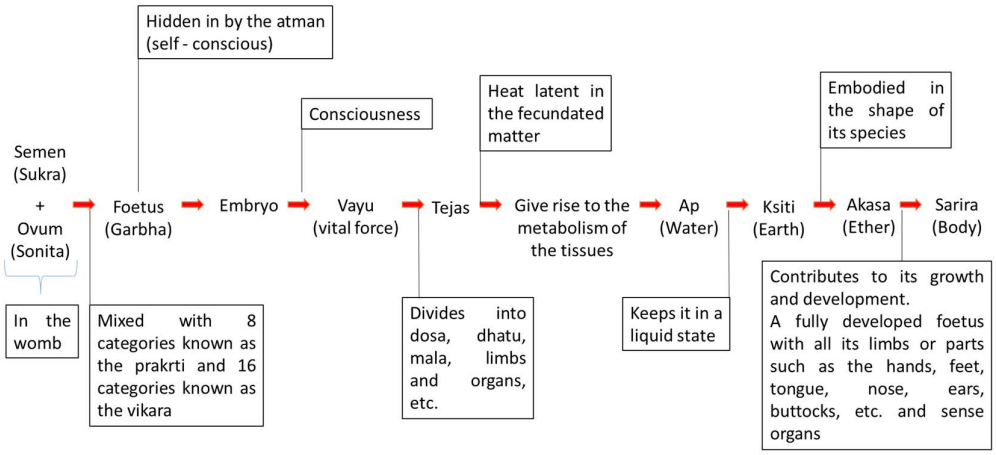


***Figure 3 Flow Chart of Human Evolution (Source: Primary)***

*Prana* acts as an indicator of life in the body. It is formed by the conversion of all seminal energy i.e. kinetic energy into respirational energy i.e. potential energy. *Pranpratistha* is the religious term used in this case to agitate the static state of newly constructed temples in active form. This potential energy is stored in all parts of the body according to their needs in order to function properly so that body can be active and energetic. It can be understood easily by relating with example of growing tree (Vatsyayan, 2003).

a) Semen and ovum = Seed
b) Development of organs = Branches of tree, flowers, fruits
c) Full body of man = Complete tree

It also acts as the beam of the body where all organs rests on it as in case of the main beam in the building where all load bearing structures rest on it. The eye, the ear, the mind, the speech, the senses, the body act as the sub beam which is supported on the main beam i.e. rest on the breath (Vatsyayan, 2003). Therefore, through above discussion it is seen that in temple architecture *bindu* has been taken as a hole in the centre of the *amalaki* installed over the summit. The centre point on top of the temple spire (*sikhara*) coincides in one line with the centre of the *garbha – yantra* in the *garbhagriha* or sanctum. While *vedic* altar or holy pit or *kunda* is used as the first step in the evolution of the temple through the generation of fire flame in it which also follows the concept of the navel (*nabhi*) of the fire sticks where fire remains latent there.

Apart from point, lines also play an important role during construction of Hindu temple structure. Everything in the world or universe must have some form or shape which can be made through the help of lines. Horizontal lines represent restfulness; vertical lines symbolise flame soaring upwards while the diagonal lines depict speed or movement. These three types of lines are widely used in the Hindu temples in order to maintain the structure in stable, constant and energetic condition. These lines are implemented in the *Vastupurusha Mandala* which act as the nerves and arteries of the temples like in human body. The importance of temple can be denoted based on the basis of its three character i.e. a thing (*dravya*), quality (*guna*) & action (*kriya*).

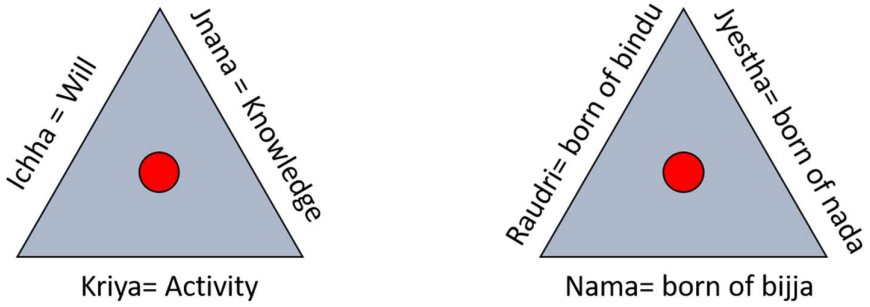


***Figure 4 Three Characters used in Hindu Temples (Source: Primary)***

## 4. Results

### 4.1. Concept of Architectural Geometry

The orientation of the temple is aligned by marking or drawing a circle around the peg through joining the intersection points of its shadow in the morning and evening period in order to decide the east – west direction. After the alignment of the site, *Vastupurusha Mandala* the magical diagram is overlaid over it as it is considered as the master grid for design. It is believed that cosmic man is pressed down on each of its square sub grid which represents its own identity. The temple stands on the cosmic configuration, the *Vastupurushmandala*. *Mandala* is a broader spatial term for *Ksetra*. From the ancient texts it is clear that there were four highest creators of the world namely *Sthapati, Sutragrahin, Takshaka* and *Vardhaki*. The *Sthapati* is known as the master builder or architect who govern the construction of building. Then *Sutragrahin* is known as surveyor and follow the instruction given by his Guru *Sthapati*. He is skilful in measurement by the Sutra or cord and *Danda* or rod as applied to buildings in their vertical and horizontal proportions. Then third one is called as *Takshaka* who is carpenter and sculptor used to work usually with wood, stone, iron, brass, copper, gold, silver and clay. And at last *Vardhaki*, the mason who is the master of painting and give final touch to the work finished by *Takshaka* (Chakrabarti, 1998).

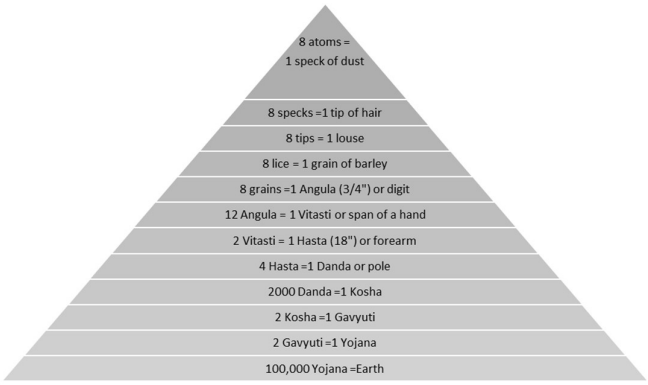


***Figure 5 System of Measurement (Source: Adapted from (Chakrabarti, 1998)***

The size of the respective grid of *Vastupurusha Mandala* is determined based on the construction unit of measurement called multiple of *Angula* or the width of the middle phalange of the middle finger of the officiating priest, which is about 1.9 cm. According to *Rig Vedas* one *Vitasti* or span of a hand is equivalent to twelve *Angula* and one *Hasta* or hand equals to two times *Vitasti* and further one *Danda* or rod is equivalent to four *Hasta* which measuring six feet (Chakrabarti, 1998). The architectural geometry is used to achieve the goal between the total and the calculable approach. It is used to evaluate and fix the variable by putting a measurement unit. The thickness of the building materials plays an important role in qualitative as well as quantitative strength of the building especially in the Hindu temples. According to the scholar, the size of bricks does not always determine the age of a structure. But the sizes of bricks can depict various texts of *Vastuvidyas* which are as follows (Bhattacharyya, 1947):

| | |
|---|---|
| Visvakarma Prakasa bricks will be | 18” x 18” x 6” |
| Visnudharmmottaram | 18” x 9” or 18” x 4 ½” |
| Hayasirsa Pancharatram (Saurakanda) | 18” x 9” or 18” x 3” |
| I-S-G-Paddhati | (a) 18” x 9” x 6” |
| | (b) 9” x 4 ½” x 2 ¼” and |
| Other two dimensions in Angulas | (c) 10” x 5” x 2 ½” |
| | (d) 8” x 4” x 2” |
| Agni Purana | 9” x 9” x 3” (or 18” x 9” x 3”) |
| Atri Samhita | 18” x 9” x 4 ½” or 18” x 18” x 9” |
| Silparatnam | 9” x 4 ½” x 2 ¼” |
| Sarnath Bricks of Kushan Period | 16 ½” x 11” x 2 ¼” or 12” x 9 ½” x (unknown) |
| Gupta Period | 15” x 9” x (unknown) |
| Bricks found at Nagari | 14 ½” x 9” x 2 ½” or 12 ½” x 8 ¾” x 2 1/8” |
| Tiles at Besnagar | 14 ½” x 8 ¼” x (unknown) |
| Mayamatam | Angulas 8 x 4 x 2 or 10 x 5 x 2 ½ or 12 x 6 x 2 or 16 x 8 x 2 |
| Mansara | 39 ½” x 22 ½” x 11 ¼” & 11 ½” x 6 ½” x 1 $^{1}/_{8}$" |
| | or 22 ½” x 17” x 8 ½” or 6” x 1 ½” x $^{5}/_{8}$" |

According to *Mayamata* the width of the bricks was measured as four, five, six or eight *Angula* or digits. While the length of the brick is equivalent to twice its width and the height of the brick equals to a quarter of its width (Chakrabarti, 1998). But the smallest unit of measurement of space is an atom, the smallest particle of dust while the *Angula* is the multiple of an atom. The list of all measuring units from the smallest to the highest is detailed in triangular figure as above.

The mathematical calculation of *Vastushastra* is also based on *Aayadi* formula which is used to find the length, breadth, perimeter, area and the height of the building. By the use of *Aayadi* formula on the building structure reflects positive effects. It is the composition of *Aaya, Vyaya, Yoni, Raksha, Vara* and *Tithi*. The remainder obtained plays an important role and considered as deciding factor of loss or gain. If it is a gain, then the structure is proportionate and stable and the dimensions are right while if it is a loss, then it means the dimensions are not right and should be suitably corrected. The explanation of all its composition are detailed out as follows:

- *Aaya* – It is the remainder obtained when length is multiplied by 8 and divided by 12.
- *Raksha* – It is the remainder obtained when length is multiplied by 8 and divided by 27.
- *Vyaaya* – It is the remainder obtained when breadth is multiplied by 9 and divided by 10.
- *Yoni* – It is the remainder obtained when breadth is multiplied by 3 and divided by 8.
- *Vara* – It is the remainder obtained when height is multiplied by 9 and divided by 7.
- *Tithi* – It is the remainder obtained when height is multiplied by 9 and divided by 30.

*Aaya* and *Raksha* formulae are used to fix both the length of the buildings and of the rooms. *Aaya* means income and *Vyaya* means expenditure. So *Aaya* should always be greater than the *Vyaya*. While *Yoni* and *Vyaya* formulae are used to fix both the breadth of the buildings. If the *Yoni* obtained is an odd remainder, then it is good *Yoni* where as if it is even, then it is considered as Bad *Yoni*. The height of the building can be fixed using the *Vara* and *Tithi* formulae (Carolus Chess, 2011).

### 4.2. Concept of Vastushastra and Vastupurusha Mandala

The evidence of Vastushastra are found in the ancient *vedic* text known as *Rig Veda*. *Vastushastra* is also called as *Vastu Vidya* which deals with sacred space. Its application is still working and followed at present time by astrologers, craftsmen, conservation architects and priests. *Vastushastra* is well bifurcated into two schools of architecture i.e. one is the *Nagara* and the other is *Dravida* schools after 6$^{th}$ century AD. "Hindu architecture always begins by laying the cosmic body of God (*purusha*) over every building site (*mandala*)". It is believed that the god *Vishwakarma* is viewed as the father of *Vastushastra*. *Vastushastra* is the religious subject under which the term *Vastupurusha Mandala* is considered as the main idol of any particular building (Chakrabarti, 1998). "*Vastu* is the study of 'space *samkaras'* of methods for turning ordinary or aggrieved spaces into dimensions, shapes, arrangements, and other characteristics. *Vastu* is a philosophy of living that specialized in determining the aptness or relevance of site and situation, particularly in architectural contexts. *Vastu* guides us to inspect

every space that we shape and that shapes us, from the most miniscule (tiny) to the most mammoth (huge)" (SVOBODA, 1980).

Some application of *Vastushastra* is found by discussing its types of *Chandas*. As *Chanda* signifies the aesthetics appeal of any building. *Chanda* is a characteristic of Nagara school of Indian Architecture and accordingly this canon has found an important place in the canons of architecture as expounded by the two principal texts of Nagar *Vastu-vidya*, the *Samarangana-Sutradhara* and the *Aparajita-prchha* (Shukla, 2019). The first type of *Chanda* is *Meru Chanda* which signifies as center of all physical, metaphysical and spiritual universes. Most of the Hindu temples are structured on the *Meru* concept to represent as Mount *Meru*. The second is *Khanda Meru Chanda* which depicts partial structure at other end in order to expose the front elevation as *Meru Chanda*. The example of this type of *Chanda* prevails in Burj Al Arab hotel in Dubai which is the second tallest hotel in the world with height 1050 feet. *Pataaka Chanda* is the third type of *Chanda* which seems to be like a flagstaff with a flag unfurled, i.e. with a narrow lower portion and progressive, cantilevered upper floors. Its example is the Throne Pillar at Fatehpur Sikri, India; CN Tower in Toronto, Canada. Then the *Sushi Chanda* as fourth *Chanda* shows the appearance like needle and its example is Burj Khalifa, Dubai the tallest towers in the world with height of 2717 feet. *Uddista Chanda* and *Nasta Chanda* is considered as the fifth and sixth *Chanda* respectively. They are not independent. They have no perspective view of their own. They were used in the design of different buildings meant for different functions (Carolus Chess, 2011).

The term *Vastupurusha Mandala* can be easily understood by knowing each bifurcated word. *Vastu* means physical environment or land or site; *Purush* means unseen energy, power or cosmic being; *Mandala* means diagram or chart or cosmos. *Vastupurusha Mandala* acts as a primary tool for superimposing *Purush* or construction design of a building in terms of rhythmic proportion over the elastic geometric grid drawn on the land or on the site (Marshall, 2012). The vertical and horizontal lines of the *Vastupurusha Mandala* are referred as veins of the body. It is a psychological map which can be of various shapes other than square shape. It is also considered as a cosmological grid diagram with full of grid patterns and each grid square has its own identity based on its orientation. "The network of lines of the *mandala* guides the relative position and size of building parts, in a manner that ensures a proportional equation between all the macro and micro features of the building" (Marshall, 2012). According to Hindu mythology there are thirty – two gods that exist in the universe which includes 12 Gods of *Aditya*, 8 Gods of *Vasu*, 11 Gods of *Rudra* and 2 Gods of *Ashwani*. Now the *Vastupurusha Mandala* is of various types which are tabulated below.

***Table 1: Types of Vastu Purush Mandala***

| Types of Vastupurush Mandala | Name of site | Its sizes (in square Pada) |
|---|---|---|
| *Sakala Mandala* | *Eka – Pada* | 1x1 |
| *Paisacha Mandala* | *Dwi – Pada* | 2x2 |

| | | |
|---|---|---|
| *Pitha Mandala* | *Tri– Pada* | 3x3 |
| *Mahapitha Mandala* | *Chatush – Pada* | 4x4 |
| *Upa-pitha Mandala* | *Pancha – Pada* | 5x5 |
| *Ugra-pitha Mandala* | *Shashtha – Pada* | 6x6 |
| *Sthandila Mandala* | *Sapta – Pada* | 7x7 |
| *Manduka / Chandita Mandala* | *Ashta – Pada* | 8x8 |
| *Paramasayika Mandala* | *Nava – Pada* | 9x9 |
| *Aasana Mandala* | *Dasa – Pada* | 10x10 |
| *Sthaniya Mandala* | *121 Pada* | 11x11 |
| *Desiya Mandala* | *144 Pada* | 12x12 |
| *Ubhaya Chandita Mandala* | *169 Pada* | 13x13 |
| *Bhadra Mahasana Mandala* | *196 Pada* | 14x14 |
| *Padma Garbha Mandala* | *225 Pada* | 15x15 |
| *Triyuta* | *256 Pada* | 16x16 |
| *Vart Bhoga Mandala* | *289 Pada* | 17x17 |
| *Karanastaka Mandala* | *324 Pada* | 18x18 |
| *Ganita Mandala* | *361 Pada* | 19x19 |
| *Surya Mandala* | *400 Pada* | 20x20 |
| *Su-Samhita Mandala* | *441 Pada* | 21x21 |
| *Suprati Kanta Mandala* | *484 Pada* | 22x22 |
| *Vishalaka Mandala* | *529 Pada* | 23x23 |
| *Vipra – Garbha Mandala* | *576 Pada* | 24x24 |
| *Vishvesa Mandala* | *625 Pada* | 25x25 |
| *Vipula – Bhoga Mandala* | *676 Pada* | 26x26 |
| *Vipra – kanta Mandala* | *729 Pada* | 27x27 |
| *Visalaksha Mandala* | *784 Pada* | 28x28 |
| *Vipra – Bhakti Mandala* | *841 Pada* | 29x29 |
| *Visvesa – Sara Mandala* | *900 Pada* | 30x30 |
| *Iswarakanta Mandala* | *961 Pada* | 31x31 |
| *Chandrakanta Mandala* | *1024 Pada* | 32x32 |

The application of *Vastupurusha Mandala* is highly visible in the various design. For example, the design of Jawahar Kala Kendra and Vidhan Sabha of Bhopal is fully based on the Correa's Mandala. The Indian architect Charles Correa follows the *Navagraha* or the nine planets on his structural design. Its each grid relates to a planet and its function is also composed based on the features of the respective planet. While the planning of the city of Jaipur is entirely based on astronomical principles by the help of an architect Vidyadhar. *Vastupurusha Mandala*

pattern is also used in the Computer Science and Engineering Department of IIT Bombay showing diagram of nine squares representing cosmic elements (Chakrabarti, 1998).

## 5. Conclusion

The research paper concludes that the involvement of every aspect of the temple elements in its construction has its own significance. The Hindu temple is directly compared with the growth of human beings and with other living creatures through the help of *Vastupurusha Mandala*. The architectural geometry of the Hindu temples is also emphasised with the concept of measurement unit in terms of *Angulas* and a *bindu* or a point. A *bindu* must be regarded as a form of *atman* in the context of architecture (*vastu*) and sculpture (*silpa*). That's why the temple is referred as the dwelling area for the body of *purusha* or God while the *garbhagriha* (womb-house) for the *atman*. Hence the *brhamasthana* should not be damaged during their life span. Their presence of vital organs of the body in that holy areas affect the whole body without any prediction.

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