

Guiding Urban Development of Nodal Areas of a City: Defining Important Aspects of Research Work

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Abstract— Urban Development is a dynamic process of growth of any area, situated in the city. Node is the intersection of two or more movement corridors. Nodal Area of a City means a place surrounding an urban node, generally covering its immediate neighborhood, on all sides. Nodal areas of a city are places where numerous people converge for various reasons, main focus on movement, change of transport mode, commerce or business, entertainment and more. Urban development of Nodal Areas of any city is the emerging issue as nodal areas acted as the main activity magnet for the entire city. Different activities in nodal areas along with the different movements initiate further urban development of the city. Therefore, design guidelines and principals for these nodal areas should be carefully formulated, otherwise, these key areas of the city will face haphazard and uncontrolled urban growth which will impact the urban development in further. In this perspective, the said research work is undertaken and guidelines for urban development of nodal area should be formulated in the contextual manner. This paper aims to identify those important aspect of the said research work so that, the urban development of existing and upcoming nodal areas would be guided in desire direction.

Keywords— Urban Development, Nodal Areas, Urban Development of Nodal Areas, Activity, Movement, Vitality, Identity

I. INTRODUCTION

Urban Development gives special form of any urban area along with the new movement corridors. In addition, the intersections of these movement corridors play the magnetic role for the future urban developments (Burkhardt, 2002). Therefore, urban development of nodal areas are the major controlling factor of special, physical, social and economic developments of that entire neighborhood.

Nodal Areas or the areas surrounding of the junctions of the two or more-movement corridors are itself the pull factor of the further developments.

Nodes and the areas surroundings are the hub of different activities as these are feeded by the users of that moment corridors (Marshall S. , 2004) (Figure 1, 2 and 3). Hence, nodal areas of any city area become the major interactive hub of the urban fabric.



Figure: 1, Time Square , NY

Source: (chensiyuan, 2013)



Figure: 2, Hidco Crossing , 2012,

Source: author



Figure 3, Hidco Crossing , 2024

Source: (Kumar, n.d.)

Now a days, nodal areas in historically native areas are suffering encroachments, haphazard special developments, uncontrolled vehicular movements. The significance of local context is now missing when new developments are taking places ignoring the old cultural values. New nodal areas are facing the same, though, these areas are designed in the careful manner. Local, contextual and social aspect of the city is ignored while designing the new nodal areas (Eizenberg, 2019). As a result, new nodal areas are suffering the same as the old ones. Urban development of nodal areas basically a dynamic process which can be achieved by decision making, forming planning strategies, designing the spatial form and it is a long-term process. For the planning strategies and design guidelines, the very first step would be to identify the relevant parameters which are responsible for urban developments of nodal areas. The parameters are evolved by identifying the gaps, ignored issues, unpracticed design parameters, socio–special relationships of that area (Rybak-Niedziółka, 2022).

Therefore, the main two objectives of this paper are:

- To understand the relationship between urban development and nodal areas of a city.
- To identify the parameters and sub parameters responsible for the urban development of nodal areas of a city.

II. DISCUSSION

A. Urban development and Nodal Areas

Since 1960, two types of Urban Development process are being practiced. They are European Cities pattern and American Cities Pattern. Where European pattern largely focused on the cultural and historical aspect in the development, American pattern follows the typical planning followed by zoning rules (Smith, 2005). European city pattern solely has the high degree of different values like emotional social and cultural and these values help to shape the future developments of the urban areas.

This theory tries to organise the adequate open space, quality work space, improved infrastructure along with communication and mobility to develop more attractive urban space and keep their heritage (Figure 4 & 5). In American pattern concept the cities are subdivided in to different functional zones and these functional zones act as satellite settlements which are connected through communication networks or movement corridors and this is the continuation of Howard model (Howard, 1898). American pattern sees the urban developments as a continuous process where urbanism and de-urbanism taking place in terms of special structure (Lorens, 2006). Resultant of the rapid population growth, this urbanism and de-urbanism is being taking place from centre of the city and leads to the periphery of the city. Thus, small to big public places, urban growth immersed and these are connected through the new movement corridors. Later Arturo Soria y Mata and Ebenezer Howard addressed the main issue responsible for urban development is transportation (Rybak-Niedziółka, 2022). However, according to Krier (1984), too much planning and zoning were destroying the sense of community feelings. In 1966, 1st Gruens and later on 1993, Peter Calthorpe (1993) introduces and explained the benefits of transit-oriented development. Peter Calthorpe explained the extended version of TOD as earlier mixed used central hub with streetcar concepts. Transit oriented development is used to consider as growth magnet. Calthorpe proposed transit oriented mixed used development where the automobile dominated movement corridors help to cater all kind of mixed-use developments around the nodal or central areas (Calthorpe, 1991). Burkhardt proposed a new urbanist model called urban network which again based on the arterial movement corridors of urban settlements and a pedestrian friendly mixed-use development at the centres (Burkhardt, 2002). This model focused on transit oriented along with pedestrian friendly urban developments which can blend easily with high traffic movement corridors (Audirac, 2011). Therefore, throughout the history of mankind, all kinds of urban activities were taken place along the main movement corridors or roads or streets. Natural optimum parcel of land was used for the natural movements after the settlement of cluster of dwellings and this emerged as the natural movement corridors. This movement corridor became the urban street which act as a pull factor of the further different functions and business opportunities (Carmona, 2022). Thus, by Llewelyn-Davies, movement corridors and their intersection constituted the traditional urban structure in history (Marshall S. , 2004).



Figure: 4, Oxford Circus Crossing, London

Source: (www.standard.co.uk, 2012)



Figure: 5, Connaught place, New Delhi, India

Source: ([Kabi1990, 2014](#))

B. Nodal Areas of a City

Nodal Areas of a City are places surrounding of urban nodes, generally covering its immediate neighbourhood, on all sides. Nodal areas are places where numerous people converge for various reasons, with the main focus on and commerce or business or different activities (Spreiregen, 1965) (Figure 6). According to Lynch, Nodal Areas can be characterized as Linear Squares, Squares, the Entire CBD (Lynch K. , 1984). According to (Heimeriks, 2011) nodal areas can be categorized as Internal Scale, Local Scale, and Regional Scale. However, in general nodal areas can be of following types. 1. Historic or existing and 2. Emerging. The two major components of the nodal areas are the road or the movement corridors and the second is the space surrounding them.

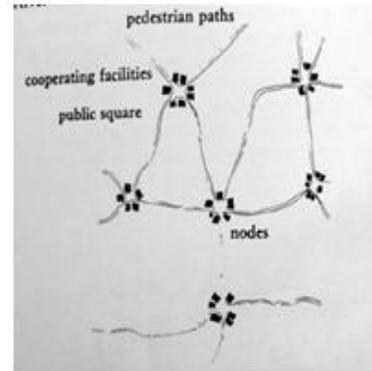


Figure 6 Nodes are primarily junctions, places of a break in transportation.

Source: ([Spreiregen, 1965](#))

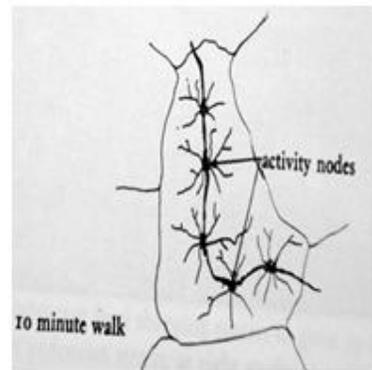


Figure 7 Creation of Nodes and how it turns into activity Nodes

Source: ([Alexander, 1977](#))

Thus, how intersection of movement corridors become nodes and turns into activity zone (Figure 7), by (Alexander, 1977). The major 2 components of nodal areas are movement corridor or road itself and the urban area surrounding them. Here, nodal areas are described as different types of space only. There are two types of space, the movement corridor which has it distinguish function for movement for both vehicles and pedestrians (Jacobs, 1961). The next is the space surrounding the movement corridor. There are different kinds of activities can be taken place as per the requirements. The movement corridor has its direct impact on these activities and vies versa.

Again, to the urban designer, movement corridor or road or street is basically sequence of space and its associated functions (Marshall S. , 2004). Therefore, major two components are the space and function of that place. By identifying the parameters which have the impact on this space and functions are the parameters responsible for the urban developments of the nodal areas.

Nodal areas of any city become the public place to live, work, interact and sometimes to play (Wardner, 2014). Thus, nodal areas can break through in to places where all the movements of people are happening. Along with that, the gathering of people not only for the transportation but along with commercial, official, recreational and seasonal gathering make a place of break in transportation a central area of attraction (Spirn, 2011) (Figure 8). These activities are also act as the centripetal force which encourage the further urban development (Figure 9 and 10).

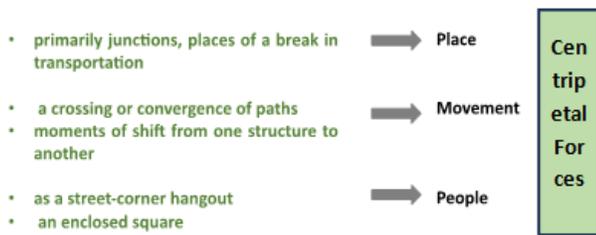


Figure: 8, Components of Nodal Areas. (Lynch K. , 1984)



Figure: 9, Components of Nodal Areas

Source: author

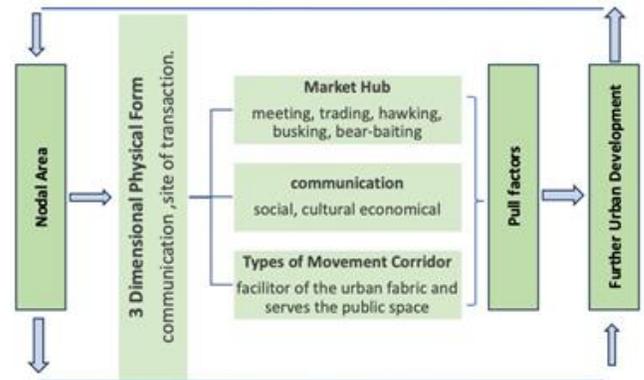


Figure: 10, Relationship between Urban Development and Nodal Area.

Source: author

C. Urban Development of Nodal Areas of a City

Urban Development of a Nodal Areas of a City are moreover movement oriented mixed-use developments. Peter Calthorpe mentioned that the automobile dominated movement corridor helps to cater all kind of mixed-use developments around the nodal or central areas (Audirac, 2011). Niemira (2007) mentioned that mixed-use development is a real estate project with planned integration of some combination of retail, office, residential, hotel, recreation or other functions. It is pedestrian-oriented and contains elements of a live-work-play environment (Wardner, 2014) (Figure 11). In postmodern era, new practice has been introduced to intergrade the functions and activities to make a hybrid development of overall urban developments. (Ellin, 2011) (Figure 12)

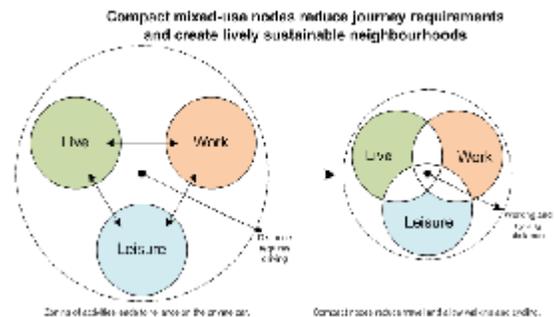


Figure: 11, Concept of Mixed-Use Urban Development

Source: (Wardner, 2014)



Figure: 12, Responsible Centripetal forces of Mixed-Use Urban Development

Source: author

Donovan in 2018 commented that the roads and intersections are more precisely mixed used developments as it is a magnet and act as a derived force for the immigrant to set up their economic, social and physical setup there (Carmona, 2022). According to Jacobs in 1961, mixed use means constant mutual support between different uses and activities both socially and economically. Basically, a city is developed on the basis of mutual support and interaction of different activities, which are the key ingredient of the good urban designing (Jacobs, 1961). By Schwanke in 2003, new concept of mixed use means mainly retail uses in the ground floor followed by the office or residential uses above. Outside the building, there should be street, sidewalk, plaza or large public places. (Mark, 2011). Creating mixed-use promotes urban quality by making settlements more attractive, liveable and memorable as per Rabianski in 2009 (Wardner, 2014). The components of mixed-use by Grant, Niemira, Rabianski, are those of the typical land use (e.g., residential, office, retail, restaurants, entertainment), but have been expanded to include activities (live, work, play, learn) and to cater to the demographics of the communities (income, wealth, gender, age, education, skill levels) located within those developments (Wardner, 2014). Again, by Moughi.C where city is the social fact and road or movement corridors are the physical fact in urban areas (Moughtin, 2007) (Figure13). Physical fact depends on the users and their uses and controls.



Figure: 13

Source: (Moughtin, 2007)

Movement is the one of the major function through movement corridor. Secondly, in modern scenario, the roads along with its junctions are become the multifunctional urban areas. These are the major stimuli for the activities of the nodal areas. The movement corridors have 2 aspects, Physical and Social (Figure 14). Changing the characteristics of manly depends on that two factors. However, movement not only includes the physical form but also the flow or the movement itself in the physical channel and people of the city observers the place while moving through the physical form of the roads. People not only observe the city while they move but also the take participation to constitute the city through their movement along the corridors (Jensen, 2009). Thereby Wall pointed out that vehicular movements or the traffic flow is the material and environment of the city (Wall, 1996). Because of the vehicular movements, different activities are happened and shape the urban form (Maheshwari,2020).

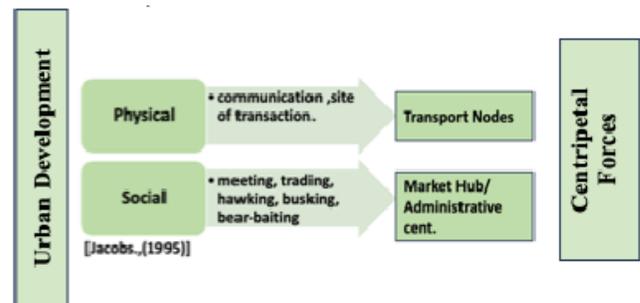


Fig: 14, Aspects of Urban Development of Nodal Areas

Source: (Moughtin, 2007)

According to Jacobs in 1995 a road and its intersections not only serves multiple functions related to movements but also shape the commerce, physical activity, and social interactions (Talen E. C., 2023). Another important aspect of the movement is giving shape and also transformed the shape of urban form. There by urban area can be Widely identified or recognized by the movements and their interchanges (Jensen, 2009). Therefore, the nodal areas which are combinations of urban space combination of mainly public space and roads where different movements like vehicular and pedestrian are taking place along with different social activities (Figure 15).

Physical	Roads	Movements
Social	City	Activity
		Space

Figure: 15

Source: author

This human activity in urban space shows the mainly urban vitality (Nia, 2021). To understand the quality of the urban space, one has to focus on the vitality of that area. By the observation of Montgomery, 1998, vitality is the key factors which help to integrate the urban activities along with the developments and flourishing's of the urban area (Montgomery, 1998). Lynch defined the vitality as the support system of the urban or public place for their sustainability, any kind of biological needs or any vital functions (Lynch K. , 1964). The social activity along the roads and interactions, pedestrian movements, the dynamic interplay among the users and the places and mainly the public life along the roads and the nodal areas enhance the vitality of that area (Jacobs, 1961). Thereby along with other factors vitality is the fundamental elements of any public space (Khaleghimoghaddam, 2025). As the result high value of the vitality denotes the attractiveness of the area which enhance the further urban developments (Jin, 2024). Jin also added that, urban vitality also increases the spatial quality of any area and in place to place, city to city this spatial quality varies depending upon the relationship between vitality and built environments. Jacobs mentioned in his work in Death and Life of Great American Cities that street is the place where because of the various transportation, diversify of the people are taking place which not only encourage the city economy but also retained the 24 hours city vitality (Fishman, 2011) (Figure 16).

Social	City	Space	Vitality
		Activity	

Figure: 16

Source: author

Vitality not only includes space and activity for the urban social life but also includes identity which is another key factor for further urban developments (Salzano, 1997).

In 1981, Lynch identify that people can recognise or remember a place by its own distinguish or particular characteristic. It's not actually a physical characteristics but an overall functional phenomenon. Lynch, 1981 address peoples perseverance of the place is more important to understand that place and to design further. The "sense of place" is the perception of the people who are using that place. He also identified that identity is the key parameter to understand the "sense of place" (Lynch K. , 1984). The actual meaning of the place is how people is identifying that place or remember or recognise that place, gives that place a unique identity. Place identity can be visual and can be by its historic, political or social identity. Lynch also added that unique identity of any place increases the activity of the people around that place and in new urbanism, the meaning of identity mainly focused on human scale street design along with the building (Ruggeri, 2011). Gorden Collen explain this identity can be achieved by using small urban elements like texture, colour, street furniture, light , view , built form etc (Cullen, 1961). Also, unique buildings characters as a whole make the characteristic, identity of that place as we know that building is not only a form but also a space which gives shape of the frontage/streetscape as well as the urban fabric. (Tibbalds, 2007). In our evolution, identity helps the urban designer to be contextual and guide us what should be incorporated (Ruggeri, 2011). Along with that , path or the movement corridor space itself is the key element of the urban identity (Lynch K. , 1964) because the meaning of identity mainly focused on human scale street design along with the building (Ruggeri, 2011) (Figure 17).

Identity	Built Form
	Movement Path

Figure: 17

Source: author

In urban design viewpoint, street or movement corridor design mainly focused on physical form of the street. By mean of physical form is cross section along with street with and the buildings type that is along with the street and their function means types of building and their uses and last of all the functional aspect and type of nodal areas. The modern problem is identified that the street or movement corridors severs only as motorway. Therefore, there is no room for the traditional mixed-use or mixed function urban street (Marshall S. , 2004).

Thus, the urban developments of nodal areas should be measured (for existing) and can be planned and design by focusing the local context in terms of movement, vitality and identity. Nodal areas are the concentrated and interactive zone of that movement corridors followed by both pedestrian and vehicular movements (Jacobs, 1961). These two types of movements, chatter and influence the types of activities taking place in the nodal areas. This can be addressed and understood in terms of the vitality of that nodal area. These types of activities again aggravated further developments and movements as it's a continuous process. Depending on the activities and movements, the space of the nodal areas have to be planned and designed to achieve the well-regulated movements and followed further activities. Space can be open or built-up space. When it comes built-up space there comes the form. Here comes how people identify that nodal area in terms of space scale and built form. Identity again is the determinising parameters to understand the nodal areas. Therefore the primary parameters for this study would be movement vitality in terms of space and activity and identity.

In 1980, new idea came up and it's called 'New Urbanism' which refer the idea of preservation of old built fabric of the city by preserving the conventional transport network. Not only that, reuse of old buildings are also prescribed there with retardative use. Moreover, the building should " Contextual" and should follow "the traditional typologies of the neighbourhood, and organized into solid perimeter blocks fronting pedestrian-scale streets lined with ground-floor retail establishments". The true concept of "city of tomorrow" includes the true amalgamation of old and new urban fabric which will also include the design aspects of human scaled, traditional and conventional design language of street and square (Fishman, 2011). So, the focuses should be on the historic, social, cultural and environmental aspects for the future urban development process. For that the main focus should be on local context, local need and the deficiencies if existing framework.

III. CONCLUSION

The main focus of the future research work should be to make design framework for an urban place or settlements and the place itself should be understand by the terms of the above-mentioned parameters. It can be better apprehended by how common people interpret a place and their sense of place as described by Lynch (Lynch K. , 1984).

To understand that, survey work has to be conducted on the basis of the derived parameters to comprehend users' perspectives, needs, level of comfort and security. Thus, the nodal area, which is basically a place for movements, exchange of communication, commerce, recreation will serve the next stage of urban developments in a desire manner (Spirn, 2011). It will reflect the community, the heritage and the essence of the social life of that city along with a well-designed movement cum communication space. To continue this further study, detail Nodal Areas related urban spatial/physical development has to be surveyed that have already taken place of the existing core areas of Kolkata based on these parameters and sub parameters through primary investigation thereby confirming the workability of this parametric relationship. After that relevant urban spatial/physical development strategies and recommendations based on this study has to be formulate to guide similar developments that would be taking place in the desired direction.

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