IMPACT OF PROXIMITY TO METRO LINE ON SURROUNDING AREA USING GIS. A COMPARATIVE STUDY OF MUMBAI METRO AND PROPOSED PUNE METRO

Omkar U. Mithe[1], Dr. Ushadevi Patil[2]

[1]PG Student, [2]Professor Department of Civil Engineering,
D.Y Patil Institute of Engineering and Technology, Ambi, Pune
Savitribai Phule Pune University), (India).

ABSTRACT

There is considerable increase in recognition of transit oriented development as an effective approach for sustainable urban development, most cities of developing countries like India, does not know how to effectively implement the concept of transit oriented development. If accepted and implemented properly, such models and schemes have great potential to become an effective finance and planning source for cities like pune in our developing country. Transit oriented development usually consists of rail or bus system at its centre and surrounded by high density infrastructure and as the distance from metro line increases the density of infrastructure gets lowered. The main aim of TOD is to develop an area in such a way so as to make it easier for the people to get to their destinations faster in an economically risk free way. There are many advantages of TOD which includes cost efficiency, decrease in pollution and reduced traffic and parking congestion. Thus to study the impact of proximity to metro line on surrounding area properties GIS is used. Also, various data collected for project include Development plans with CTS numbers of the study area, ready reckoner rates of various years of study area and actual photographs. After the necessary data collection the desired development plan is georeferenced and digitized using GIS.

Keywords*: *Development Plans, (GIS) Geographical information system, Impact of proximity, Metro Rail, Transit Oriented development.

I. INTRODUCTION

Pune has witnessed huge industrial growth since 2000. Speedy urbanization within the recent past has place the city's travel infrastructure to worry. With an oversized range of units have return up each in little scale likewise as in serious & medium scale trade etc.; traffic within the town is rising at baleful rates. Because the population of a town grows, share of transport, whether or not road or rail-based, ought to increase.

Expertise has shown that, in cities like Pune wherever roads don't have adequate breadth and that cater to mixed traffic conditions comprising slow and fast-paced vehicles, road transport will optimally carry 8000 persons per

hour per direction. Being a thickly geographical region, Pune's traffic wants can't be met by road-based system and extra flyovers. Once traffic density will increase on the far side this level, average speed of vehicles comes down, journey time will increase, pollution goes up and commuters square measure place to accrued level of inconvenience. The prevailing urban transport system of Pune town that is road-based has already return underneath stress resulting in longer period, accrued pollution and rise in range of road accidents. Transport System is associate economical user of house and with reduced level of air and pollution. Therefore once on a passageway, traffic density throughout peak hours crosses this figure, provision of rail-based mass transport ought to be thought of. The preparation of elaborated project report (DPR) work was undertaken by the Delhi railroad line Rail Corporation and submitted their report on fifteen August 2008. In 2010, the Pune Municipal Corporation (PMC) delayed submitting the proposal to the Union government to create provisions within the annual take into account the project. Transit oriented development can also be achieved by construction ring road around a city which is proposed for pune city and BRTS (Bus rapid transit system) which is also running in Pune city. [1]

II. LITERATURE REVIEW

The practices and instruments of urban governance are a pace dynamical in Delhi, a metropolitan space of twenty four million inhabitants characterized by robust socio-economic inequalities. The Delhi railroad megaproject and its funding mechanism through land worth capture are the prism through that this study analyses governance patterns at totally different scales. This model has led to the assembly of mixed-use areas within the heart of the town, leaving a spatial inhabitation of transport functions also as residential, commercial, and economic uses, following a pattern that has been known collectively of the process options of a 'new generation of megaprojects. The author argues that although there has been significant institutional change, notably the entry of private sector actors in mega infrastructure development, careful analysis of the modalities of this mechanism reveal important aspects of continuity including the pre-eminence of techno-scientific planning, minimal stakeholder consultation and conflicts in the public sphere. Delhi railroad case are going to be located inside the larger Indian context, that has been marked since the 2000s by the emergence of city-centric growth ways with public investments focused in massive cities typically within the variety of public-private partnerships and therefore the importation and adaptation of international models. This study explores governance problems round the designing and therefore the management of native outcomes of mixed-use megaprojects within the metropolitan space of Delhi. The reconfiguration of urban area through large-scale mixed-use comes has been known within the international literature collectively of the process options of a brand new generation of megaprojects. The report presents a case study of the Delhi railroad that may be a region for a brand new funding mechanism for urban megaprojects that consists of funding a part of the capital prices by capturing the land worth, associate instrument not antecedently utilized by public actors in Republic of India. This model has led to the assembly of mixed-use areas within the heart of the town, leaving a spatial inhabitation of transport functions also as residential (condominiums), industrial (shopping malls), and economic uses. [2]

A. Cities worldwide are experiencing escalating issues in getting monetary resources for transport investment. Investments in transport therefore got to look for new paradigms to unravel these issues. Accessibility may be an important component during this context as a result of it's going to induce will increase in land worth whereby some or all of those increments in land worth resultant from the rise in accessibility may be captured to recover the capital prices of a transport investment. From this perspective the author Francesca Medda reviews the main land value capture finance (LVC) mechanisms (betterment tax, accessibility increment contribution, and joint development) in relation to increased transport accessibility. The 3 finance instruments retain common options like the power to realize wider public goals and personal objectives, and that they square measure versatile and may be enforced through completely different kinds of monetary instruments. For the undefeated implementation of a land worth capture finance Programme to require place, he should always take into account the context (the geographic area and also the transport mode) additionally to the economic relationship between the life cycle of the transport system, its profit and also the property market. Ancient funding mechanisms, notably for urban transport investments, became progressively inadequate to hide the growing gap between operational expenses and revenues attributable to advanced and numerous urban goals. The world economic downswing that in 2008 was precipitated by the United States of America sub-prime mortgage crisis has actually exacerbated true. Not solely did specific sectors of the urban property market suffer from the event of worth spikes, speculative behavior and boom and bust cycles however conjointly, attributable to the financial and banking crisis, governments and concrete enterprises have practiced important restrictions with regard to their disposition and revenue activities. The ensuing quandary relative to move funding leads United States of America to analyze doable various kinds of monetary resources. A key requirement to stimulate investment in transport and provides confidence to investors may be an abstract shift with relation to funding mechanisms; this shift may be completed by unlocking and enhancing urban assets supported their accessibility worth. Accessibility is ‘‘the extent to that land use and transport systems change people to succeed in activities or destinations by suggests that of transport mode’’, therefore they observe that variety of elements establish the accessibility worth. During this work we tend to argue in favor of accessibility as a method of making and increasing urban worth whereby public smart options and personal sector edges square measure combined. In an attempt to decrease reliance on the car and to later on mitigate its direct and indirect effects within the provision of urban transport, we tend to should take into account the variety of different transport services. As an example, mass transit systems offer capability and competitive levels of service for an outsized range of urban travelers. [3]

B. The study is conducted for a forty seven mile long circumferential road in Ahmadabad, India, planned and enforced victimization self-financing land readjustment (LR) technique. Uniquely, no landowners were displaced; whereas the road's 200' wide right-of-way (ROW) was reserved whereas land adjoining the road's ROW was conjointly developed in a very self-financing manner. Forty six completely different neighborhood scale LR plans were developed, consistently planned, and spatially organized to carve the road's ROW and repair adjoining land with infrastructure. In This study author Jay Mittal showcases how a regional level infrastructure asset can be created using the LR technique and how rapidly growing fringe area can benefit using the LR technique.

This case is changing into a replacement model for capital intensive road comes currently in Republic of India, exalting alternative financially strained similar size cities to follow Ahmedabad's LR primarily based circumferential development model. The case study is beneficial for land management and coming up with professionals, particularly those that are engaged with in fiscal matters strained and rapidly urbanizing cities of the developing world. As per the Census of Republic of India (2011), within the last decade, urban Republic of India witnessed a 31.8% growth as compared to a bare 12.2% in rural areas. Since India's population base is massive 1.2 billion in a pair of years speedy urbanization trends create serious challenges to the cities in terms of lack of infrastructure, basic amenities, roads and repaired land for housing and most significantly, inadequate municipal funds. The McKinsey world Institute (2010) report calculable that by 2030, over 590 million individuals in Republic of India can sleep in cities, sixty eight of which is able to be within the million-plus cities alone. Further, over seventieth of cyberspace new jobs are going to be in cities and a banging $1.2 trillion are going to be needed to finance the urban infrastructure investment that is over eight times of the investments created in Indian cities these days. Moreover, over thirty billion ft^2 of paved roads are needed (McKinsey world Institute, 2010). Attributable to this speedy urbanization pressure, urban growth precedes any planned interventions, ensuing into extremely chaotic and engorged cities, severely lacking in economic infrastructure and alternative basic amenities. On one hand, cities are exploding with speedy urbanization and economic growth; whereas on the opposite hand, cities are in fiscal matters most challenged with restricted budgets that they're failing to fulfill the increasing infrastructure demand and growing gaps aggravating scenario. There's a necessity for different mechanism to form provision for infrastructure in additional innovative method. [4]

C. Urban rail transit projects are suffering from the cost burden in Japan as a result of the present funding system relies on borrowed cash by loans and bonds that area unit repaid principally by fares. The fund cannot bear the increasing expenditure demand owing to the accelerated construction demand and also the rising price of land acquisition. In Japan, urban rail transit enhancements area unit supported for the most part by loans and bonds that may be repaid principally by fare revenue once the gap of the system. Transport operators should struggle to lift the specified funds as a result of the number of public subsidies is kind of restricted. Moreover, construction prices area unit rising at a far higher rate than the funds, owing to the land increase within the urban areas. There are accelerating demands for the advance of urban rail transit due to:-

1. The rise of travel visits within the radial directions of cities owing to the suburbanization of housing locations.
2. The intense congestion on the road networks in town centers and inner suburbs that bring unneglectable social losses.
3. The availability of access to new and improvement sites for urban resurgence.

It is quite necessary to seek out different sources of funds for funding the new lines to fulfill the above-named demands. The present funding system is being mentioned and re-examined from the point of view of the profit principle therefore on capture the rise of property values and profits owing to the advance of the transit. In this study the author yoshitsugu hayashi examines the possible menus of financing urban rail transit in the context of the balance between beneficiaries and payers, relating them to the imputation process of the benefits.

The subsidies area unit paid from subsequent year once the gap for ten years in instalments and, therefore,

cannot cowl the initial cost; the burden of the loan interest of the initial investment is extremely significant. In 1987 the whole annual take into account the subway grant was 42.3 billion yen that covers solely the development price for one or a pair of kilometers within the center of capital of Japan. The number of different subsidies in 1987 was 14.3 billion yen in total that consists of railroad line subsidy: 11.1 billion yen, populated area rail transit subsidy: 0.5 billion yen and grant for interest reimbursement for personal railways: a pair of 0.7 billion yen. As a result of the whole quantity of public subsidies is unbroken at an occasional level, native transport agencies area unit forced to depend upon bonds for 80%-90% of the whole construction price whereas non-public railways ought to borrow abundant from the Japan Railway Construction Corporation, the Japan Development Bank, and different non-public banks. Therefore, for instance, the interest payment contains nearly four-hundredth of the whole expenditure, on the common, of 9 native transport agencies that have subways. To interrupt such a bottleneck, funds while not interest payment area unit usually requested, particularly in terms of the profit principle. [5]

D. Bogotá is that the largest and most thickly settled town in South American nation. Town extends across 1637 sq. kilometers, 355 of that square measure urban. In 2010, there have been near 7.3 million inhabitants within the geographical area and its population density was concerning twenty, 500 inhabitants per sq. metric linear unit. Compared to alternative cities and metropolitan areas, Bogotá is one in all the foremost densely inhabited within the world. Whereas populated area has been the final growth pattern in most developing cities worldwide, town of Bogotá has undergone a method of concentration in specific areas within the past decade. Employing a differences-in-differences methodology, we've got shown that the bus mass rapid transit (BRT) network, Transmilenio, inbuilt this era is one in all the variables that account for this higher density. Areas served by Transmilenio, particularly those within the bound that are supplied with feeder bus routes, have the next growth than zones while not access to the present system. Using a similar methodology for assessing the growth of newly built areas, the authors Juan Pablo Bocarejo, Ingrid Portilla, Maria Angélica Pérez have not found a clear relation between the BRT and recent evolution of residential, commercial, or work areas. However, recent scientific literature confirms an impression of the BRT ashore price. Transmilenio may be a high-capacity BRT system that has been operative within the town of Bogotá (Colombia) for a decade. It's aroused curiosity among urban planners and transport specialists, not solely thanks to enhancements in period of time and a discount of externalities like road accidents and pollution on the bus corridors however additionally thanks to its impacts on urban type, land investment, and land price in its space of influence. Inspired by the system of metropolis, Bogotá's BRT has achieved monumental success in terms of potency and ridership with a restricted infrastructure and operational price. However, in terms of integration between land-use coming up with and transport it's not earned constant level of success because the Brazilian town. This result was expected, since there wasn't a planned integration between land price and transport as happened in metropolis. Higher density on mass transit corridors, higher land price in proximity to the system, and changes in use square measure a number of the positive externalities that would are expected from the Transmilenio project; in brief, it absolutely was a chance to drive urban development. [6]

III. METHODOLOGY

Procedure and methodology includes following steps:-

1. First and foremost step to begin the project work is to identify the area in which the work is to be carried out. For this, identification of research problem and research objectives is necessary.
2. After finalization of study area, extensive literature survey is done. In this, the work done by various authors in past is studied in detail and the procedure carried out by them is analysed. Further their results, conclusions and findings are also carefully observed.
3. Now, based on the above literature survey all the necessary data including photographs of plots of private ownerships and government ownership, Development plans of finalized study area,

Ready reckoner rates of various years and details of land according to use and city survey number are collected from various government bodies like PCNTDA (Pimpri Chinchwad New Town Development Authority) and PCMC (Pimpri Chinchwad Municipal Corporation).

4. After collection of all the above necessary data, it is merged with GIS for analyzation. The development plans with CTS numbers are georeferenced with GIS so that vector data is created. Now google earth image is superimposed for layer formation.

IV. CONCLUSION

After doing extensive literature survey the different concepts such as transit oriented development and impact of proximity on nearby area are understood. Further, different applications of these concepts and how the property rates vary due to the presence of different modes of transport around the city is also cleared and GIS will be effectively used in comparison.

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