

Impact of Non Motorised Vehicle on Economical Development

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Abstract: - For a sustainable development in a city, many tools now days have been experimented and researched. “NMT” is one of the tools that has been emerging and can be helpful in creating sustainable cities. Initially our Indian cities were walk-able, but due to the introduction of the motorized transportation, roads were developed more for the automobiles rather than for the pedestrian. In city development plan, no thoughts were being given to pedestrian network. Slowly and steadily cities became eccentric towards motorized transportation.

This paper investigates the ability of NMT to help achieve transportation planning objectives such as congestion reduction, road and parking facility cost savings, consumer cost savings, and various environmental benefit which will conclude to the “ECONOMICAL BENEFIT” of NMT. It identify and discusses various parameters for evaluating the benefits of improved walking or cycling conditions, increased non-motorized travel, and shifts from motorized to non-motorized modes. This study indicates that pedestrianization provides significant benefits, and that these profit can increase with cost effective incentives. Conventional transportation assessment practices tend to overlook many of these benefits, and so underestimate pedestrianization transportation progress and incentives and its feasibility.

I. INTRODUCTION

In the twenty first century cities are turning into a place full with chaos, unhealthy environment, and noise. They are becoming in-habitable place to live. With the population demand and the rising pressure on our natural resources they are diminishing day by day. So, for our future generations creating our cities into a habitable place, sustainable development should be the main concern of our city planners and designers. Sustainability can only be achieved when there is an accurate balance between Social, Economics and Environment. Thus, bearable, equitable and viable scenario can be created.

For a sustainable development in a city, many tools now days have been experimented and researched. “NMT” is one of the tools that has been emerging and can be helpful in creating sustainable cities. Initially our Indian cities were walk-able, but due to the introduction of the motorized transportation, roads were developed more for the automobiles rather than for the pedestrian. In city development plan, no thoughts were being given to pedestrian network. Slowly and steadily cities became eccentric towards motorized transportation.

The major effect of automobile was the urban sprawl. With the pressure of the increasing population, city limits are increasing day by day. Mixed use development is no more exercised. The other effect of automobile was that now for the vehicles, broad roads were constructed. Initially city fabrics were demolished to develop roads and today roads have become a governing factor in formation of the fabric.

Due to increase in the city limits people tend to take vehicle for transportation because now we could reach anywhere in very minimal time and walking is no longer a feasible option today. Now people have to roam around in different sectors for day to day activities and the roads are so designed which make walking a difficult task. All these effects directly influenced the pedestrian movement.

All these issues affect the social, economical and environmental health of the cities. Roads took all the spaces where people could interact with each other. The Social interaction spaces are no more developed and also not concerns for the city developer. To develop the roads or even to widen the road always green trees are cut down which directly affect the environment of the area. Roads with vehicular movement never help in the business along side when we compare a street with pedestrian movement; it always helps to generate business for vendors and hawkers. Every year huge amount of funds issued for the construction of the road by the government, but on the other hand very minimal issued for pedestrian network. Creating space for the pedestrian to walk will also help people to interact more because it create space in human scale. No more trees will be cut down for development of the road or widening the road (pedestrian doesn't need straight line pathway for movement). Thus, the research tries to answer if city planning can be sought as a solution by taking NMT as tool to make the cities more sustainable. Also the research tries to study and analyze how is it going to help the economics of the city or it will became a burden to the city's infrastructure funds.

II. WHY ECONOMICS IS IMPORTANT?

India is a developing country; economical development is the major aspect of the development. 24 % of world energy use in transport sector. According to a report by Ministry of Environment and forest (MoEF) IN 1994, the transportation sector is responsible for 12% of the country's total energy released related CO2 emission. This is the scenario in 1994 by

that time Indians purchasing power of car is increased immensely. In the Integrated Energy policy 2006 stated that “no economic substitutes are obvious for the transport sector at least till 2031-32. So use of mass transportation cycling and pedestrianization should be motivated in development plan of cities. The poor are not the minority but represents the majority in our cities. We should enhance and improve the economical status of our urban poor. It is directly helping to create a sustainable society.

III. NMT AS A TOOL FOR ECONOMICAL DEVELOPMENT

To understand the relationship of NMT and economic, we need to understand those various parameter which are helping in economical development of the urban area and related to the NMT. There are various factor which get influence after improving the NMT of the area, many research had been done in identifying these factor such as accessibility, health, land value, retail sale, expenditure in transportation, livability, distribution of resources, tourism etc.

IV. AIM

To establishing NMT as an important layer for city’s economical development, considering economics as major factor for sustainable development.

V. OBJECTIVE

- a. Establishing a method by which NMT of the can be improved.
- b. To identify the various parameter of economical development and establishing the relation with NMT
- c. To evolve a measurement techniques for each parameter for the calculation the parameter.
- d. To identify the indicator of the economical development of the area, by which development growth can be measure.
- e. Identifying the area on which this theory can be researched.

VI. ECONOMICAL VARIABLE EFFECTED BY NMT

6.1 ACCESSIBILITY

Accessibility in a city can be defined as the degree to which accessibility is based on the physical proximity between origins and destinations or on transport solutions which can overcome spatial separation, and the degree to which these solutions involve private or public motorized transport.

To a certain extent, physical proximity in cities can be substituted by increasing the speed of travel through the use of rapid, motorized modes of public and private transport. It is important to note, however, that even then the overarching objective remains the provision of access to opportunities rather than mobility or movement itself. Infrastructural

features that define such ‘access by velocity’ include the surface coverage of roads, the quality of road and rail networks and other public transport infrastructure. In addition, transport operations and service quality determine transport-based access and typically include the service level of public transport. So, things which can improve the accessibility are depends on various factor such as-

- a) Availability of public transport
- b) Speed of transportation
- c) Cost for using such transportation
- d) Extent of transportation
- e) Hierarchy of transportation etc.

6.2 HEALTH

There are many disease which are associated with physical in activeness like heart disease, obesity, hypertension, osteoporosis, stroke, depression and dementia, diabetes and many more. many people are suffering with these disease in india and for the treatment they are spending major portion of their income.

Walking about 30 minutes a day increases your bone density and slows down bone loss in your legs. This low-impact exercise is also said to target your spine, legs and hips. It promotes mental well-being. Known as a great stress-buster, if you walk outdoors, the combination of fresh air and exercise is an excellent way to boost your morale and mood.Helps prevent type 2 diabetes. Studies have revealed that walking approximately 150 minutes per week can reduce the risk of diabetes. Reduces the risk of colon and breast cancer. So, by introducing NMT in our current fabric of city can heap in economical development by reducing the expenditure on health issue.

6.3 PROPERTY VALUE

The relationship between land values and NMT. There is lots of research which proves that property value is much higher in those place who was designed for the NMT than the car oriented neighborhood. Pivo and Fisher (2011) find that proximity to amenities, hence, NMT increases value, but their focus is on commercial real estate values. Cortright (2009) studies 15 metro areas including Chicago, San Francisco, Sacramento, Austin, and Charlotte where the value of Walk Score was greatest and uses Walk Score to determine its impact on house values. The author finds that homes that rank as above-average in NMT has much higher property values over homes in less walkable neighborhoods.

6.4 RETAIL SALE

Around the world it has been identified and proved that markets which are are more walkable has higher sale than the market which is car oriented. Copenhagen inner core area had been converted to pedestrian streets. The conversion was initially appose by the shop owner of the area but slowly it was adopted and whole core had been converted to pedestrian

area and the sale of this area are much higher than previous situation.

Downtown Lodi launched a \$4.5 million public-private pedestrian oriented project, including a retrofit of five main street blocks from building face to building face. On the main School Street, sidewalks were widened, curbs bulbed out at intersections and colored paving stones laid in the new sidewalks and street. A striking gateway was installed, as well as 140 street trees, lighting, benches, and other streetscape amenities. The city credits the pedestrian improvements, as well as economic development incentives, with the 60 new businesses, the drop in the vacancy rate from 18% to 6%, and the 30% increase in downtown sales tax revenues since work was completed in 1997.

6.5 LAND USE EFFICIENCY

Community designed for walking or for cycling tends to more compact in nature. The density of these neighborhood is larger than conventional planned community. These neighborhood are designed like many destination (convenient shops which are needed for day today life, primary school, primary health care centre, etc) are approachable and designed in human scale in planning aspect. These community have attractive sidewalks and pathways which accessibility, affordability and livability of the community. These compact, mixed use walkable community can enhance smart growth can improve accessibility for individual without improving the mobility.

The second important aspect in conventional planning is that it is based on the motorized transportation network which motivates the car sale in the societies. The larger the number of car means it is going to occupy larger the area either to run on road or parking. The cars are occupying large portion of our important urban land which has very high price used as parking or road. Delhi has 21% of land under road network but it is still fail to resolve traffic congestion on road. Even in UDPFI guideline 10%-18% of land is proposed for transportation.

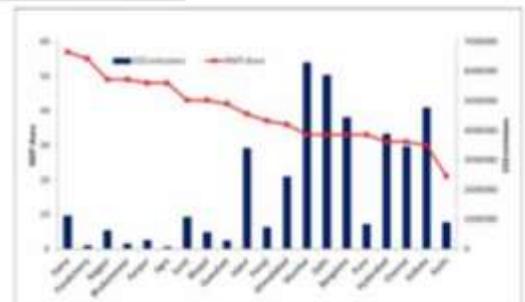
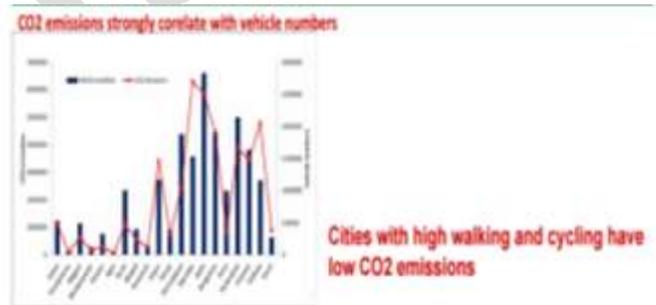
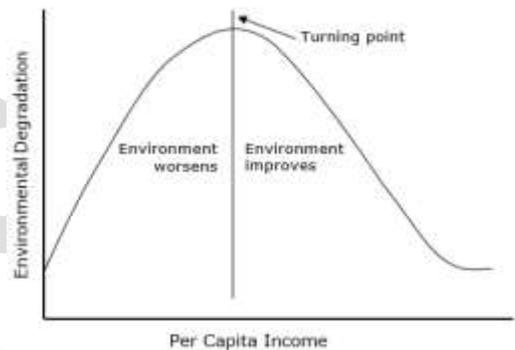
Proposed Land use Structure of Urban Centres in Plain areas according to UDPFI Guidelines

Land use category	Percentage of Developed Area			
	Small	Medium	Large Cities	Metro Cities
Residential	40-50	40-45	35-40	35-40
Commercial	2-3	3-4	4-5	4-5
Industrial	8-10	8-10	10-12	12-14
Public and Semi-public	6-8	10-12	12-14	14-16
Recreational	12-14	18-20	18-20	20-25
Transport and communication	10-12	12-14	12-14	15-18
Agriculture and water bodies	Balance	Balance	Balance	Balance
Total Developed Area	100	100	100	100

Source: Urban Development Plans Formulation & Implementations Guidelines-1996

6.6 ENVIRONMENT

As per TERI, 2006, the number of vehicles in the country will increase to about 670 million by 2030 at a GDP growth rate of 8 per cent in a business as usual (BAU) scenario, which is about the number of cars now in the world. As per this study, if the share of buses is increased to 75 per cent by 2030 and private vehicles and IPT modes meet the remaining 25 per cent of the travel demand, the fuel demand would decrease by 21 per cent and CO2 emission by 20 per cent as compared to the Business as usual (BAU) scenario. The **environmental Kuznets curve** is also explains the relationship between **environmental** quality and economic development: various indicators of **environmental** degradation tend to get worse as modern economic growth occurs until average income reaches a certain point over the course of development.



Source: CSE India, 2012

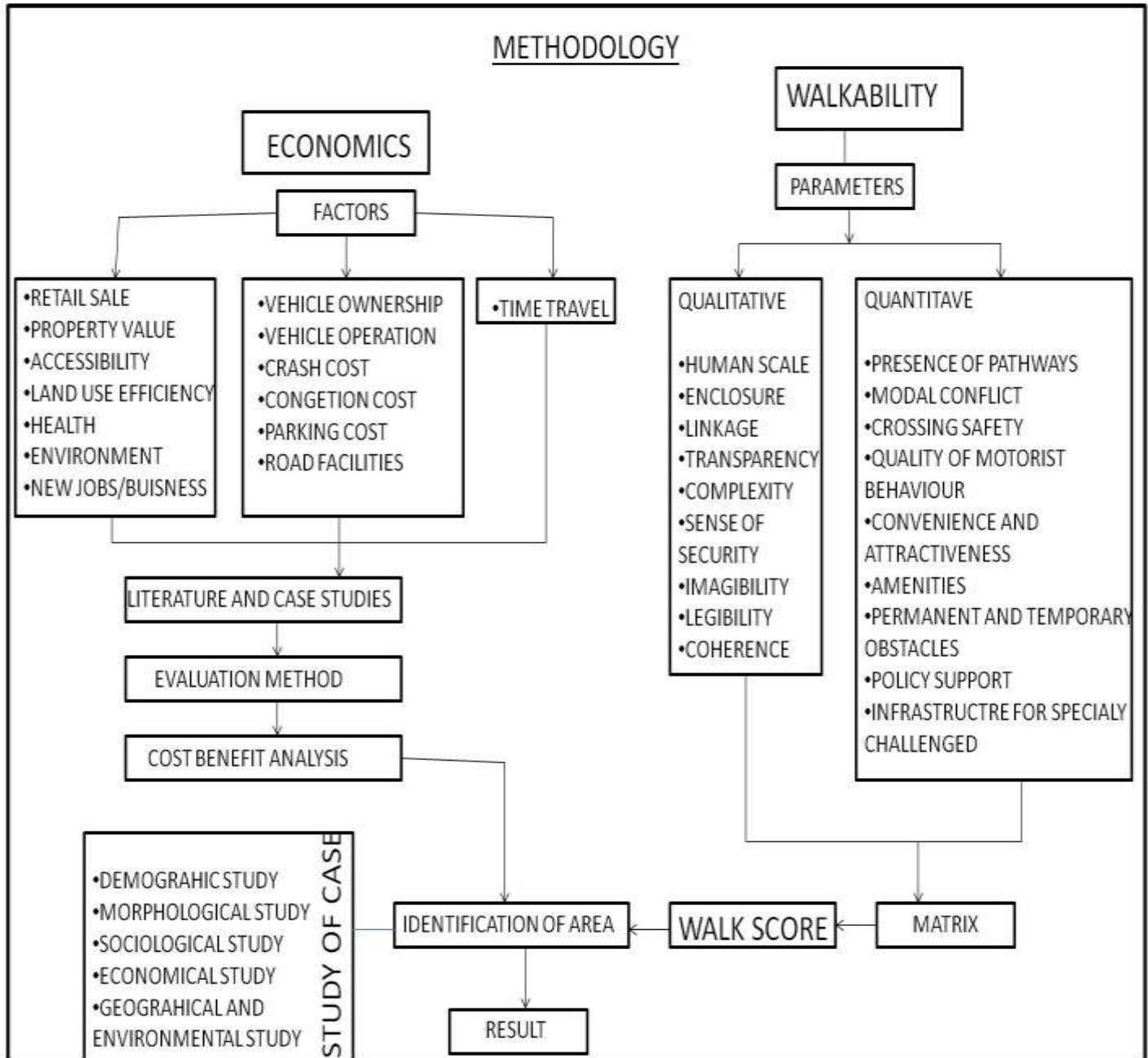
VII. EXPECTED IMPACT ON INDUSTRY

There is a national mission by ministry of urban development for sustainable habitat. By this mission government is promoting the non motorized mode of transportation. Under this mission a scheme has been already developed in which a public cycle sharing toolkit has been already made for

implementation and operation of cycle sharing system across the country. But in the case to pedestrianization the only achievement is sanctioning and construction of pathway along the BRTS route which has been developed after 2007. So we can understand that government has great interest in this sector by there has been lack of research plan or development plan. So if we are able to develop a method by which we can

enhance the NMT of any area and after that we have some kind of framework by which can check the economy of the same than we will be able to improve our sustainable development techniques in cities.

VIII. METHODOLOGY



X. SUMMARY OF LITRATURE STUDY

FACTORS	AREA	SCALE	READINGS	LEARNINGS
RETAIL SALE	COMMERCIAL	STREET LEVEL /CLUSTER LEVEL(MARKET AREA)	1. Impact of pedestrianization and traffic calming on retailing: A review of the evidence from Germany and the UK -Carmen Hass-Klau -Transport Policy 1993 1 (1) 21-31 2. The Impact of Pedestrianisation on Retail Economic Activity -Ben Lane	IN INITIAL 1-2 YEAR OF TRANSFORMATION RETAIL SALE GET DOWN BUT AFTER THAT IT RAISES UPTO 20-30%
PROPERTY VALUE	COMMERCIAL /RESIDENTIAL	STREET LEVEL /CLUSTER LEVEL/ CITYLEVEL	Residential Land Values and Walkability -Stephanie Yates Rauterkus and Norman G. Miller JOS RE. Vol. 3 No. 1– 2011	land values increase with walkability as measured by Walk Scores. The relation appears to be strongest in the most walkable neighborhoods, where Walk Score is above average
ACCESSIBILITY	COMMERCIAL /RESIDENTIAL	CITYLEVEL	1. Accessibility and the local concentration of economic activity: a case study for county Galway -Amaya Vega 2. Accessibility Measures: Overview and Practical Applications -Jan Scheurer Carey Curtis	Access to people, goods, services, and information is the basis of economic development in cities, so better accessibility improve economical status of the city.
LAND USE EFFICIENCY	COMMERCIAL /RESIDENTIAL	CITYLEVEL	1. Measuring Compact Urban Form: A Case of Nagpur City, India Rajashree Kotharkar Pankaj Bahadure and Neha Sarda 2. A report on analysis of Land Use Efficiency in Oregon Cities	Compact planning enhances walkability, which helps in effective landuse management.
HEALTH	COMMERCIAL /RESIDENTIAL	STREET LEVEL /CLUSTER LEVEL/ CITYLEVEL	1. The Spatial Determinants of Health in Urban Settings Grant, M., Barton, H., Coghill, R. and Bird, C. 2. Neighborhood Walking, Environment and Activity Level Are Associated with Obstructive Sleep Apnea: The Multi-Ethnic Study of Atherosclerosis -Martha E Billings, MD, MSc, Dayna Johnson, PhD, MPH, MS2, Guido Simonelli, MD3, Kari Moore, MS4, Sanjay R Patel, MD, MSc, Ana V. Diez Roux, MD, PhD4 and Susan Redline, MD, MPH2	People staying on main arterial road have breathing people, depression and other disease comparing with people staying on local street or near to park or green area
ENVIRONMENT	LOCAL/GLOBAL	STREET LEVEL /CLUSTER LEVEL/ CITYLEVEL	How Paris is Fighting Climate Change -Feargus O'Sullivan	Walkability decreases the vehicle on road which reduces the air pollution.

XI. EVALUATION METHOD OF FACTORS

FACTORS	LITRATURE STUDY	LIVE CASE STUDY	EVALUATION METHOD	DATA /INFORMATION NEEDED
RETAIL SALE	STROGET, COPENHEGEN	FORMAL-NEW MAKET BHOPAL INFORMAL- BHADRA SQUARE, AHEMDABAD	THROUGH QUESTIONNAIRE	SALES TAX SUBMITTED BY THE RETAILER
PROPERTY VALUE	15 AMERICAN CITIES	LUCKNOW-DIFFERENT ZONES OF CITIES (COMPARITIVE ANALYSIS)	THROUGH PRIMARY SURVEY AND USE OF CIRCLE RATE	MARKET SURVEY OF THE PROPERTY VALUE
ACCESSIBILITY	DALLAS-FORT WORTH METROPOLITAN AREA	LUCKNOW	ANALYSING ACCESSIBILITY INDEX $A_i = \frac{\sum \delta_{ij} * f(d_{ij})}{\lambda}$ <ul style="list-style-type: none"> - THE DEGREE AND TYPE OF DISAGGREGATION - THE DEFINITION OF ORIGINS AND DESTINATIONS - THE MEASUREMENT OF TRAVEL IMPEDANCE AND - THE MEASUREMENT OF ATTRACTIVENESS 	LAND USE MAP AND ANALYSIS WITH TRANSPORTATION NETWORK
LAND USE EFFICIENCY	METROPOLITAN REGION OF ATHENS	NAGPUR, MAHARASTRA	TROUGH PRIMARY AND SECONDARY SURVEY	
HEALTH	SOUTHEAST TORANTO	PEOPLE STAYING ON MAIN ARTERIALROAD AND IN NEIGHBOURHOOD OR NEAR PARKS	THROUGH PRIMARY SURVEY	
ENVIRONMENT	ISTANBUL HISTORICAL PENINSULA			

XII. CONCLUSION

Conventional transport planning considers walking as a small mode and recognize only humble benefits from improved NMT and increased walking. This reflects evaluation practices that undercount nonmotorized travel and undervalue walking benefits. Other perspectives indicate that walking is a critical section of the transport system, and NMT have major economic, social and environmental impacts. Improved NMT and increased walking can provide a variety of benefits, including accessibility, transport cost savings, improved public health, external cost reductions, more efficient land use, community livability, economic development, and support for equity objectives. Various methods can be used to measure these benefits, although some, such as achieving equity objectives, are not easily quantified.

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