DETERMINATION OF SOCIAL TRANSPORTATION INDEX OF PUNE CITY

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Abstract—This report aims at identifying the research issues and challenges that need to be addressed to achieve sustainable transportation system for Pune city. The same is achieved by understanding the current system and trends of urbanization, motorization and modal shares in Pune; and their impact on mobility and safety (the two basic goals of transportation) as well as environment. Cities should respect nature, consider the urban ecological environment as an asset, integrate environmental issues into urban planning and administration, and accelerate the transition to sustainable development. The work proposes a procedure to evaluate sustainable mobility in Pune city. A set of indicator according to three dimensions of sustainability, i.e., environment, economics, and social aspects, are proposed to evaluate mobility in Pune city. The sustainable mobility evaluation is based on an index calculated through a weighted multi-criteria combination procedure. The basic implication of the analysis is that urban-transportation sustainability can be greatly enhanced if there are profound changes in urban structures and activities that can slow or reverse the growth in the use of private automobiles and can make transit and other modes attractive. In this report we have calculated the social index of the Pune city with respect to social indicator analysis.

Index Terms—Pune city, sustainable transportation, indicators, social index.

I. INTRODUCTION

One of the greatest challenges is to plan and invest wisely in infrastructure for sustainable urban transport. Transport plays a crucial role in urban development by providing access for people to education, markets, employment, recreation, health care and other key services. Especially in cities of the developing world, enhanced mobility for the poor and vulnerable groups is one of the most important preconditions for achieving Millennium Development Goals. Those cities with transport modes in an integrated system are more likely to evolve and prosper as centers for trade, commerce, industry, education, tourism and services. It is common that cities ranking at the top of surveys measuring urban quality of life have high quality urban transport systems that prioritize public transport and non motorized modes.

The existing reality, however, is that urban transportation systems in most developing cities are far from ideal. The most visible and frequently mentioned transport problem of a city is its traffic congestion, and it is well known that high levels of congestion create significant impact on local and national GDP. Accessible and affordable public transport service and safe infrastructure for non-motorized transport such as cycling and walking are lacking in most developing country cities. The number of private vehicles has been increasing continuously and dominates the roads. As a result, the transportation sector is heavily responsible for public health issues in cities such as air pollution (acidification, smog), noise, greenhouse gas emissions, and road accidents. While transport enables the economy to grow, if not well-managed, it can also retard growth and the efficient delivery of essential social services. The lack of comprehensive planning of transport systems, without due consideration to social, economic, environmental and cultural.

India is one of the most rapidly urbanizing developing nations. Economic growth is the driving force behind urbanization. But unfortunately this growth is largely unplanned, creating a high risk of unsustainable sprawl.
II. SUSTAINABILITY AND SUSTAINABLE TRANSPORTATION

The most common and widely used definition of sustainable development comes from the United Nations’ Brundtland Report, sustainable development is defined as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

In the recent past, the word ‘sustainability’ has attained a prominent place in transportation planning, policy and other documents. It can be broadly defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their needs’. In the context of transportation, sustainability would mean developing better transportation systems, options and expectations consistent with the objective of securing future social and economic development within a sustainable environment that ensures community well-being. Sustainable transport can be achieved through measures pertaining to transportation system management, energy management, capacity management and environmental management. Sustainable transport is also important for developing countries from the perspective of climate change, i.e. to improve carbon footprint/ ecological footprint (EF) of transportation. A sustainable transportation system is one that: Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations; is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy; limits emissions and waste within the planet’s ability to absorb them, minimizes consumption of non-renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.

III. SOCIAL INDICATOR

Social impacts include equity, human health, community livability (local environmental quality as experienced by residents and visitors) and community cohesion (the quality of interactions among community members), impacts on historic and cultural resources (such as historic sites and traditional community activities), and aesthetics.

IV. METHOD TO FIND SOCIAL INDEX

The first step is to identify and define the problem and on the basis of it, deciding the objective and scope of work; Literature base is required to understand which technique is to be used to solve the identified problems. For that, journals, text books, research papers, thesis works etc. is to be referred which is focusing on similar problems; Selection of study area is to be finalized; Data has been collected from primary data and secondary data; Primary data has been collected through home interview survey technique from different areas of Pune city which includes socio-economic data and travel characteristic information; Secondary data has been collected from various journals, reports, research papers, Pune Municipal Corporation (PMC); Compilation of collected data; The analysis has been done using M.S excel; Based on indicators selected for study area social index is formed for Pune city.

V. DATA REQUIRED TO FIND SOCIAL INDEX

A. Primary data

Primary data has been collected through home interview survey technique from different areas of Pune city which includes socio-economic data and travel characteristic information. For that one questioner is prepared for collecting the data.

B. Secondary data

Secondary data has been collected from various journals, reports, research papers, Pune Municipal Corporation (PMC).

VI. SOCIAL INDICATOR DATA ANALYSIS

![Fig.1: Social indicators](https://example.com/social_indicators.png)
A. Safety
As a starting point of social transport sustainability dimension we begin to analyze the indicator of safety, which is represented by the sub-indicator road accidents and reflects a significant issue of transport sustainability. More the index better is the sustainability. The fatalities index is 0.82 and the serious injuries index is 0.86, so the overall safety index for Pune city is the average of fatality and injury index i.e. 0.84.
- Fatal Accidents=419
- Total Accidents=1443
- Killed=438
- Injured=1205
- Severity=30.4%

B. Non motorized transport
Most sustainable modes of transport are the non-motorized modes (also known as active transport or human powered transport). These include walking, cycling, cycle rickshaw, handcarts, etc. Non-motorized modes of transport are not only environment friendly but also provide an opportunity for building better society. Virtually every trip begins and ends with a non-motorized mode i.e. walking or cycling trip, whether between a parking lot and an office building or a home and a bus station. Here, with reference to the household interview for different areas of Pune city. The percentage of trips by walk are 0.13 and the percentage of trips by cycle are 0.27.

VII. CONCLUSION
The indexes are calculated by normalizing the indicator values by the formula of Normalize Transport Performance Indicator (NTPI) and it is:
\[ NTPI = \frac{\text{Actual indicator value} - \text{Min. threshold value}}{\text{Max. threshold value} - \text{Min. threshold value}} \]
The overall safety index of fatalities and serious injuries is 0.84 and the non motorized transportation index is average of walk and cycle trips i.e. 0.20. So the overall social index for Pune city is 0.52 which is medium and can be improved.

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