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An Introduction to Traffic Management Systems in India

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Abstract

There is a continuous increment in the traffic demand and with a high rate of urbanization, there is an extra load on current infrastructure in terms of managing the road transportation. With the boom in the built environment leads to the shortage of habitable shape in work surrounding and people have to move out for buying their budget home. The objective of the paper is to identify and critically analyse the current traffic management systems and their impact on economy, health & safety, and contribution towards sustainable development. The methodology adopted for the study is to perform an extrinsic literature review of published articles in the field of traffic management and to analyse the current situation of traffic management in India and world level. The findings of the study concludes that there is an urgent need of Integrated traffic management system in India to reduce the impact of congestion on highways and do our bit towards a better and cleaner environmental friendly sustainable all-around development.

***Keywords*:** Traffic, Traffic Management System, India, Development, Sustainability.

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INTRODUCTION

In the past 4-5 decades, the rate of growth is higher, especially after the Second World War and this growth leads to many innovations in different areas such as healthcare, infrastructure, transport, manufacturing, automobiles, construction, education, and other sectors. The development in infra and automobiles leads to the new innovative modes and ways of transportation. Especially in terms of road transportation. In terms of conventional traffic control approaches, efficient utilization is made possible by controlling and managing the roadside infrastructure intelligently, which in turn can improve traffic performance. Now a day's intelligence is introduced in the functioning of the traffic systems by applying of roadside based measures and control handles such as ramp metering systems, dynamic route guidance panels, dynamic speed limits, and also by means of using special infrastructure equipment like actuators and sensors (Hossain 2016; Hao&Yue 2016).

Traffic management now becomes act like an industry which provides possibilities and opportunities for the use of technology, telecommunication, control, and information science to merged together and enable the traditional traffic management into the integrated or intelligent traffic management system. "Which is a basic medium to distribute the intelligence between vehicles and the roadside infrastructure, and to improve the traffic performance in a reliable and efficient manner. This performance can be expressed in terms of safety, throughput, travel time, fuel emissions, etc." (Wismans et al. 2014; Lomakin et al. 2018; Stubbe 2018; Bertini&ElGeneidy 2002).

Traffic

The dynamic traffic management system is defined as "Dynamic traffic management employs technologies for real-time traffic management: the management of traffic flows, traffic adaptive control to respond to changing conditions in the transportation system while improving the efficiency, safety and travel conditions of the overall transport network"(Anderson 1998) (Anderson 1998).

Current situation

There is a continuous increment in the traffic demand and with a high rate of urbanization, there is an extra load on current infrastructure in terms of managing the road transportation. With the boom in the built environment leads to the shortage of habitable shape in work surrounding and people have to move out for buying their budget home. This new trend is also putting extra pressure on the infrastructure because they have to come to the city for their jobs and go back home in the evening. Lack of sufficient and sustainable public transportation also one of the major and significant catalysts for traffic congestion. A majority of the people in NCR using private or own vehicle for their office, outing, dining, and other activities. Due to the everincreasing traffic demand, modern societies with well-planned road management systems, and sufficient infrastructures for transportation still face the problem of traffic congestion. Traffic congestion results into loss of productive time, loss of fossil fuels, adds to the high level of pollutions and economic losses (Wismans et al. 2014; Majid et al. 2018;

Hashemi & Abdelghany 2016; Jia et al. 2018; Davis et al. 2017; Makino et al. 2018; Tomar et al. 2018; Cao et al. 2017).

Literature review

In 2018 (Wang et al. 2018) studied the fact that road transportation negatively affects the quality of the environment and deteriorates its bearing capacity has drawn a wide range of concerns among researchers. They explained that in order to know the exact situation and to propose realistic traffic data for the estimation purpose and to capture the demand in the master plan we need to have a centralized database management system to capture the data directly from sensor enables vehicle such as speed of vehicle in different –different times, congestion patterns, accident-prone area, and others. The authors also emphasis on the importance of environment
and sustainability while planning for new infrastructures such as dedicated freight corridors, national highways and other schemes.

In 2018 (Nagy & Simon 2018) suggested that the rapid development in machine learning and in the emergence of new data sources help to examine and predict the issue and challenges of traffic management in smart cities. They concluded that this could optimize the design and management of transport services in a future automated city. The authors provide a detailed presentation of the predicted traffic patterns using intelligent traffic management system for the smart cities.

In 2018 (Makino et al. 2018) studied the development and pattern of traffic congestion, deterioration, and traffic accidents of the environment because of fast growth in population, and the increase in level of urbanization (a major portion is because of the migration from rural to urban area for seeking high wages, and good opportunities of carrier growth) have become one of the significant issues in the Asia-pacific region. To resolve the issue of traffic congestion and to maintain a swift speed of traffic the intelligence system is the need of the hour.

Traffic management system

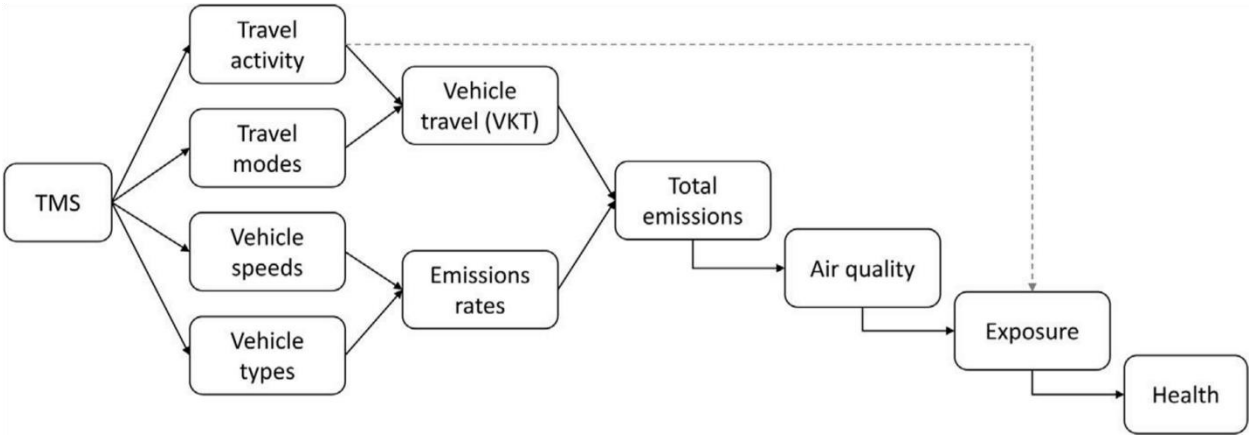

Figure 1 principal effects pathways for TMS to influence traffic-related emissions, air quality, and pollution-related health effects (York Bigazzi & Rouleau 2017)

Traffic Management System (Discussion)

As an extension to the current traffic control approaches, advanced technologies in the field of communication, control, and information systems have been combined with the existing transportation infrastructure and equipment (Nitsche et al. 2016; Menon& Park 2016). This advancement in technology and problems in managing the traffic manually leads to the development of new advanced traffic control and management strategies, which could use the on-time real data from the vehicles such as speed, congestion, could track the condition of roads, and forecast or predict the traffic situations and could guide and alert in situations of incidents, over speeding or any other traffic rules and regulations violation is proposed as Integrated traffic management systems (ITMS). ITMS incorporate intelligence in both the roadway infrastructure and in the vehicles with the intention of reducing congestion and environmental impact, and of improving traffic performance, by exploiting the distributed nature of the system and by making use of cooperation and coordination between the various vehicles and the various elements of the roadside infrastructure (Eline&Teije 2015; Antoniou et al. 2019; Ryu et al. 2018; Yousef et al. 2019; Gorevet al. 2018)

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