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City Growth Patterns Intensifying Complexities to Control Vehicular Exhaust Pollution in Pakistan:
A Case Study of Peshawar City

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ABSTRACT

Unplanned constructions of high-rise buildings are continuing to fulfill the demand for commercialization in cities. This change in land use has overlooked the associated infrastructure. Beside other problems, it thoroughly escalates vehicular movement and makes the environment more vulnerable. Symptomatic approaches from the government continue but could not succeed to avert the danger permanently. This research has examined circulation pattern and traffic flow on major roads of the city. Beside it, the performance of vehicle emission testing station is reviewed. The author found that disproportionate change in land use has intensified vehicular movement, and the crammed road network spoiled all the curative measures. A professional's interviews were carried out to understand the problem. During professional discussion, many things were found missing within the management system of the city. Therefore, the researcher developed a systematic approach/model to incorporate all aspects of the missing components in order to curb air pollution effectively in cities.

KEYWORDS

Cities Growth, High Rise, Land Use, Traffic Congestion, Vehicular Exhaust Pollution

1- INTRODUCTION

Cities growth pattern are greatly flawed in Pakistan (Ahmad, 2020). Densification through high rise buildings without considering its environmental impacts had become an emerging pattern of cities growth in Pakistan. Rampant construction of high-rise buildings to boost up commercialization in cities had produced complex problems. No doubt there is no choice except high rise to accommodate the ever-increasing demands, however, environmental consideration and development control has been compromised to meet the ever-increasing demand. It not only distraught the physical fabric of cities (Zhao, and Lu, 2011) but alter the pleasant and tranquil communities into vicious places through rampant high-rise construction (Belkina, 2008; Nelson, 2002). Dioxides, (1979) explained that "The most successful cities of the past were those where people and buildings were in a certain balance with nature…". His research elaborated that "High-rise buildings work against networks of transportation and utility services, since they lead towards higher densities and overloaded roads…"

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High density could have a positive influence on the reduction of vehicle hours travelled. However, many scholars urge that high-density development increases traffic congestion and thereby the overall environmental effects of motorized transport increased (Cervero, 1995; Levinson and Kumar, 1997; Barter, 2000). In this respect, Levinson and Kumar (1997) uses threshold of density for the effects on car travel time, and founds a positive relationship between density and travel time in cities that had a density above 10,000 Persons Per Square Mile (PPSM), whereas there was a negative relationship when density was below 10,000 PPSM. Their research concluded that travel times fell as density increased and that densities and overcrowding induced traffic congestion and delays on roads and thereby increases air pollution.

In South Asia, demand for vertical growth in cities are increasing due to concentration of population and commercialization (Wali, Yar, and Bircan, 2021). However, there exists no assessment criteria in building bylaws/regulation of cities to allow change in land use pattern within cities. High rise construction is allowed irrespective of the abutting road width and infrastructure capacities. Consequently, construction of high-rise building overburden infrastructure and creates traffic congestion. It always causes to create air pollution and other environmental problems (Shaban, Kourtit, and Nijkamp, 2020). Government has started various curative measures such as ban on heavy vehicles, auto rickshaws (three-wheeler vehicle) and vehicle fitness certification. The interconnected nature of the problems always spoils governmental action to retain the balance through sector approach. In this regards the Hanoi city experience explicitly mentioned that air pollution cannot be reduced through sole manner but through employing an integrated approach to combat the menace effectively (Thuy, 2004). Similarly, government of India used various curative policy measures to check vehicular pollution in Delhi city, but could not remain successful (Kathuria, 2002). His study concluded that in fact the containment of vehicular pollution requires an integrated approach instead of a certain sectoral solution in a sole manner.

Prescriptive practices such as car ban tried in Athens, Santiago, Florence, Lubbeck, Milan, Rome and Bologna etc remain successful in the developed world (Zuckermann, 1992). Other practices like auctioning traffic routes in Chile, congestion charges and restraint on vehicle use in Singapore and Mexico were also successfully used (Boone and Modarres, 2006; Button and Rietveld, 1999). However, these practices involved a great deal of technical skill, political pressure, funds to experiment such methods, suitable institutions and above all the physical form of their cities. Symptomatic approaches always remain ineffective in the achievements of the stated goals in developing countries. The literature supports that city planner must go across sectors to interpret the problem. However, in developing countries institution are very weak to handle the issue effectively. It requires a coordinated efforts, awareness and political support to ensure success. Therefore, the objective of this research is to devise a mechanism that could specify the role and responsibilities of various sectors to reduce the menace of cars inclusively in cities. This study concluded that a holistic approach of Environmental Management Measure (EMM) towards combating vehicular air pollution is indispensable rather than to tune up vehicle in isolation particularly in Pakistan.

This article prelude to explain the theme of the research in the context of local, regional and international perspectives. Section-II is mentioning the procedure in order to grasp the problem faced in cities of Pakistan. Next section-III is generally explaining the land use and building violation and its after effects in major cities of Pakistan. Section-IV is about the case study city (Peshawar). This section analyzing both the public and private sector investment which cause to change land use pattern without having a development/zoning plan for it. Construction of high-rise building are allowed without considering carrying capacity of necessary infrastructure to support the proposed buildings. Section-V described the government efforts to reduce the menace of cars through curative measures such as Vehicle Emission Testing Station (VETS). Section-VI analyzes the sole efforts of the (VETS) that why it could not succeed to overcome the issue. Finally, section-VII is about the proposed strategy to overcome the problem through a coordinated manner. At last a conclusion is drawn to the whole work in a concise manner.