Planning & Consolidation Strategies for Sustainable Urban Freight- Jaipur City, India

Author: Pankaj Kant[1] & Dr Sanjay Gupta[2]

[1]Corresponding author: PhD research scholar, Transport planning department, School of Planning & Architecture, 4-Block-B Indraprastha Estate, New Delhi-110002 India, email: pankaj179phd17@spa.ac.in

[2]Professor, Transport planning department, School of Planning & Architecture, 4-Block-B Indraprastha Estate, New Delhi-110002 India, email: s.gupta@spa.ac.in

Abstract There are growing concerns for the impacts of urban goods distribution in urban areas for congestion, externalities, infrastructure vulnerability and consistency with land use. Sustainability of urban goods transport is the key policy objective of various countries. Sustainable transportation is essential for overall sustainable development due to its contribution to externalities, economic and social issues. Strategies and key performance indicators (KPI) are used for the decision-making process, travel patterns, physical impacts, environmental effects and economic impacts. Decision-making, simulation and diagnosis are critical objectives of freight studies. Freight strategies are required and helpful for decision-makers to achieve sustainable development objectives. Local authorities and policymakers have low awareness and knowledge regarding urban freight sector due to complex supply chains of urban goods and multiple stakeholders involvement. It is tough to predict the outcomes of freight policies and strategies. There is a need to raise awareness for freight issues considering all relevant stakeholders.

Heterogeneous nature of urban freight stakeholders and goods movement characteristics in the city poses a pivotal challenge to policymakers to select suitable freight strategies for sustainable goods distribution. Freight strategies for sustainable urban goods distribution are not adequately addressed in India. This research paper evaluates the weights of various freight planning & consolidation strategies for sustainable urban goods distribution for Jaipur city (India) by the Analytical Hierarchy Process (AHP) and Best Worst Method (BWM) method. AHP & BWM are useful tools for dealing with complex decision making. AHP and BWM aid the decision-maker to make the best decisions. Freight planning & consolidation strategies are selected based on the literature review of urban goods distribution for this research study

This paper critically analyses the freight planning & consolidation strategies in the preview of wholesalers, transport operators and local policymakers involved in urban goods

distribution in case city. Primary data and response were collected with face to face paper-pencil survey from stakeholders in case city for selection and ranking of freight strategies. Response received from 30 stakeholders of Jaipur is used for analysis. The final weights of freight strategies are geometric means of individual responses with consistency ration less than 10%.

Jaipur is the capital city for the state of Rajasthan in India. The city is a major attractor of tourists and major hub for handicrafts, gems, jewellery, die printing (textile) and stone crafting. Jaipur city is located in the north-eastern part of Rajasthan state, 280 Km from Delhi. The total population of Jaipur city is 30.5 lacs (yr. 2011). Residential land use of city constitutes 44.8% (13825 ha), commercial 6.7% (2064 ha), industrial 6% (1862 ha), governmental 2% (602 ha), mixed land use 3.3% (1034 ha), public & semi-public 10.5% (3241 ha), recreational 11.3% (3461 ha) and circulation 15.4 % (4741 ha). In Jaipur city, there are 11 major wholesale markets. Building Hardware market and Electronic market were selected for the assessment of freight planning & consolidation strategies. The building Hardware market is planned market recently developed by Jaipur development authority, whereas the electronics market is situated in the old city (walled city) area. Goods distribution in building hardware market is weigh based, whereas, it is number and item-based in the Electronics market.

The study results confirm that there are variation and similarity in weights of freight strategies across markets by both AHP and BWM methods. Design guide/enforcement for on-street loading bays is least preferred strategies across both markets. Urban logistics spaces as a strategy are most preferred in building hardware market followed by loading-unloading facilities. Urban consolidation spaces are most preferred in the electronics market, followed by loading-unloading facilities. Combined weights of strategies for two markets have the highest weight for urban logistics spaces followed with loading-unloading facilities strategy. BMW method is more comfortable then AHP method in the context of surveying as it has the simple and lesser comparison of alternatives than AHP method, especially when the number of paired comparison is large. Both methods are very tedious and too time-consuming for data collection. Assigning of the rating scale to alternatives is hard to explain to transport operators and wholesalers due to their low education level, especially with the AHP method. The policy implications based on this study demonstrates the potential utility of AHP & BWM as a decision-making tool in urban freight sector in India.

Keywords: Sustainability, Freight Strategies, AHP, BWM