The Effect of E-Commerce in Reducing Intra-urban Trips and Carbon Monoxide Emission in District 5 of Tehran

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Extended Abstract

1. Introduction

Tehran is one of the first and most important environmental challenges in the country's air quality due to geographical, climatic, and strategic conditions. Therefore, urban planners and policymakers need to take unified and integrated actions to get out of contaminated cities and harmful to citizens' health. Information and communication technology (ICT) and its tools such as E-commerce were introduced as a management solution to reduce intra-urban traffic, reduction in energy consumption, and air pollutants. E-commerce has been defined as doing any commercial affairs such as the purchase, sale of goods or services by tele-communication tools. E-commerce is derived from ICT and generally changes the purchase and distributing pattern. In the past decades, low land rates and widespread migration have increased congestion, increased traffic volume, and consequently increased air pollution and economic costs in District 5 of Tehran. Therefore, the effect of E-shopping on the amount of intra-urban trips and the carbon monoxide emission before and after the E-shopping application was investigated.

2. Review of the Literature

In the last two decades, urban planners have shifted to cyberspace to manage travel demand. In cyberspace, the meaning of place is reconstructed. In this space, looking at the city as the space of places changes the space of currents, which on the one hand makes the movement of the population and on the other hand the movement of information possible. In this space, urban planners try to play an important role in managing the travel demand by managing the movement of urban affairs by expressing concepts of electronic services such as E-banking, E-learning, E-health, E-commerce, etc. E-commerce is one of the most important parts in E-services. E-commerce plays a very important role in the economic growth of human societies and generally changes the pattern of buying and distributing goods between sellers and buyers. These services are provided online, and its goal is to provide high speed and performance services without the need for physical presence on site, while reducing economical costs, traffic, and consequently reducing traffic and pollution. The UK Department of Transportation (2003) has identified E-commerce as a soft policy to help the UK's transportation goals and policies to reduce traffic and energy consumption. Siikavirta, Punakivi, Kärkkäinen, and Linnanen (2002) concluded that the low share of this strategy in reducing greenhouse gases is due to share of ten percent of virtual stores in marketing. Koivanit (2018) concluded that online shopping at Canadian grocery stores would

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reduce greenhouse gas emissions by 92.9 percent. Meshkini, Gholami, Moghaddam, and Rastegar (2011) concluded that the prosperity of electronic banking reduces the presence of citizens to the bank, the relative improvement of urban traffic and the reduction of costs in the city of Zanjan. Alavi, Fakhrimjoo, and Parhizkar (2018) stated that there is a significant negative relationship between the use of E-government services and urban traffic. In other words, with the provision of E-government services and its increase, urban traffic has also decreased significantly.

3. Method

District 5 is one of 22 municipality districts that is located in the northwest of Tehran. Excessive urban trips for utilizing various urban services are known as one of the factors influencing the trip pattern and, consequently, the increase of air pollution and fuel consumption. Therefore, this study aimed to investigate the impact of E-commerce application on reducing intra-urban travel and reducing carbon monoxide emissions in district 5 of Tehran. At this stage, two scenarios are determined:

Scenario 1: Investigating the status of the pre-implementation of the E-shopping on intra-urban trips and carbon monoxide emissions.

Scenario 2: Investigating the status of the implementation of the E-shopping on intra-urban trips and carbon monoxide emissions.

For this purpose, it is necessary to estimate the level of readiness of samples to accept the change in the state of purchase from the traditional to the electronic, as well as the reduction in trip length by distributing the questionnaire. The structure of the questionnaire included introduction, general information, behavioral, trip demand, and perspective questions. The frequency and mean of data presented in the descriptive part, and the data were analyzed in SPSS software. In addition, other information such as vehicle type, trip length, and number of trips per month asked and analyzed. Then, it is necessary to estimate the amount of carbon monoxide emissions from the trip distances by vehicle to purchase the goods according to the IPCC equation. In addition, it is necessary to estimate the number of purchase orders, the amount of trip and trip distances by a carrier car in the second scenario.

4. Results and Discussion

In this research, a sample size of 384 was determined according to Cochran's method with an error level of 5% and 95% confidence. Questionnaires were distributed randomly in the studied area. In addition, the Cronbach's alpha method was used to evaluate the reliability of questionnaire. The questionnaire had high reliability with overall alpha coefficient higher than 0.6. Results from demographic data show that 50.3% of the respondents are women and 49.7% are men. The results show that 40.9% of the sample is between 35 and 45 years of age. In addition, 67% of the statistical samples had a bachelor's or higher education degree that their level of awareness about the internet and computer programs with the average of 3.60 is higher than moderate. The results showed that from the viewpoint of citizens, their role in reducing the air pollution problems with a mean of 3.01 was average. In addition, they stated that their readiness level in order to reduce intra-urban trips was greater than moderate by a mean of 3.32. The results showed that the role of E-shopping from chain stores in reducing household and transportation costs was lower than the averages with 2.75 and 2.66, respectively. The results showed that the carbon monoxide emissions in the households of district 5 of Tehran which tend to E-shopping, is 41.3 tons per year in current purchasing situation. When the E-commerce program is implemented, the emission of carbon monoxide will reduce by 39.62 tons per year. In addition, the application of this strategy in total 22 districts of Tehran will reduce the 13.37% of purchasing situation. When the E-commerce program is implemented, the emission of carbon monoxide will reduce by 39.62 tons per year. In addition, the application of this strategy in total 22 districts of Tehran will reduce the 13.37% of shopping trips in Tehran, and decrease 871.64 tons of carbon monoxide contaminants per year for the all district of Tehran.

5. Conclusion

Result showed that young people with a higher education have a more positive tendency toward E-shopping, and the level of awareness, readiness and acceptance of new replacement systems in their purchases is very high. Citizens declared their role in
reducing the problems of air pollution was relative, which can be related to the public’s view to the more effective role of government in reducing air pollution by providing infrastructure, economic, and cultural solutions. Citizens stated E-shopping from chain stores is an effective strategy to reduce intra-urban trips. They are ready to participate in reducing intra-urban trips to decrease the environmental impact on their urban community. The result showed that the role of E-shopping from chain stores in reducing household and transportation costs is less that the average which requires economic incentives to encourage citizen for E-shopping. The results showed that the application of this strategy would reduce 13.37 percent of shopping trips in Tehran, and reduce carbon monoxide emissions by 871.64 tons per year for all 22 districts of Tehran. The behavior of purchase cannot be changed at once. Nevertheless, experience has shown that providing a suitable and integrated model to meet the needs and demands of citizens by applying incentives such as easiness, economic benefits, and welfare encourages the citizens to improve the environmental situations.

**Keywords:** Air Pollution, E-shopping, Trip Demand, District 5 of Tehran, Carbon Monoxide

**References (In Persian)**


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