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Explore the Factors Contributing to Online Versus Store Shopping in Transportation Perspective: Evidence from India

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Abstract

In recent times, there has been a growing demand for e-shopping as compared to in-store shopping due to rapid changes in technology as well as extensive usage of the internet. E-shopping has changed people's shopping and travel behaviour. Due to the increase in internet usage, there is a tremendous change in people's shopping choices and it further impacts the travel patterns in urban communities. In this context, the proposed study evaluates people's shopping choice behaviour in an urban scenario. To fulfil the proposed objective, a questionnaire survey has been conducted in order to understand consumer behaviour about their shopping choices as well as the number of online orders that have been made by the user during the specified duration of time (viz., during the last one month). To analyse the collected data, a principal component based logistic regression analysis has been adopted to estimate the significant contributing factors affecting consumer shopping choices. The results show that motivational factors (viz., saving in travel time and better prices) have a significant positive impact on online shopping; however, there are concerns such as delivery time as well as care required during online payment. The frequency of using online shopping mode and recently made purchases has had a significant positive impact on online shopping. Further, it has been concluded that higher income levels and higher occupation levels negatively impact e-shopping choice. The results are useful for transport planners to predict the transformation in people's travel behaviour with respect to shopping trips in present and future scenarios.

Keywords: E-shopping; store shopping; shopping choice; travel behaviour; motivational factors.

1. Introduction

In recent years, there has been rapid technological advancement and an increase in internet usage, which has resulted in changes in user shopping behavior. Urban commuters have widely adopted information and communication technologies (ICT) that enable them to use the internet for wide applications such as private modes (viz., ride-hail service) and access to a wide variety of daily necessary products, which impacts their travel patterns. In particular, the shopping-based activities have been altered due to

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advancements in ICT. In general, there are two main approaches to shopping, viz., e-shopping (online shopping) and store-based shopping. Online shopping is a form of electronic commerce that allows consumers to directly buy a product or services from various sellers over the internet using a web-based platform. In earlier days, users had more choices and dedicated time to shopping for goods or availing services from physical stores. E-shopping helps individuals do their shopping without moving to the destination and continuing their work as usual. Physical store trips have an impact on the travel patterns due to the consumers' choice of shopping destination as well as products, which further impacts on the travel mode choice (Suel and Polak, 2017). E-shopping has completely changed people's travel and shopping behaviours by saving them time and money by using online shopping, and overall it helps to decrease the traffic congestion on the roads by reducing shopping trips (Pettersson et al., 2018). Further, the increase in use of e-shopping in developing countries like India may contribute towards a decline in traffic congestion, saving of fossil fuels and help to reduce carbon emissions, and this would help to improve the quality of life in urban areas (Alyoubi, 2015).

Several research studies have been focused on evaluating the impact of e-shopping over store-based shopping in order to understand whether e-shopping substitutes, complements, or has no effects on store-based shopping (Weltevreden, 2007). If more people choose online shopping as compared to store-based shopping, there will be chances for substitution of store shopping trips, resulting in significant changes in urban commuter activity patterns. In developing countries such as India, there is a remarkable increase in the number of internet users, which positively contributes towards an increase in online shoppers and income generated through online shopping. Internet penetration in India rose from just 4% in 2007 to 52.08% in 2019, showing a 24% compound annual growth rate from 2007 to 2019, and the Indian e-commerce sector has been on an exponential growth trajectory and is predicted to overtake the United States to become the second-largest e-commerce market by 2034 (IEIR, 2020). Hence, with an increase in the number of online shopping users, there might be a chance of significant substitution of shopping trips. However, some researchers have shown that online shopping might increase urban freight activity, which adversely impacts the congestion in urban areas or increases travel time due to the increased number of delivery trips (Cherrett et al., 2017). In this line, researchers have also explored different options for the delivery of goods to reduce urban freight activity (Bjørgen, et al., 2019). Products such as groceries, electronics, etc., are expected to be home delivered, which might increase the freight traffic and result in just a complimentary impact on shopping trips by using e-shopping. On the other hand, for products such as software and music CD's, there is no need for door delivery, and it can be delivered online, and e-shopping will perfectly act as a substitute for these shopping trips. Further, there are many factors, such as discount rates, product comparison, and product class verification of the product with e-shopping that might influence the choice of shopping (Hsiao, 2009). In this context, the present study explored the factors that contribute to the shopping choice of online versus offline, which further relates to the transportation perspectives in the Indian context.

The rest of the paper is organized as follows. Section 2 presents the literature review and the study methodology that includes data collection and modal formulation is presented in section 3. Section 4 describes the model results. Section 5 presents the discussion on the study results. Conclusions and limitations of the study are given in section 6.

2. Background of the study

In order to understand people's shopping choices and their shopping behaviour, it is essential to consider the factors that influence consumer shopping choices. The existing studies have considered a wide range of factors, and the present study reviewed the previous studies to identify various factors which were explored and essential for this study. The existing studies mainly focused on the four important aspects, whether the impact of online shopping on store shopping trips is substitution, complementary, neutrality, or modification. In general, the following are the potential effects of online shopping on in-store shopping:

- "Substitution," which indicates whether online (e-shopping) shopping substitutes the customers' store shopping trips.
- "Complementary," which indicates that due to online shopping, the number of shopping trips will increase.
- "Modification," which indicates that e-shopping may alter the shopping patterns.
- "Neutrality", which indicates that e-shopping, does not have an effect on shopping trips.

Researchers have compared various products (viz., clothes and shoes, electronics, food and drinks) that are purchased online versus store-based trips, and results showed that 44% of respondents' depicted reduced store shopping trips because of e-shopping, and another 15% of respondents claimed that they are increasing their shopping trip frequency (Shi et al., 2019). In another study, conducted in Sydney, identified that internet usage is still in its early stages. Nevertheless, for the people who are using the internet, there is a reduction in the number of shopping trips (Corpuz and Peachman, 2003). Further, researchers have analysed households' decision-making processes for e-shopping with respect to the delivery, searching for information on the internet, and purchases made, and based on the results, it is identified that the shopping trips only slightly substitute the store shopping trips (Rotem-Mindali and Salomon, 2007). Moreover, the store purchase of products such as books has been significantly substituted by online shopping, and the results concluded that people who have spent more time on books have a higher probability of online shopping for books (Sinai and Waldfogel, 2004). In addition to this, people's risk perception in buying attitudes, purchase intention, and preparedness to pay are important contributors for online shoppers (Liu et al., 2017).

Researchers have assessed the association between e-shopping and physical store-based shopping trips with the help of a national household travel survey in the US and the results concluded that there is either no substitution or complementary effects on the store-based shopping trips by using e-shopping (Zhou and Wang, 2014). Further, studies have explored the factors that contribute negatively towards consumers' choice of online shopping, and the results concluded that security concerns regarding payment and risk related to improper product delivery through online mode significantly impact substitution and complementary effects of shopping trips (Crocco et al., 2013). Studies have also focused on the effects of different factors such as socio-demographics, psychological and attitude characteristics on the internet experience of users, and results concluded that though internet usage might be higher, the online shoppers are relatively less as compared to the internet users, which indicates that higher internet usage does not indicate significant e-shopping (Sim and Koi, 2002). Furthermore, researchers have

concluded that product information, delivery, and discounts are the most important factors influencing purchasing decisions (Rotem-Mindali and Salomon, 2007). In addition, the consumer's motivation, attitude, satisfaction, and intention to buy a product have a significant contribution towards their choice of shopping choice of store versus online. Many existing research studies have concluded that psychological characteristics have a substantial role in consumer purchase behaviour (Rohm and Swaminathan, 2004).

ICT has a significant role in transportation and has changed people's shopping and travel behaviours, as they can continue their work or shopping activity without moving to the destination. Researchers have explored the reduction in travel time with e-shopping and the results concluded that individuals who shop more through e-shopping save travel time. However, it is not clear whether this saved time is utilized for any other purpose of travel (Farag et al., 2007). Further, researchers have studied the relationship between searching for a product online and buying the same product from a retail shop through physical trips, and they found that the frequency of infrequent shopping trips increases as respondents search online more often (Farag et al., 2005). In this line, researchers have explored that shopping trips are also based on a desire to travel because sometimes people travel with the intention of making a leisure trip, and the outdoor shopping activity is a kind of leisure to them (Mokhtarian, 2004). Researchers have shown that most consumers who search for product information online do not change their store-based shopping trips, which indicates the neutrality effect of online shopping on shopping trips (Hoogendoorn-Lanser et al., 2019). In the same line, researchers proved that those who spend more time on online shopping experience more shopping trips (Lachapelle and Jean-Germain, 2019).

Some researchers have also focused on understanding suburban commuter shopping choices, with results indicating that suburban commuters travelling to grocery stores take more long-distance car trips (Jiao et al., 2011). whereas another study showed that shopping in the city centre is negatively correlated with online shopping as compared to store-based shopping (Weltevreden, 2007). Researchers have identified the impact of accessibility on store-based shopping trips and it has been noted that accessibility to transport modes plays an important role in choice for physical store-based shopping trips (Maat and Konings, 2018). Studies have also focused on islands to study the impact of online shopping on the travel practices of island people, and results have concluded that saving in travel time is one of the main benefits for the island residents of adopting online shopping (Freathy and Calderwood , 2013). Further, online shopping behaviour has been observed to significantly depend on product information, product experience, and ease of financial transaction through various options, which has shifted the inclination of consumers to shop more through the online mode as compared to store-based shopping (Cao, 2012). Studies have also focused on evaluating online purchasing behaviour with respect to consumer choice as well as adaptation, and the results concluded that the wide variety of information and discount rates are the prime factors in adaptation to online shopping (Huang, 2000). However, it has also been noted that there is no assurance that the gathering of online information by potential consumers results in the confirmed purchase of products online (Forsythe and Shi, 2003). Based on the inferences from the above studies, it is understood that studies are necessary to understand the factors that significantly contribute to the consumers' shopping choice in the growing urban community in a developing countries context. In this context, the present study has explored the factors that contribute to the shopping choice of online versus store-based shopping.

3. Methodology

In order to fulfil the study objectives, a structured questionnaire has been formulated and stratified random samples were collected through face-to-face interviews as well as online mode in Nagpur city, India. Prior to conducting the survey, it is essential to understand the various sources of the store-based shops as well as the different products people purchase through online shopping. A preliminary online survey has been conducted to explore the various products purchased by the consumers in the last one month both online and offline in a selected study location in Nagpur city. From the preliminary survey, it has been understood that there was more preference towards store-based shopping, particularly for products such as electronic goods, clothes, footwear etc. From the results of the preliminary survey, the main structured questionnaire survey has been prepared.

3.1 Survey questionnaire form

The required data for this study was collected through a structured questionnaire given to respondents in Nagpur, India. The questionnaire form was distributed through online media in and at selected store locations, and the face-to-face interviews were also conducted at stores with the same survey form based on a stratified random sampling. The online as well as offline surveys were carried out from November 2019 to January 2020, and the survey form was prepared in the local language (Marathi) as well as English. Respondents were requested to provide information about their last purchase-related activity and details of purchase activities during the last one month. The study also collected data for preparing trip tables in order to understand the travel patterns of the commuters and their corresponding shopping choices. However, this data has not been included in the trip tables in the present analysis.

3.2 Data collection

The questionnaire survey form comprises questions to obtain data related to socio-demographic characteristics and shopping-related attitudes of respondents, motivational factors related to online shopping and social constraints. In general, the completion of the survey form took 6–8 minutes based on the face-to-face interview. To avoid bias, the data were collected on weekdays as well as weekends, and a total of 806 survey samples were included in the final analysis for model development after the removal of inappropriate and incomplete data from the raw data. It has been noted that the data is more inclined towards the employed and younger individuals (21–30 years old). From the collected data, the responses received from males were higher than females, and the mean age group of the collected data samples was 21–30 years. The questionnaire form includes a question regarding their time savings after using online shopping, and the majority of respondents agreed that they are saving some time by choosing the online mode instead of store shopping. Moreover, the monthly frequency of online shopping is almost equal to that of in-store shopping for the respondents. This may be due to the fact that the responses are more inclined toward the employed people as well as the students, and these groups of respondents utilize more online shopping as compared to the elderly people. In order to develop a model for evaluating the effects of different factors on consumer shopping behaviour, the details of collected variables and their mean values have been summarized in Table 1.

Table 1:Details of the data collected from survey

Variables	*Definitions*	*Mean*
Gender	1 = Male, 0 = Female	0.73
Age (Years)	1=<21; 2=21-30; 3=31-40 4=41-50; 5=>51	2.3
Education	1= High school; 2=Intermediate education; 3=College graduation; 4=Master's degree; 5=Doctoral degree	3.21
Occupation	1= Student; 2=Employed; 3=Business	1.73
Income	1= <Rs 10000; 2=Rs.10000-25000 3=Rs.26000-40000; 4=Rs.41-60000 5= >Rs. 60000	2.65
Car ownership	0= No; 1=Yes	0.5
Location of Home	1= Urban; 2=Sub-urban; 3=Rural	1.46
Credit card	1=Yes; 0=No	0.33
Internet Experience	1= Less than one year; 2=1-2 years; 3=2-3 years; 4=3-4 years; 5=More than 5 years	4.34
To Save time	1= Strongly disagree ; 2= Dis-agree ; 3=Neutral; 4= Agree ; 5= Strongly agree	4.11
Get better prices/discounts	1= Strongly disagree ; 2= Dis-agree ; 3=Neutral; 4= Agree ; 5= Strongly agree	4.04
Risk to online payment	1= Strongly disagree ; 2= Dis-agree ; 3=Neutral; 4= Agree ; 5= Strongly agree	3.01
It takes more delivery time after shopping in online	1= Strongly disagree ; 2= Dis-agree ; 3=Neutral; 4= Agree ; 5= Strongly agree	3.37
More varieties of products are offered online.	1= Strongly disagree ; 2= Dis-agree ; 3=Neutral; 4= Agree ; 5= Strongly agree	4.08
Change in frequency of visiting the stores after introducing the online shopping.	1= Decreased substantially; 2=Decreased somewhat; 3=No change; 4=Increased somewhat; 5=Increased substantially	2.22
Monthly frequency of shopping in online	1= Once in a month; 2=Twice in a month; 3=Thrice in a month; 4=Four times in a month; 5=Above 4 times	1.67
Monthly frequency of visiting making shopping trips.	1= Once in a month; 2=Twice in a month; 3=Thrice in a month; 4=Four times in a month; 5=Above 4 times	1.71
Do you think shopping trips are reduced after introducing of online shopping.	1= Yes; 0=No	0.78
Describe your last purchase	0= Store shopping; 1= online shopping	0.59

3.4 Descriptive analysis

From Table 1, it can be observed that most of the respondents have internet experience of more than three years, with a mean value of 4.34, and the level of education is inclined towards college graduation (mean = 3.21, refer Table 1). From the survey data, it has been identified that users are inclined towards online shopping due to better prices and more product varieties, and the mean values for these factors are 4.04 and 4.08, respectively. Further, the survey results reveal that online shoppers have reasonable concerns related to risk during online payment as well as delivery time, and the mean values are 3.01 and 3.37, respectively. The survey also indicated that the respondents have significantly saved their time due to adopting online shopping and this has resulted in a reduction in their store-based shopping trips. However, the responses to the monthly frequency of online and store-based shopping are not significantly different, and the mean values are 1.67 and 1.71, respectively. Many respondents have stated that they have reduced physical store-based shopping trips after adaptation to online shopping. From the survey responses of the present study, it is understood that online shopping is preferred by the younger age group in India.

3.5 Conceptual framework

People's shopping choices are complex due to variations in people's attitudes, social concerns, and motivational factors towards shopping. Motivational factors can affect the choice of shopping, viz., online versus store-based. However, online shopping may depend predominantly on the product description, delivery time, and discount rates. Further, social constraints have a significant impact on online shopping, with payment options or product descriptions affecting the choices for online shopping. The frequency of online or store-based shopping is also an important factor in shopping choice behaviour. Socio-demographic characteristics such as gender, age, family size, education, car ownership, and income levels can have an influence on shopping choice behaviour. Hence, these factors include people's attitudes, social concerns, and motivational factors, which were considered in the model building process in order to understand the significant contributing factors to shopping choice.

3.6 Model formulation

Principal component based binary logistic regression analysis was used to examine people's shopping behavior. In the first step, dimension reduction analysis was used to identify the factors that will influence people's purchasing behavior. In the next step, considering the people's shopping choice behaviour (online versus store-based shopping) as a dependent variable, a logistic regression analysis was carried out in order to understand the significant contributing factors affecting the people's shopping choice. This model examines the probability of choosing shopping choice between online versus physical stores. The estimated probability may be influenced by factors such as socio-demographic characteristics, motivational factors, frequency of shopping and social constraints. The model was developed using the Statistical Package for the Social Sciences (SPSS) version 24. The stepwise method was adopted for developing the logistic regression model, which includes the most significant contributing variables affecting the shopping choice behaviour. The collected variables related to socio-demographic

characteristics include variables of binary type (viz., gender and car ownership) and other variables in categorical form (viz., age group, income, education, and occupation). The motivational factors for shopping include saving time, better prices with discounts, and a greater variety of products. The social concerns include more delivery time and a perceived risk perception about payment. The responses were given on a 5-point scale. The reliability of these questions was assessed using the Cronbach's Alpha analysis.

3.7 Factor analysis

Online shopping is influenced by several contributing factors related to consumers and has been broadly classified as motivational, barrier, and concern-related factors. By applying factor analysis, by exploring the perception behind the present attitudes towards shopping as well as the past attitudes towards purchasing various products (viz., last one month's purchasing behaviour), and the frequency of such purchasing. The survey form included these attitudinal questions as a 5 point Likert scale (viz., 1: strongly disagree to 5: strongly agree); wherein, the respondents were requested to rate their perception on this scale. A varimax rotation was used to understand the impact of this data. A factor analysis was conducted to group the more relevant variables affecting shopping choice behaviour. This was confirmed with the Kaiser-Meyer-Olkin (KMO) measure of scale of reliability, which must be greater than 0.5.

Further, the null hypothesis was tested with the help of Bartlett's Test of Sphericity, which recommends the correlation matrix with the corresponding selected factors. In general, the higher the factor loading (viz., 0.5), the better it explains the variance of the original variables. However, in the present study, a KMO greater than 0.5 is considered, which rejects the null hypothesis (viz., there is no single variable that could explain the significance of shopping choice behaviour). The alpha (α) of Cronbach is a measure of inner consistency, viz., how closely a set of items is related in a group. Generally, it is used as an indicator of reliability in size. A higher alpha value doesn't mean the measure is one-dimensional. It is one of the methods of testing dimensionality in exploratory factor analysis. The general accepted rule is that α above 0.6 indicates an acceptable level of reliability. The present study estimated that the Cronbach's alpha value is 0.568, which is considered close to an acceptable level.

4. Results and Discussion

The urban commuter's shopping choices were analysed based on the principal component logistic regression analysis. The factor analysis results are shown in Table 2, which indicates that it significantly affected shopping choice behaviour and which can be considered for further analysis for logistic regression. From the results, the KMO value is 0.545, which is close to the test significant value of 0.6. Also, the Bartlett's Test of Sphericity chi-square value is 77.295 with 21 degrees of freedom and it is significant with a p-value 0.000. The present study estimated three possible factors, including motivational factors, barriers, and social concerns, stated as factors 1, 2, and 3, respectively, in Table 2. The motivational factors include saving time, better prices, and product variety and the respondents who are interested in saving their time and getting more product variety with discount rates are more inclined towards online shopping. Frequency denotes the monthly frequency of purchase in online shopping as well as frequent internet users, and both these variables have positively impacted on the choice of online shopping. The third factor is related to the social concerns that include payment

risk as well as delivery time. All the selected factor loadings are greater than 0.6, which indicates the strong influence of these factors on consumers' shopping choices.

Table 2: Factor analysis results

Hypotheses	*Factors*		
	Motivational	*barriers*	*concerns*
Saving in time	0.646		
Get better prices	0.606		
More product variety	0.685		
Monthly frequency of purchasing in online		0.750	
Internet experience		0.668	
Risk in making payment			0.742
More delivery time			0.726
Percentage of variance	17.631	17.520	16.639
Cumulative Percentage of variance	17.631	35.151	51.79
Eigenvalues	1.234	1.226	1.165
Note: Total number of observation =806			
Extraction Method: Principal Component Analysis			
Rotation Method: Varimax with Kaiser Normalization			
Kaiser-Meyer-Olkin Measure test of adequacy: 0.545			
Bartlett's Test of Sphericity: $\chi^2 = 77.295$; df = 21; p = 0.000			

The model has been developed with the above-stated factors as well as socio-demographic variables (viz., gender, age, income, education, occupation, etc.) as independent variables and shopping choice considered as a dependent variable. The factor loading of social concerns, motivational factors, and frequency is analysed in terms of shopping choice by considering individual hypothetical variables for each factor. It is also important to understand that the contributing factors affecting shopping choice are analysed with particular focus on online shopping. The model results are summarized in Table 3 and all the variables are significant at a 95% confidence level except the respondent age, which is significant at a 90% confidence level.

The binary logistic regression model results show that motivational factors positively contribute towards online shopping, viz., 3.095 (refer Table 3). The motivational factors generally include three different variables, viz., discount in prices, more product variety, and saving in time, and due to these factors, more people are inclined towards online shopping. These results are in line with the existing study results, and researchers estimated that more product varieties are the strongest factor for motivating people to use online shopping (Farag et al., 2005). Also, another positive impact is the discount rate on online products that attracts more consumers towards adopting online purchase behaviour as compared to store-based shopping, and a recent study has shown that the discount rate acts as a mediating variable which impacts the perception of saving due to online shopping (Hsiao, 2009). Existing studies also show that due to online shopping, people's travel behaviour is altered, wherein they save time due to the cancellation of physical store trips and this saved time is utilized for other purposes (IEIR, 2020; Cherrett et al., 2017). Studies have also shown that the proximity of the store influences online shopping

behaviour in built-environment areas (Shen et al., 2020). However, the study results do not show the impact of saving in shopping time on other trips and the proximity to the store, which impacts the store-based shopping on online shopping. Whereas, studies have shown that the increase in online shopping results in more shopping trips, which indicates a complementary effect of online shopping (Etminani-Ghasrodashti and Hamidi, 2020). According to these findings, the present study results indicate that the motivational factors towards online shopping may not be sufficient to guarantee that there will be a substitution for shopping trips. Many exciting research studies have demonstrated that there is a substitution effect due to online shopping, which has a significant impact on travel behaviour (Shi et al., 2019).

Table 3: Shopping choice behaviour binary logistic regression model results

Variables	*Estimated coefficient*	*Standard error*	*Wald*	*p-value*	*Exp(B)*
Constant	-4.616	0.948	23.732	0.000	0.010
Motivation for online shopping	3.095	0.716	18.698	0.000	22.089
Social constraints	-1.060	0.327	10.523	0.001	0.347
Frequency of online shopping	0.410	0.162	6.408	0.011	1.506
Age	0.290	0.177	2.671	0.100[#]	1.336
Income	-0.190	0.092	4.271	0.039[*]	0.827
Occupation	-0.417	0.161	6.683	0.010[*]	0.659
Last purchase	2.248	0.236	90.854	0.000[**]	9.467
Model fit statistics					
-2Log Likelihood			479.934		
Chi-square			199.897		
Degree of freedom			8		
Nagelkerke R Square			0.444		

*Note: #Significance at 90% confidence level; * Significance at 95% confidence level; **Significance at 99% confidence level.*

Another important factor (viz., social concerns) has a negative impact on online shopping, viz., -1.060 (refer Table 3). This factor includes two important variables, such as concern about the delivery time of the product and risk during online payment. These two factors negatively impact online purchase behaviour and other concerns like product quality, replacement, and delivery time are not included in the present study. From the transport perspective, these factors might have a significant impact on the urban freight delivery system. Existing studies show that the risk during online payment is one of the main concerns for the consumer, and delivery time further impacts the purchasing decision through online mode (Li et al., 2011). However, due to non-physical delivery, some products, such as e-books and music CDs, are likely to have an impact on online purchases. The present study does not segregate the various product types to understand which types of products are associated with major concerns related to delivery time. Perhaps other studies have shown that electronic goods have a higher delivery time and

these products also influence the urban freight distribution patterns and the choice of the mode for such delivery (IEIR, 2020).

Further, the results estimated that with frequent use of online shopping, more people adopt online shopping and this factor has a positive impact on choice for online shopping. This factor includes two different types of variables, viz., frequency of online shopping as well as internet usage. Many researchers have identified that the internet experience has positively impacted online shopping behaviour (Freathy and Calderwood, 2013). This study identified that the frequent ordering of products online along with more internet experience have positive effects on e-commerce. These factors would be important to be considered by transport planners to perform travel behaviour analysis in an urban environment. Further, the younger generation has adopted more online shopping as compared to the elderly group of people. Hence, the future travel behaviour analysis is important by considering online shopping behaviour. Also, frequent online shopping behaviour may have an influence on the substitution of shopping-based trips, which has an impact on lowering the traffic congestion levels, saving fossil fuels, and hence overall benefits to the economy. However, the present study could not identify whether an online shopping choice has a substitution, complementary, or neutral impact on store-based shopping. However, it has been noted that the last purchase made online shows a positive impact, and this indicates that the last purchase made online by a consumer results in a higher probability of having their next purchase also made online. However, the study does not consider the data corresponding to the last purchase (viz., type of product, quality of the product, discount rate from online purchase, delivery time, etc.), and the effect of these factors on the probability of the next purchase through online shopping needs to be explored through further studies.

Furthermore, the study estimates that people's income and occupation have a negative impact on online shopping, indicating that people with higher incomes are more likely to prefer store-based shopping over online shopping. The earlier research shows that the brand and the quality of the products are prime factors rather than discounts. However, these factors may be more relevant for the higher income group of people (Smith and Brynjolfsson, 2001). Also, researchers have proven that shopping trips are desire-based travel, and people perceive these trips as leisure types of trips (Mokhtarian, 2004). Studies have also proven that attitudes towards travel are important, viz., travel is derived from demand due to their emotions and self-satisfaction (Mokhtarian and Salomon, 2001). From this point of view, shopping is about how people feel about themselves, and this is more important to people with more money when it comes to brand, quality, and status symbols. The other factor is occupation, which is important in consideration of the income levels, wherein businesses and employed people are more willing to have store-based shopping due to the relaxation during such trips. This means that the lifestyle of the urban commuter becomes more important in the adaptation to online shopping, and this also influences the other individuals in the household groups and their choice of store shopping as a leisure activity. However, this study does not identify how car ownership impacts online versus offline shopping choices. However, car ownership can be generally attributed to relatively high-income groups of people. Additionally, the socio-demographic characteristics and the proximity to stores are also important to understand the impact of online shopping on store-based shopping trips. However, this study did not consider the effect of proximity of stores and the type of stores available in the vicinity of the user.

5. Conclusions

The present study analysed shopping choice behaviour of respondents (online versus store-based shopping trips) based on the principal component based logistic regression analysis. The model was formulated based on the motivational factors, frequency, and social concerns of consumers about their shopping. From the structured questionnaire survey, factor analysis was carried out, and the effects of the three factors mentioned above were derived from the factor analysis. The logistic regression adopted the significant factors and socio-demographic characteristics by considering shopping choice as the dependent variable. From the results, it has been concluded that motivational factors such as discount rates, more product options, and saving time have a strong positive impact on people's online shopping choices. The study also concluded that the delivery time as well as the perceived risk of online payment have a negative impact on online shopping choice. The results identified that people may be more inclined towards online shopping based on discount rates and less delivery time for online orders. In the fast-going internet era and with the more widespread usage of smart phones among the younger generation, there are more chances of an increase in online shopping orders in the near future, which impacts the travel behaviour in urban areas. The study results concluded that the higher frequency of using online shopping as well as internet usage increases the probability of next purchasing an item from the online mode as compared to store-based shopping. The study could not identify whether online shopping has a substitution or complementary impact on store-based shopping, but the motivational factors suggest that there might be a chance of substitution of physical shopping trips in the near future in developing countries like India. Further, the study results also revealed that higher income group people with higher occupation levels have more accepted store-based shopping compared to online shopping.

Though the study estimated people's shopping choice behaviour considering the effect of various contributing factors, the study has some limitations. The survey data was collected in a particular area where shopping malls and supermarkets are available. The surveys were not considered as nearby grocery shops, and the proximity of the nearest stores was not included in the present study. Also, the study did not consider how the saved time during online shopping was utilized for any other purposes, and the travel attitudes could not be established, though earlier studies suggest that people belonging to higher income groups have a greater desire to travel for shopping. Further, the study analysis did not analyze the travel patterns due to the change in shopping trips. In spite of these limitations, the study established the significant contributing factors that impact the shopping choices of consumers in an urban environment. The study results are useful in transport planning to understand the travel behaviour of urban commuters based on their shopping trips. Also, the insights from these study results would be useful to predict people's changes in travel patterns due to shopping trips in urban areas, and policies for the delivery of goods in urban areas can be optimized, considering that a greater number of online-based shopping orders can be expected in the future.

References

Alyoubi, A. A. (2015) "E-commerce in Developing Countries and How to Develop Them Duringthe Introduction of Modern Systems", *International Conference on Communication, Management and Information Technology (ICCMIT 2015), Procedia Computer Science,* 65, pp. 479-483.

Bjørgen, A., Bjerkan, K.Y., Hjelkrem, O.A. (2019) "E-groceries: Sustainable last mile distribution in city planning", *Research in Transportation Economics,* 87, pp. 1-9.

Cao, X. (2012) "The relationships between e-shopping and store shopping in the shopping process of search goods", *Transportation Research Part A: Policy and Practice,* 46, pp. 993-1002.

Cherrett, T., Dickinson, J., McLeod, F., Sit, J., Bailey, G., Whittle, G. (2017) "Logistics impacts of student online shopping – Evaluating delivery consolidation to halls of residence", *Transportation Research Part C: Emerging Technologies,* 78, pp. 111-128.

Corpuz, G., Peachman, J. (2003) "Measuring the impacts of internet usage on travel behaviour in the Sydney Household Travel Survey", *26th Australasian Transport Research Forum* Wellington 1-3 October, New Zealand.

Crocco, F., Eboli, L., Mazzulla, G. (2013) "Individual attitudes and shopping mode characteristics affecting the use of e-shopping and related travel", *Transport and Telecommunication,* 14, pp. 45-56.

Etminani-Ghasrodashti, R., Hamidi, S. (2020). "Online shopping as a substitute or complement to In store shopping trips in Iran?", *Cities,* 103, pp. 1-12. doi:10.1016/j.cities.2020.102

Farag, S., Schwanen, T., Dijst, M. (2005) "Empirical Investigation of Online Searching and Buying and Their Relationship to Shopping Trips", *Transportation Research Record,* 1926, pp. 242-251.

Farag, S., Schwanen, T., Dijst, M., Faber, J. (2007) "Shopping online and/or in-store? a structural equation model of the relationships between e-shopping and in store shopping", *Transportation Research Part A*, 41(2), pp. 125–141.

Forsythe, S.M., Shi, B. (2003) "Consumer patronage and risk perceptions in Internet shopping", *Journal of Business Research,* 56, pp. 867–875.

Freathy, P., Calderwood, E. (2013) "The impact of internet adoption upon the shopping behavior of island residents", *Journal of Retailing and Consumer Services,* 20, pp. 111-119.

Hoogendoorn-Lanser, S., Kalter, M.-J. O., Schaap, N. T. W. (2019) "Impact of different shopping stages on shopping-related travel behaviour: Analyses of the Netherlands Mobility Panel data", Transportation, doi:10.1007/s11116-019-09993-7

Hsiao, M.-H. (2009) "Shopping mode choice: Physical store shopping versus e-shopping", *Transportation Research Part E: Logistics and Transportation Review,* 45(1), pp. 86–95.

Huang, M.H. (2000) "Information load: its relationship to online exploratory and shopping behavior", *International Journal of Information Management,* 20, pp. 337–347.

IEIR, (2020) Indian Ecommerce Industry Report, https://www.ibef.org/industry/ecommerce-presentation.

Jiao, J., Moudon, A.V., Drewnowsk, A. (2011) "Grocery Shopping How Individuals and Built Environments Influence Choice of Travel Mode", *Transportation Research Record,* 2230, pp. 85–95.

Lachapelle, U., Jean-Germain, F. (2019) "Personal Use of the Internet and travel: Evidence from the Canadian General Social survey's 2010 time Use module", *Travel Behaviour and Society,* 14, pp. 81–91. doi:10.1016/j.tbs.2018.10.002.

Li, C.C., Wu, H.Y., Chang, Y.F. (2011) "The critical factors impact on online customer satisfaction", *Procedia Computer Science,* 3, pp. 276-281.

Liu W., Batra, R., Wang, H. (2017) "Product Touch and Consumers' Online and Offline Buying: The Role of Mental Representation", *Journal of Retailing,* 93(3), pp. 369-381.

Maat, K., Konings, R. (2018) "Accessibility or innovation? Store shopping trips versus online shopping", *Transportation Research Record,* 2672(50), pp. 1-10.

Mokhtarian, P.L., Salomon, I. (2001) "How derived is the demand for travel? Some conceptual and measurement considerations", *Transportation Research Part A: Policy and Practice,* 35(8), pp. 695–719.

Mokhtarian, P.L. (2004) "A conceptual analysis of the transportation impacts of B2C e-commerce", *Transportation,* 31, pp. 257–284.

Pettersson, F., Hiselius, W.L., Koglin, T. (2018) "E-commerce and urban planning – comparing knowledge claims in research and planning practice", *Urban, Planning and Transport Research,* 6(1), pp. 1–21.

Rohm, A.J., Swaminathan, V. (2004) "A typology of online shoppers based on shopping motivations", *Journal of Business Research,* 57, pp. 748–757.

Rotem-Mindali, O., Salomon, I. (2007) "The impacts of E-retail on the choice of shopping trips and delivery: some preliminary findings", *Transportation Research Part A,* 41, pp. 176–189.

Shen, L., He, Y., Li, L.H., Chau, K.W. (2020) "Impacts of online shopping convenience and physical retail proximity on housing prices in Shenzhen, 2016–2018", *Journal of Housing and the Built Environment,* pp. 1-20.

Shi, K., De vos, J., Yang, Y., Witlox, F. (2019) "Does shopping replaces shopping trips? Empirical evidence from Chengdu China", *Transportation Research Part A: Policy and Practice,* 122, pp. 21-33. doi:10.1016/j.tra.2019.01.027

Sim, L.L., Koi, S.Z. (2002) "Singapore's Internet shoppers and their impact on traditional shopping patterns", *Journal of Retailing and Consumer Services,* 9, pp. 115-124.

Sinai, T., Waldfogel, J. (2004) "Geography and the Internet: Is the Internet a substitute or complement for cities?", *Journal of Urban Economies,* 56, pp. 1-24.

Suel, E., Polak, J.W. (2017) "Incorporating online shopping into travel demand modelling: challenges, progress, and opportunities", *Transport Reviews,* 38(5), pp. 576–601.

Weltevreden, J.W.J. (2007) "Substitution or complementarity? How the Internet changes city centre shopping", *Journal of Retailing and Consumer Services*, 14(3), pp. 192–207.

Zhou, Y., Wang, X. (2014) "Explore the relationship between online shopping and shopping trips: An analysis with the 2009 NHTS data", *Transportation Research Part A,* 70, pp. 1-9.

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