

Measuring the Factors Associated with Shopping Mall Traffic Attraction Gleaned from Consumer Psychology in India

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Abstract

In today's customer-centric urban world, service platforms like shopping mall and transportation infrastructures are growing rapidly. It is important to improve, maintain and manage operations to achieve a consistent level of service. In this study, factors influencing traffic attraction in various classes of malls in India were measured by consumer psychology. A consumer psychology survey was conducted in 11 malls where a random sampling technique was followed. 5091 responses were collected using a self-administrated questionnaire. The latent construct factors were identified using Factor analysis followed by Structural Equation Modelling (SEM) to investigate empirically the causal relationships among the factors considered. It was found that the tendency of travel, means of travel, class of travel, and location dependence were major factors for patron traffic attraction in malls of Class A, B, C, and D respectively. The research shall help the mall to understand the factors affecting customer attraction. For urban and transportation planners, this shall be used as groundwork for improving accessibility and mobility.

Keywords: Consumer Psychology; Urbanization; Shopping mall patron; Traffic Attraction; Structural Equation Modelling; Sustainable transport

Introduction

A society's subjective well-being is determined by a number of interconnected factors. The daily life includes transportation which is influenced by the said factors (Zhang, 2017). As a result, a higher standard of life can be achieved by more efficient transportation. Urban residents in India have risen dramatically from 62 million people in 1951 to 377.11 million people in 2011, the population is anticipated to reach 900 million people by 2050 (Gangeswaran, 2016). Rapid urbanization is one of the most serious issues confronting developing countries like India. Travel supply has remained unmatched to travel demand due to rapid urbanization and increased demand for transportation services. After the work trips, shopping trips account for the second highest proportion of trips (Sasidhar, Vineeth, & Subbarao, 2016). This significant share of shopping trips not only influence individual travel behaviour but also have a significant impact on the transportation network. In India, People's living standards have greatly improved due to urbanization and a

significant share of improvement is because of shopping malls in this process. Consumers in India are drawn to shopping malls because of the entertainment factors and leads into positive effect on the frequency and time of visit in shopping malls.

Consumers prefer shopping malls because they have all of their needs met under one roof, have centralized air conditioning, a posh environment, multiplexes, an amusement park, and a food court, among other amenities. Shopping malls are one point entertainment destination for all age groups such as children, teenager, young, middle age, and senior citizen. Although, shopping malls along with shopping allows for social activities such as meeting up with friends and mingling with the crowd, as well as spending time for consumers. In the case of the general public, a visit to a shopping mall may be a cure for loneliness and /or boredom. Many visitors, particularly singles, go to shopping malls to pass the time. Shopping malls are built in areas ranging from 18600 to 37200 square meter, with various anchors and tenants. A person can easily spend three to four hours visiting a shopping mall. In Indian scenario, the shopping malls industry is flourishing, with the construction of new malls in major cities (Howard, 2009; Kuruvilla, Joshi, & Shah, 2009; Srivastava, 2008). In India (1999), started launching of shopping malls were Ansal's Plaza (Delhi), Crossroads (Mumbai) and

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Spencer Plaza (Chennai) and these shopping malls only existed up to 2002. The shopping mall lifestyle has been readily accepted by metropolitan cities like Delhi, Mumbai, Hyderabad, Bangalore, Pune, Kolkata and Chennai. From the year 2007 to 2008, the growth rate of the mall was tremendous overall in the country. At present, more than 600 malls are functioning across the country and the research reveals that as many as 35 new malls would be coming up by the end of year 2022 (Published by Statista Research Department, Feb 23, 2022).

For the Indian mass affluent, the call of the mall is showing desirable and development of mall is expected in 60 metro and mini-metro cities by the end of this decade. This development generates enough traffic leading to congestion and force the community to spend more resources into the transportation network. The improper planning of road networks and incorrect prediction of trip generation for future demand leads to traffic congestion in urban area. In order to plan effectively, the traffic impact of the developments must be analysed. Traffic Impact Analysis (TIA) is a study which assesses the sufficiency of the present or upcoming transportation infrastructure to accommodate sufficient additional trips generated by a new development and redevelopment. As evident from the past researches, shopping mall traffic attraction factors were summarized in Table 1. A very few of them have studied the underlying structure of exploratory factor. It reveals that to perform TIA, the several factors associated with shopping mall traffic attraction is essential to measure for an improved transportation infrastructure. This is a micro level research, especially in other major cities. This would undoubtedly assist policymakers in better understanding and handling the problems. This would allow them to develop rules and guidelines to tackle critical issues with the ultimate goal of benefiting society as a whole. However, being a critical problem to address for a better Level of Service (LoS), not much work has been done in India to understand the factors associated with shopping mall traffic attraction for an improved transportation infrastructure. Hence, shopping mall traffic attraction in Indian context is a central concept in this study and taking a cue from literature this study tries to address the objectives are

1. To identify and measure the various factors associated with shopping mall traffic attraction gleaned from consumer psychology.
2. To identify the underlying factor structure of the constructs and understand the casual relationship between the constructs using the SEM approach.

3. To recommend/suggest the measuring factors to perform traffic impact analysis of a shopping mall development for an improved transportation infrastructure and mobility.

Formulation of Hypotheses

Based on the literature review, it is understood that the shopping mall's traffic attraction prediction is new interventions to improve the Quality of Life (QoL) like the level of service of the adjacent corridors of the shopping malls, channelization of the building permits is scanty studied. Deriving ideas from papers on shopping malls traffic attraction, the following hypotheses were formulated in this study.

- H_0 – The null hypothesis was that there is no relationship (linear) between the identified latent variables.
- H_n – The latent factors (n) have a direct and significant impact on shopping malls traffic attraction.

The alternative hypothesis proposed was checked empirically. An Exploratory Factor Analysis (EFA) was conducted first to arrive factors from the items followed by a Confirmatory Factor Analysis (CFA) to check the factor structures. Next, Structural Equation Modelling (SEM) was performed to examine the proposed hypotheses.

Study Location and Sample

The development of shopping mall traffic attraction analysis is still at the initial stage in India; thus, the users who are understand this new analysis and adopt it are limited. Chennai is the capital of Tamil Nadu, an Indian state, and a rapidly growing metropolitan area. It is India's sixth most populated city as well as fourth most populous urban agglomeration, according to the census of India. Therefore, Chennai is South India's most important shopping destination, with its suburbs supplying luxury retail districts. The first shopping mall in India is the Spencer Plaza in Chennai. Apart from this, there are many shopping malls in Chennai. Chennai has a host of malls due to its urbanization status. The growth of the city is more pronounced along with shopping mall development. It is the highest order of land use activity that attracts trips by public and private modes. In this context, the study area selected was Chennai and location of malls depicted in Figure 1.

In Chennai there are more shopping malls in the city of which eleven shopping malls are considered to have attracted a greater number of

people. In Table 2, described the list of classified shopping malls. The pattern of attraction usually differs according to the types of shopping malls. Shopping mall classification is important because it is generally used for urban (land-use) development and transportation planning (Prinsloo, 2010). Shopping malls were classified into four clusters according to the Gross Leasable Area (GLA) and the facilities which acts as the predominant attraction characteristics of the mall (Jonker & Venter, 2019). The focal point of the mall attraction is considered as Multiplex Cinema theatres, Restaurant or Food Court, and Amusement Park or Game Zone. These eleven shopping malls are categorized and taken for study to make analysis easier and applicable for almost all shopping malls in the city which will emerge in the future to estimate the customers / trips attracted towards the shopping malls.

A test, pilot in nature, was conducted to assure that the respondents were able to go through the questionnaire without any ambiguity and to complete it proper manner. The study was tested for an appropriate wording to check the meaningfulness to the respondents, or whether the appropriate questions were asked or not (Sekaran, 2003). After the pilot test, a face-to-face questionnaire survey was conducted to identify the socio-demographic and travel characteristics of customers to visit shopping malls and measure the traffic attraction of the shopping malls. A well-structured self-administrated questionnaire was prepared with six questions to measure socio-demographic characteristics, and seventeen questions on travel characteristics depicted in Table 3. These characteristics were measured using a multiple-choice question by surveyors from the entrance and exit of each shopping mall classes namely A, B, C, and D. The survey was conducted three days, one is on weekend (Friday) and other is on Saturday, and Sunday for a span of the shopping malls working time (10:00 AM – 09:00 PM). About 5091 complete samples were obtained based on random sampling from customers aged 18 years and above (Aliaghaa et al., 2015; Dellaert, Arentze, & Timmermans, 2008; Idoko, Ukenna, & Obeta, 2019; Iroham et al., 2020). With an interval of 95% confidence and a 5% error margin of error of 5, the minimum sample size required to represent the population is 4235 (385×11). The participation was voluntary, and no rewards were given. The questions were read aloud in their convenient language and the responses were taken only after ensuring that they understood the questions well.

Results of The Data Analysis

Respondents from shopping malls: Socio-Demographic Profile

The demographic characteristics of the shopping mall attractors were briefly presents in the Table 4, like gender, age, marital status, occupational, and monthly income. Out of the 1688 respondents from class A shopping malls, 60.8% were male, 39.1% were female, and 0.1% were transgender. From Table 4, it can be noted that most of the respondents are from the age group 26-35 years. On further examination, it was found that in this age group out of 51.3%, 33% were male and 18.3% were female; followed by 29.7% in 18-25 years age group, out of which 16.8% male and 12.9% female, 11.6% in 36-45 years age group, out of which 7.4% male and 4.2% female, and 6.1% in 46-60 years age group out of which 2.7% male and 3.4% female. Respondents of the age group >60 years were 1.3%. About 62.7% of the respondents were unmarried (single / bachelor), 37.2% were married, and 0.1% were other (divorcee / widowed). The young adults (26-35 years) were observed to be more attracted towards the shopping malls due to facilities, services provided and activities carried out in the shopping malls.

In terms of the occupation level of the respondents varied widely; 37.1% of visitors were students, 21.3% private job, 14% self-employees, 10.4% IT workers, 9.5% teachers / professors, 5.7% government employees, and 2.0% others including unemployed, retired personal and serviceman. The details of monthly income were also collected from the respondents. 28.1% of the respondents' monthly income was ranging between 10,000-25,000 INR; followed by 25.4% in 25,000-50,000 INR, 24.6% in less than 10,000 INR, 8.2% in 50,000-1,00,000 INR, and 2.8% in >1,00,000 INR. Nearly 11% of the respondents did not respond to this question is called other.

Out of the 805 respondents from class B shopping malls, 59.9% were male, and 40.1% were female. From Table 4, it can be noted that most of the respondents are from the age group 18-25 years. On further examination, it was found that in this age group out of 47.1%, 26.1% were male and 21% were female; followed by 36.4% in 26-35 years age group, out of which 22.7% male and 13.7% female, 11.8% in 36-45 years age group, out of which 7.8% male and 4% female, and 4.3% in 46-60 years age group out of which 3% male and 1.3% female. Respondents of the age group >60 years were 0.4%. About 61.2% of the respondents were unmarried (single / bachelor), 38.6% were married, and 0.2% were other (divorcee / widowed). The

youths (18-25 years) were observed to be more attracted towards the shopping malls due to facilities, services provided and activities carried out in the shopping malls.

In terms of the occupation level of the respondents varied widely; 37% of visitors were students, 17.5% IT workers, 16.1% private job, 12.1% self-employees, 9.3% government employees, 5.5% teachers/professors, and 2.5% others including unemployed, retired personal and serviceman. The details of monthly income were also collected from the respondents. 32.9% of the respondents' monthly income was less than 10,000 INR; followed by 28.2% in 25,000-50,000 INR, 14.6% in 10,000-25,000 INR, 15% in 50,000-1,00,000 INR, and 3.7% in >1,00,000 INR. Nearly 6% of the respondents did not respond to this question is called other.

Out of the 1380 respondents from class C shopping malls, 66.4% were male, and 33.6% were female. From Table 4, it can be noted that most of the respondents are from the age group 18-25 years. On further examination, it was found that in this age group out of 50.8%, 32.7% were male and 18.1% were female; followed by 34.9% in 26-35 years age group, out of which 24.2% male and 10.7% female, 11.6% in 36-45 years age group, out of which 7.3% male and 4.3% female, and 1.8% in 46-60 years age group out of which 1.6% male and 0.2% female. Respondents of the age group >60 years were 0.9%. About 63.8% of the respondents were unmarried (single / bachelor), 35.4% were married, and 0.8% were other (divorcee / widowed). The youths (18-25 years) were observed to be more attracted towards the shopping malls due to facilities, services provided and activities carried out in the shopping malls.

In terms of the occupation level of the respondents varied widely; 37.5% of visitors were students, 15.5% IT workers, 15% self-employees, 14.9% private job, 9.7% government employees, 5.2% teachers/professors, and 2.2% others including unemployed, retired personal and serviceman. The details of monthly income were also collected from the respondents. 34% of the respondents' monthly income was ranging between 25,000-50,000 INR; followed by 26.4% in less than 10,000 INR, 22% in 10,000-25,000 INR, 9.9% in 50,000-1,00,000 INR, 3.6% in >1,00,000 INR, and 4.1% of the respondents did not respond to this question is called other.

Out of the 1218 respondents from class D shopping malls, 70% were male, and 30% were female. From Table 4, it can be noted that most of the respondents are from the age group 18-25

years. On further examination, it was found that in this age group out of 45.5%, 33.8% were male and 11.7% were female; followed by 40.4% in 26-35 years age group, out of which 27% male and 13.4% female, 12.7% in 36-45 years age group, out of which 8.1% male and 4.6% female, and 1.4% in 46-60 years age group out of which 1.1% male and 0.3% female. About 52.5% of the respondents were unmarried (single / bachelor), 47% were married, and 0.5% were other (divorcee / widowed). The youths were observed to be more attracted towards the shopping malls due to facilities, services provided and activities carried out in the shopping malls.

In terms of the occupation level of the respondents varied widely; 42% of visitors were private job, 19.3% students, 11.1% teachers/professors, 9.5% self-employees, 9% government employees, 8.1% IT workers, and 1% others including unemployed, retired personal and serviceman. The details of monthly income were also collected from the respondents. 50.7% of the respondents' monthly income was ranging between 25,000-50,000 INR; followed by 21.1% in less than 10,000 INR, 18.9% in 10,000-25,000 INR, 5.7% in 50,000-1,00,000 INR, 0.6% in >1,00,000 INR, and 3% of the respondents did not respond to this question is called other.

Measures of Association Between Socio-Demographic Variables

A two-way contingency table analysis was done to check the relation between the different socio-demographic characteristics considered for the study. Pearson's Chi-Square and Fisher's Exact Test were performed. Pearson's Chi-Square Test helps identify the underlying association between the variables considered (under the 'association between') column in Table 5. This test checks whether two variables are independent based on the significance value obtained. A value less than 0.05 indicates that the variables are not independent and therefore, the hypothesis that the variables were independent can be rejected and the hypothesis that they were related can be accepted (Field, 2009). The Chi-Square Test of independence shows an exception of the assumption that all cells should have a predicted count more than or equal to 5. This indicates inadequate sample size, leading to maximization of risk in making wrong decisions (Kroonenberg & Verbeek, 2018). Therefore, when the expected count was less than 5, Fisher's Exact Test was done. These tests were performed using IBM SPSS. Table 5 represents the test statistic values for Chi-Square and Fisher's Exact Tests for categorized shopping malls.

The expected counts had more than 5 between the associations of Gender with Age, Occupation, Income of class A, B, C, and D shopping malls and Occupation and Income of class A and C malls. Similarly, the association between Gender and Accompanying person of class A mall and Gender and Marital status of class C mall as well. Thus, only Chi-Square Test was performed for those variables. The results showed a strong ($p < 0.01$) association between all the variables considered in this study, except the relationships between Gender with Age of class C and D malls and, accompanying person of class C mall. Gender and Age of C and D malls, as well as Gender and Accompanying Person of C mall ($p < 0.05$), had a good association.

Exploratory Factor Analysis (EFA)

An EFA was conducted to decrease the number of variables in shopping malls traffic attraction constructs. The questionnaire items were checked for their significance based on communality values to decide on including / excluding an item and eigen values for factor inclusion. Communality and eigen values are more than 0.4 (Tabachnick, Fidell, & Ullman, 2013) and 1 (Kaiser, 1960) respectively, were used for benchmarking to arrive at the latent variables. Values below 0.4 were excluded from further analysis. Maximum Likelihood (ML) extraction method and varimax with kaiser normalization rotation method were used for factor extraction. The Bartlett's test for sphericity values for all the factors were found to be less than 0.01. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were found to be significant. The consistency within the factors were measured using Cronbach alpha test. Values greater than 0.7 were deemed to be significant (Lance, Butts, & Michels, 2006). Table 6 gives an overview of classified shopping malls traffic attraction factors identified with their corresponding item in the questionnaire, standardized factor loadings, KMO values, eigen values, variance explained and reliability coefficient. Based on the factors obtained from EFA results, hypotheses were studied and checked for their validity.

The analysis results revealed four factors under class-A shopping mall traffic attraction – *Tendency of Travel, Attractive Environments, Time Reliance, and Personal Requirements*, four factors under class-B mall traffic attraction – *Location Dependence, Personalized Preferences, Means of Travel, and Attractive Environments*, four factors under class C-mall traffic attraction – *Tendency of Travel, Motive of Visit, Duration of Visit, and Location Dependence*, Four factors under class-D

mall traffic attraction – *Tendency of Travel, Personal Preferences, Time Reliance, and Location Dependence* were identified. The item called rate of parking charges in class-A, accompany person from class-C, time of the day visit from class-D was dropped out from further analysis due to low communality value and remaining items were clustered under four different factors. The Cronbach alpha test was then performed to measure the internal consistency/reliability within the factors. The reliability coefficient for all the factors was greater than 0.7 (Lance et al., 2006) except 'Personal Requirements' in class-A and 'Personalized Preferences' in class-B', which was slightly less, but negligible (Emrich & Urfer, 2004).

Confirmatory Factor Analysis (CFA) and Reliability

A multivariate normality test was performed to check normality assumption. The result ($p > 0.5$) supported this assumption. An CFA was conducted to confirm the proposed linear relationship (Kim, 2003; Yoon & Uysal, 2005). It is seen from EFA results that the first-order factors were reflective of the second-order factors that they represented, that is shopping mall traffic attraction. Therefore, a two-stage CFA was performed using R 4.1.2 mathematical programming language for statistical computing and graphics. In the first stage, four factors identified from EFA results were allowed to intercorrelate and the measurement item reliability was measured. At 95% confidence interval, all the measurement items were found to be significant. The Squared Multiple Correlation (SMC) coefficient for all the items were obtained in the range of 0.373 to 0.842, this indicating medium to strong reliability of all the items considered. The obtained covariance between the factors within the proposed second-order constructs of class A, B, C, and D shopping mall is also depicted in Table 7. Tables 7 and 8 show that the standardized loadings are higher than 0.6 is considered significant; however, a few research (Chen & Tsai, 2007; Ertz, Karakas, & Sarigöllü, 2016) have accepted values greater than 0.3, based on the relevance of those components in the context of the investigation.

In the second stage, the four factors obtained in each class of shopping malls were assumed to have a linear relationship with their corresponding second-order factors (mall traffic attraction). Prior to examining using SEM, the confirmatory measurement model should be assessed to check for its validity (Anderson & Gerbing, 1988; Byrne, 2010). Therefore, each attraction attribute was analysed separately before performing SEM to check whether the factors within a construct

measure the same construct. The measurement model's convergent validity was checked by assessing the item reliability (*t*-value), Average Variance Extracted (AVE) and construct reliability. These outputs of class A, B, C, and D shopping malls are presented in Table 8. The AVE values range from 0.4 to 0.7 indicated moderate consistency in variation (Hair et al., 2010). The construct reliability values were greater than recommended value of 0.7 for all factors, indicating good internal consistency and thus reliability for all items (Bagozzi & Yi, 2012; Loewenthal & Lewis, 2020). Overall, the measurement indices of each factor of classified shopping malls were within acceptable bounds. Furthermore, all first-order factors loaded positively on their corresponding second-order factors.

Structural Equation Modelling (SEM)

A covariance-based SEM model was used as the data follows normal distribution and minimum sample size criterion is met (Astrachan, Patel, & Wanzanried, 2014). Shopping mall Class A, B, C, and D path loadings are presented in Figure 2, 3, 4, and 5 respectively indicates the strength of the direct relationship between the constructs of the shopping mall class A, B, C, and D respectively. The loadings indicate good level of association between the constructs. There are, three types of key model fit indices were assessed (i) Absolute fit measures – to assess how well the model fits the sample data. This includes the ratio between Chi-square and degree of freedom (CMIN/df), Root Mean Square Error Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR), (ii) Incremental fit measures – to assess the proportionate fit of the hypothesized model with a baseline model. This includes Normal Fit Index (NFI), (iii) Parsimonious fit measures – to assess whether the model fit is achieved by an overfitting data. This includes Parsimonious Normal Fit Index (PNFI), Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI). The key model fit indices and their recommended values are reported in Table 9. All fit indices values were found to be within the permissible range for all class of shopping mall traffic attraction model. Therefore, the proposed hypothetical shopping mall traffic attraction model has a good fit.

Hypothesis Test

The hypothesized casual model was then tested by SEM to examine the casual relationship among the latent constructs. Finally, Figures 2, 3, 4, and 5 show that the formulated hypotheses have a direct and positive association with traffic attraction in

shopping mall classes A, B, C, and D, respectively. These were confirmed based on the standardized estimates and *t*-values obtained at a significance level of 0.05. The obtained outputs of shopping mall class A, B, C, and D are summarized in Table 10 respectively, identical to the covariance-based SEM estimation. Therefore, all hypotheses were accepted and the paths denote the possible direction of the relationships.

Discussion and Conclusion

The study intended to identify the traffic attraction factors for the different classes of Indian shopping malls for an improved transportation infrastructure and mobility using consumer psychology survey. It can be concluded that shopping mall traffic attraction has a causal relationship with mall patron socio-demographic and transportation characteristics. The hypothetical model conceptualized based on literature is proven to be acceptable from the tenable evidence arrived from the Structural Equation Model. This gives a valuable insight to the urban and transport planners that the quality of life can be improved by providing such improved transportation network in the city where citizens can travel their own choice. It helps build community feels, and citizens take pride in living in such cities.

Shopping mall: Class A

This class of shopping mall consist total 4 statements. Out of these, highest factor load (HFL) was 0.888 for 'Tendency of travel' and the lowest (LFL) was 0.577 for 'Attractive environment'. The tendency of travel describes (i) mall patrons parking preference, (ii) mode of travel, (iii) accompanying persons, and (iv) time of the day amongst this 'mode of travel' is dominant attraction factor carries 0.771 loadings. The Cronbach's (construct reliability) 'α' value for all four statements was greater than 0.711. This confirms the high internal consistency of factors. A covariance test reveals a significant interdependence of 0.846 between tendency of travel and attractive environments. For class 'A' malls, mode of travel is the most important determinant of traffic attraction. This includes owning of personalized vehicles such as two-wheeler and car, accessibility of mall by public transportation like bus, sub-urban train, and metro rail, availability of private car (cab) including OLA, UBER and FASTRACK and also paratransit i.e., autorickshaw, followed by the distance from the drop off point / nearby residence to the mall by walking or cycling.

Shopping mall: Class B

This class of shopping mall also consist 4 statements. Out of these, HFL was 0.852 for 'Means of travel' and the LFL was 0.628 for 'Personalized preference'. The means of travel states that mall patrons (i) travel time, (ii) origin zone, and (iii) accompanying persons. Among these, 'origin zone' is dominant attraction factor carries 0.791 loadings. The Cronbach's (construct reliability) ' α ' value for all four statements was greater than 0.742. This confirms the high internal consistency of factors. A covariance test reveals that there is an interdependence between means of travel and personalized preference and the value of 0.862 shows that the interdependence is very high. For class 'B' malls, customers zone of origin is the most vital factor to measure the traffic attraction. Customer zone of origin represents that attraction is not only from neighboring residence, instead it is based on (i) distance of the mall, (ii) journey time, (iii) availability of modes, and (iv) socio-demographics characteristics. The study also reveals that there was significant attraction from adjacent district. Hence this was also required to be considered while predicting the shopping mall traffic attraction.

Shopping mall: Class C

This class of shopping mall consist same number of statements as of previous classes. Out of these, HFL was 0.813 for 'Motive of visit' and the LFL was 0.626 for 'Location dependence'. The motive of visit describes mall patrons (i) spending time, (ii) origin zone, and (iii) category of visit. Amongst this 'category of visit' is dominant attraction factor and carries 0.705 loadings. The Cronbach's (construct reliability) ' α ' value for all four statements was greater than 0.703. This confirms the high internal consistency of factors. A covariance test reveals an extraordinary interdependence of 0.871 between tendency of travel and location dependence. There are three types of trips named as primary, pass-by and diverted trips. From the study, it was found that in Indian Scenario, the major section of mall patrons attracted is due to the primary trips. A very few sections of mall patrons were because of pass-by and diverted trips. This type of distribution is observed because Indian malls provide a number of facilities that attract the patrons. Multiplexes, relaxation and window shopping are the major activities involving the visitors. Further these facilities provided by the malls involves the patrons for at least a duration of three to four hours. Since the time spent in malls is high, the pass by and the diverted traffics cannot use these facilities of mall properly. Hence, for class 'C' malls, the primary trips are recommended to be considered for measuring the traffic attraction to the mall.

Shopping mall: Class D

This class of shopping mall also has 4 statements. Out of these, HFL was 0.914 for 'Location dependence' and LFL was 0.654 for 'Personalized preference'. The location dependence states that mall patrons (i) trip chaining, (ii) rate of parking charges, and (iii) purpose of visit. Amongst these 'rate of parking charges' is dominant attraction factor carries 0.791 loading. The Cronbach's (construct reliability) ' α ' value for all four statements was greater than 0.726 confirms the high internal consistency of factors. A covariance test reveals a strong interdependence of 0.854 between location dependence and personal preferences. For the class 'D' malls, the most important traffic attracting factor is the rate of parking charges. For Indian Scenario, the patron feels that the payment for parking of vehicle is an unnecessary expense. The patron always has an option to park the vehicle at some other location. As there is a cheaper parking option available outside the mall. Further, if the cost of parking is competitive to the private local parking, this shall give a boost for use of mall parking and shall attract a greater number of patrons. Hence, while calculating the class 'D' malls, the rate of parking charges is very important factor.

Overall, the socio-demographic results showed that all four classes of shopping malls primarily attract 'male' customers. The class 'A' malls attract people aged '26 to 35', while the remaining three malls attract people aged '18 to 25'. All class of malls attract 'bachelors / single'. Class A, B, and C mainly attract 'students', while Class 'D' largely attracts customers with 'private job'. Class 'B' malls attract customers with monthly incomes of 'less than 10000 INR', Class 'A' malls attract customers with monthly incomes ranging from '10000 to 25000 INR', and Class 'C' and 'D' malls attract incomes ranging from '25000 to 50000 INR'.

In today's customer-centric world, to any kind of service platform such as shopping malls and transportation infrastructure, the issues of how to improve, maintain, and manage an efficient operation in order to maintain a consistent level of service for current and future customers. There have been few attempts, particularly in India, to understand or measures the factors associated with shopping mall traffic attraction for improved transportation infrastructure. The primary objective of this study was to investigate the factors that influence traffic attraction in various classes of shopping malls using consumer psychology. Multiple factors related to socio-demographic and travel characteristics of mall patrons can influence

shopping mall traffic attraction. In addition, not all of the mall's attractions were influenced by all of the factors. The factors differed depending on the mall classes. With the achieved findings, will help shopping mall managers better understand the characteristics that attract customers. The findings can also be used by mall managers to improvise overall performance of the mall and by developers to understand and analyze the site location and designs for the malls. For urban and transportation planners, this ground work study could be used for improving accessibility and mitigating the negative effects of transportation infrastructure through appropriate predictions. As a result, this study provides insightful information to shopping mall developers and urban policy makers. Concurrently, with the obtained key statement, this study hopes to provide future researchers, academicians in relevant fields with helpful references of research factors to measure the shopping mall traffic attraction in India for a sustainable transportation infrastructure.

Data Availability Statement

Some or all data, models, or code that support the findings of this study are available from the corresponding author upon reasonable request.

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Competing of interest is none

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Table 1. Summary of literature review

| Author/Year | Country | Attraction Factors | Inferences |
|---|-----------------------------|---|--|
| Mok Kim Man and Cai Qian Qiu (2021) | Malaysia | - Environmental factors - Services related factors - Administrative related factors - Transportation and location related factors | Consumers frequency and duration of visit is majorly affected by the transportation, environment and location-related factors. |
| Ying and Aun (2019) | Malaysia | - Tenant mix - Access convenience - Ambience | These three factors were proved as the highest degree of influence to attract shopping mall customers. |
| Ramadhania and Aprianingsihb (2017) | Indonesia | - Product - Place - Process - Physical Evidence | These factors are considered as major strengths to attract the shopping mall customers. |
| Wong and Nair (2018) | Malaysia | - Design and convenience - Child friendliness - Parking facilities - Tenant/Service offering - Ladies/Elderly safety convenience - Mall marketing activities | Among six attraction factors parking facilities and child friendliness were major factors in making shopping mall most attractive. |
| Brengman, Willems, and Joye (2012), Grimmer, Kilburn, and Miles (2016) and Sadeghi and Bijandi (2011) | Belgium; Australia; Iran | - Shopping mall environmental factors like building structure, atmosphere, sounds and music, fragrance and smell. | These environmental factors have encouraged customers to visit shopping malls on a regular basis. |
| Sebastian and Purwanegara (2014) | Indonesia | - Shopping mall location - Mall shopping behaviour | Customers preferring to visit the shopping mall depends on the location of mall. |
| Saber et al. (2017) and Shukor et al. (2015) | Malaysia | - Transportation and location factors such as accessibility, parking, and location. | These factors have a significant impact on customer attraction to the shopping mall. |
| Brunner and Mason (1968) | USA | - Driving time required to reach the shopping center | Driving time is highly influential in determining shopping mall patrons' attraction and most significant driving time was 15 minutes, as 3/4 th of each mall patrons resided within this range. |
| Feinberg, Meoli, and Rummel (1989) and Lotz, USA Eastlick, and Shim (2000) | USA | - Social stimulation provided by the shopping mall | There are different motivations for shopping mall visitors: entertainment activities and shopping purpose. |
| Andreu et al. (2006), Babin and Attaway (2000), Grewal et al. (2003), Keng et al. (2007) and Michon, Chebat, and Turley (2005) | UK; USA; Canada | - Shopping mall atmosphere | The shopping mall atmosphere is an important factor to determine the mall patronage. |
| Roy (1994) | USA | - Functional and recreational shopping motivation - Age, Income and Family size | This attraction factors significantly influence shopping frequency on mall. |
| Severin, Louviere, and Finn (2001) and Yilmaz (2004) | Australia; Turkey | - Shopping mall location | The most important factor influencing consumer choice of shopping mall is its convenient location. |

| Author/Year | Country | Attraction Factors | Inferences |
|---|-------------------------------|--|--|
| White (2008) | Canada | - Shopping mall mix environment (fun and social) | Customers lifestyles have changed and continue to attract consumers, goods alone not enough. |
| ICSC (1997) and ICSC (1999) | USA | - Multiplex in shopping mall | Movie theatres attracted 52 – 60% potential shoppers who would not have visited the mall otherwise. Moviegoers are younger than general shopper traffic. |
| Léo and Philippe (2002), Warnaby and Medway (2004), Chebat, Sirgy, and Grzeskowiak (2010) and Gudonavičienė and Alijošienė (2013) | France; UK; Canada; Lithuania | - Distance to the mall - Shopping mall image (retail mix, infrastructure and atmosphere) | The image of a shopping mall is a holistic entity. It is possible to manage it so that it becomes a shopping destination for its potential customers. |
| Majumdar (2005) and Anselmsson (2006) | India; Sweden | - Shopping mall accessibility - Shopping mall ambience | Sound strategies to maintain a of patronage to a satisfactory level were Accessibility and ambience. |
| Cathy et al. (2020) and Mehta (2006) | UK; India | - Parking facility - Eating joints - Apparel section - Jewellery, music and book section - Reasonable prices - Decoration and beauty salons | In a mall, people don't just buy a product; they buy an experience and for this factors mall that would entice customers. Free parking for regular customers makes them attract most frequently. |
| Kuruvilla et al. (2009) | India | - Gender | Reported that, on average, men and women spend two to four hours at malls. Specifically spending time and frequent of visit is high for men. |

Table 2. List of classified shopping malls selected for the study

| Class | Range of Gross Leasable Area (Sq.m) | Name of the shopping mall | Year | Location | Gross Leasable Area (Sq.m) | Multiplex | Restaurant / Food Court | Amusement Park / Game Zone |
|-------|-------------------------------------|---------------------------|------|-----------------|----------------------------|-----------|-------------------------|----------------------------|
| A | 80000>Area<10000 | Phoenix Marketcity | 2013 | Velachery | 93000 | Yes | Yes | Yes |
| | | VR Chennai | 2018 | Anna Nagar, IRR | 93000 | Yes | Yes | Yes |
| | | Express Avenue | 2010 | Royapettah | 84000 | Yes | Yes | Yes |
| B | 40000>Area<60000 | The Forum Vijaya | 2013 | Vadapalani | 60000 | Yes | Yes | Yes |
| | | The Marina Mall | 2019 | Egatoor, OMR | 50000 | Yes | Yes | Yes |
| | | Grand Square | 2013 | Velachery | 33000 | Yes | Yes | Yes |
| C | 20000>Area<40000 | Ampa Skywalk | 2009 | Amanjikarai | 29300 | Yes | Yes | Yes |
| | | Vivira Mall | 2011 | Navalur, OMR | 28000 | Yes | Yes | Yes |
| | | Spectrum Mall | 2011 | Perambur | 15000 | Yes | Yes | Yes |
| D | Area<20000 | Chennai Citi Centre | 2006 | Mylapore | 14000 | Yes | Yes | Yes |
| | | Chandra Mall | 2011 | Virugambakkam | 13500 | Yes | Yes | Yes |

Table 3. Structured Consumer Psychology Questionnaire Table

| | |
|--|--|
| Name of the Consumer: _____ | |
| Gender <ul style="list-style-type: none"> • Male • Female • Transgender | Marital Status <ul style="list-style-type: none"> • Single • Married • Other |
| Age group <ul style="list-style-type: none"> • 18-25 • 26-35 • 36-45 • 46-60 • >60 | Education Qualification <ul style="list-style-type: none"> • SSLC (10th Grade) • PUC (12th Grade) • Graduate • PG & above • Other |
| Occupation: <ul style="list-style-type: none"> • Student (School /College) • Self Employed • Government employed • Private job • Other: (Unemployed, Retired) | Income per Month (approx.) <ul style="list-style-type: none"> • Less than INR 10,000 • INR 10,000 – INR 25,000 • INR 25,000 – INR50,000 • INR 50,000 – INR 1,00,000 • More than INR 1,00,000 |
| Approximate travel time towards the mall <ul style="list-style-type: none"> • Less than 30 minutes • 30 min – 1 Hour • 1 – 3 Hours • More than 3 Hours | With whom would you like to go to the mall? <ul style="list-style-type: none"> • Family (Cousins / Spouse / Children's) • Friends • Colleagues |
| How long should you spend at the mall? <ul style="list-style-type: none"> • Less than 30 minutes • 30 minutes to 1 hour • 1 hour to 2 hours • 2 hours to 3 hours • 3 hours to 4 hours • More than 4 hours | Which day of the week would you like to visit the mall <ul style="list-style-type: none"> • Sunday • Saturday • Friday • Thursday • Wednesday • Tuesday • Monday |
| Which time of the day would you like to visit the mall <ul style="list-style-type: none"> • Before Noon • Afternoon • Evening | How often you visit the mall? <ul style="list-style-type: none"> • Once a week • Once a month • Rarely |

Name of the Consumer: _____**In which of these below categories you visit the mall most often?**

- Primary trip - travel intended to visit the mall
- Pass-by-trip - the mall visited on the way from an origin to a primary destination.
- Diverted trip – the mall attracted from other roadways within the vicinity, but the diversion required access to reach the destination.

Mode of Travel used to visit the mall

- Public Bus
- Sub-Urban Train
- Metro Rail
- Car (Passenger and Driver)
- Cab (OLA/UBER /FAST TRACK)
- Auto Rickshaw
- Two-Wheeler
- Bicycle
- Walk

Purpose of Visit the Mall

- Window Shopping
- Festive Shopping only
- Discount Sale Shopping
- Relaxation
- Textile (Buying Branded Clothes)
- Multiplex / Movie Theatre
- Food Court and Restaurant
- Game Zone to play games or accompany your kid
- Electronic Appliances
- Accessories
- Gym workout or Health Beneficiaries / Parlor SPA
- Social Activities
- Music launches
- Live shows
- Get-to-gather

Would you prefer to park your vehicle?

- Inside the mall parking area (Per Hour Charge)
- Outside the mall - Private Parking area (Per Hour Charge)
- Outside the mall – Unauthorized parking
- Did not travel by own vehicle

Trip Chaining – Would like to visits more than one shopping mall during one trip of shopping?

- No
- Yes, and I will visit minimum 2 malls
- Yes, and I will visit more than 2 malls

Place of Residence**How would you rate the parking charges of the aforesaid mall?**

- 5 (Very high)
- 4 (High)
- 3 (Moderate)
- 2 (Low)
- 1 (Very Low)

Table 4. Socio-demographic profile of the respondents

| Characteristics | Class-A Mall | Class-B Mall | Class-C Mall | Class-D Mall |
|------------------------------|---|--|---|---|
| | Percentage (%) (Out of 1688 samples) | Percentage (%) (Out of 805 samples) | Percentage (%) (Out of 1380 samples) | Percentage (%) (Out of 1218 samples) |
| Gender | | | | |
| Male | 60.8 | 59.9 | 66.4 | 70.0 |
| Female | 39.1 | 40.1 | 33.6 | 30.0 |
| Transgender | 0.1 | 0 | 0 | 0 |
| Age (years) | | | | |
| 18-25 | 29.7 | 47.1 | 50.8 | 45.5 |
| 26-35 | 51.3 | 36.4 | 34.9 | 40.4 |
| 36-45 | 11.6 | 11.8 | 11.6 | 12.7 |
| 46-60 | 6.1 | 4.3 | 1.8 | 1.4 |
| >60 | 1.3 | 0.4 | 0.9 | 0 |
| Marital Status | | | | |
| Single | 62.7 | 61.2 | 63.8 | 52.5 |
| Married | 37.2 | 38.6 | 35.4 | 47.0 |
| Other | 0.1 | 0.2 | 0.8 | 0.5 |
| Occupation | | | | |
| Students (School/College) | 37.1 | 37.0 | 37.5 | 19.3 |
| Self Employed | 14.0 | 12.1 | 15.0 | 9.5 |
| IT Worker | 10.4 | 17.5 | 15.5 | 8.1 |
| Government Employed | 5.7 | 9.3 | 9.7 | 9.0 |
| Private Job | 21.3 | 16.1 | 14.9 | 42.0 |
| Teacher / Professor | 9.5 | 5.5 | 5.2 | 11.1 |
| Other (Unemployed / Retired) | 2.0 | 2.5 | 2.2 | 1.0 |
| Monthly Income (INR) | | | | |
| <10,000 | 24.6 | 32.9 | 26.4 | 21.1 |
| 10,000-25,000 | 28.1 | 14.6 | 22.0 | 18.9 |
| 25,000-50,000 | 25.4 | 28.2 | 34.0 | 50.7 |
| 50,000-1,00,000 | 8.2 | 15.0 | 9.9 | 5.7 |
| >1,00,000 | 2.8 | 3.7 | 3.6 | 0.6 |
| Other | 10.9 | 5.6 | 4.1 | 3.0 |

Table 5. Results for measures of association

| Association Between | Tests | | | | | | | | df | | | |
|------------------------------------|----------------------|---------|-----------|----------|----------------|----------|-----------|----------|----|----|----|----|
| | Pearson's Chi-Square | | | | Fisher's Exact | | | | A | B | C | D |
| | A | B | C | D | A | B | C | D | | | | |
| Gender and Age | 27.367* | 26.759* | 9.548** | 10.447** | - | - | - | - | 4 | 4 | 4 | 4 |
| Gender and Marital | - | - | 24.337* | - | 25.497* | 25.964* | - | 16.803* | 2 | 2 | 2 | 2 |
| Gender and Occupation | 141.053* | 77.054* | 63.966* | 54.190* | - | - | - | - | 6 | 6 | 6 | 6 |
| Gender and Income | 62.841* | 44.097* | 26.161* | 89.552* | - | - | - | - | 5 | 5 | 5 | 5 |
| Gender and Accompanying person | - | - | - | 43.140* | 43.763* | 43.260* | 49.517** | - | 3 | 3 | 3 | 3 |
| Age and Marital | - | - | - | - | 625.757* | 513.911* | 687.427* | 586.008* | 8 | 8 | 8 | 8 |
| Age and Occupation | - | - | - | - | 1094.170* | 513.518* | 1019.173* | 697.244* | 24 | 24 | 24 | 24 |
| Age and Income | 742.313* | - | - | - | - | 330.363* | 481.651* | 259.253* | 20 | 20 | 20 | 20 |
| Age and Accompanying person | - | - | - | - | 248.052* | 147.506* | 278.089* | 257.706* | 12 | 12 | 12 | 12 |
| Marital and Occupation | - | - | - | - | 512.122* | 344.655* | 653.202* | 330.499* | 12 | 12 | 12 | 12 |
| Marital and Income | - | - | - | - | 285.909* | 239.288* | 326.359* | 155.047* | 10 | 10 | 10 | 10 |
| Marital and Accompanying person | - | - | - | - | 450.662* | 210.058* | 358.937* | 349.871* | 6 | 6 | 6 | 6 |
| Occupation and Income | 1181.233* | - | 1008.829* | - | - | 713.222* | - | 995.404* | 30 | 30 | 30 | 30 |
| Occupation and Accompanying person | - | - | - | - | 238.958* | 205.742* | 354.398* | 186.736* | 18 | 18 | 18 | 18 |
| Income and Accompanying person | - | - | - | - | 106.056* | 135.908* | 277.145* | 202.893* | 15 | 15 | 15 | 15 |

*p<0.01

**p<0.05

Table 6. EFA results of classified shopping mall attraction

| Constructs and Factors | Items | Factor Loading | KMO Value | Eigen Value | Variance Explained (in %) | Reliability Coefficient |
|--|-----------------------------|----------------|-----------|-------------|---------------------------|-------------------------|
| Class-A Mall Traffic Attraction | | | 0.752 | | | |
| Tendency of Travel | Mode of Travel | 0.627 | | 2.559 | 46.339 | 0.713 |
| | Parking Preference | 0.601 | | | | |
| | Accompany Person | 0.653 | | | | |
| | Time of the day visit | 0.593 | | | | |
| Attractive Environments | Category of Visit | 0.707 | | 1.404 | 54.654 | 0.727 |
| | Characteristics Attracts | 0.802 | | | | |
| Time Reliance | Trip Chaining | 0.780 | | 1.280 | 62.818 | 0.723 |
| | Travel Time | 0.667 | | | | |
| | Origin Zone | 0.593 | | | | |
| Personal Requirements | Purpose of Visit | 0.779 | | 1.148 | 70.601 | 0.689 |
| | Often Visit | 0.569 | | | | |
| | Spending Time | 0.599 | | | | |
| Class B-Mall Traffic Attraction | | | 0.706 | | | |
| Location Dependence | Rate of Parking Charges | 0.765 | | 2.066 | 39.40 | 0.705 |
| | Time of the day visit | 0.669 | | | | |
| | Preferred Location to Visit | 0.555 | | | | |
| Personalized Preferences | Mode of Travel | 0.627 | | 1.537 | 48.217 | 0.681 |
| | Purpose of Visit | 0.513 | | | | |
| | Trip Chaining | 0.623 | | | | |
| | Spending Time | 0.593 | | | | |
| Means of Travel | Travel Time | 0.791 | | 1.314 | 56.788 | 0.723 |
| | Origin Zone | 0.639 | | | | |
| | Accompany Person | 0.610 | | | | |
| Attractive Environments | Visiting Day | 0.723 | | 1.166 | 64.739 | 0.753 |
| | Often Visit | 0.625 | | | | |
| | Characteristics Attracts | 0.778 | | | | |
| Class-C Mall Traffic Attraction | | | 0.850 | | | |
| Tendency of Travel | Parking Preference | 0.748 | | 2.952 | 42.187 | 0.752 |
| | Mode of Travel | 0.768 | | | | |
| Motive of Visit | Spending Time | 0.721 | | 1.435 | 51.498 | 0.705 |
| | Origin Zone | 0.594 | | | | |
| | Category of Visit | 0.681 | | | | |
| Duration of Visit | Trip Chaining | 0.598 | | 1.265 | 59.852 | 0.763 |
| | Travel Time | 0.725 | | | | |
| | Visiting Day | 0.664 | | | | |
| | Time of the day visit | 0.604 | | | | |
| Location Dependence | Characteristics Attracts | 0.529 | | | | |
| | Rate of Parking Charges | 0.768 | | 1.216 | 67.558 | 0.778 |
| | Preferred Location to Visit | 0.583 | | | | |
| | Often Visit | 0.837 | | | | |
| Class-D Mall Traffic Attraction | | | 0.836 | | | |
| Tendency of Travel | Mode of Travel | 0.751 | | 2.717 | 45.545 | 0.763 |
| | Parking Preference | 0.791 | | | | |
| | Accompany Person | 0.597 | | | | |
| | Often Visit | 0.515 | | | | |
| Personal Preferences | Characteristics Attracts | 0.726 | | 1.393 | 54.960 | 0.773 |
| | Visiting Day | 0.798 | | | | |
| | Preferred Location to Visit | 0.660 | | | | |
| Time Reliance | Travel time | 0.700 | | 1.222 | 63.743 | 0.738 |
| | Origin Zone | 0.590 | | | | |
| | Spending Time | 0.790 | | | | |
| Location Dependence | Trip Chaining | 0.603 | | 1.173 | 72.151 | 0.719 |
| | Rate of Parking Charges | 0.741 | | | | |
| | Purpose of Visit | 0.688 | | | | |

Table 7. First-Order CFA model results

| Constructs and Factors | Items | Item Reliability | | | Covariance |
|---|-----------------------------|----------------------|------------------------------|---------|----------------|
| | | Standardized Loading | Squared Multiple Correlation | t-Value | |
| Traffic Attraction: Class-A Mall | | | | | |
| Tendency of Travel | Mode of Travel | 0.771 | 0.504 | 14.761 | (1<-->2) 0.846 |
| | Parking Preference | 0.493 | 0.441 | 6.302 | (1<-->3) 0.835 |
| | Accompany Person | 0.525 | 0.562 | 6.547 | (1<-->4) 0.490 |
| | Time of the day visit | 0.692 | 0.486 | 7.011 | |
| Attractive Environments | Category of Visit | 0.830 | 0.783 | 25.149 | (2<-->3) 0.809 |
| | Characteristics Attracts | 0.670 | 0.635 | 20.748 | (2<-->4) 0.685 |
| | Trip Chaining | 0.762 | 0.822 | 22.484 | |
| Time Reliance | Travel Time | 0.523 | 0.385 | 6.826 | (3<-->4) 0.731 |
| | Origin Zone | 0.718 | 0.445 | 14.761 | |
| Personal Requirements | Purpose of Visit | 0.762 | 0.589 | 16.861 | |
| | Often Visit | 0.621 | 0.491 | 15.982 | |
| | Spending Time | 0.614 | 0.658 | 18.964 | |
| Traffic Attraction: Class-B Mall | | | | | |
| Location Dependence | Rate of Parking Charges | 0.587 | 0.472 | 17.621 | (1<-->2) 0.803 |
| | Time of the day visit | 0.839 | 0.631 | 19.633 | (1<-->3) 0.630 |
| | Preferred Location to Visit | 0.725 | 0.606 | 19.659 | (1<-->4) 0.578 |
| Personalized Preferences | Mode of Travel | 0.841 | 0.573 | 18.265 | |
| | Purpose of Visit | 0.605 | 0.559 | 14.811 | (2<-->3) 0.862 |
| | Trip Chaining | 0.706 | 0.452 | 17.215 | (2<-->4) 0.745 |
| | Spending Time | 0.602 | 0.564 | 20.35 | |
| Means of Travel | Travel Time | 0.638 | 0.635 | 19.633 | |
| | Origin Zone | 0.791 | 0.468 | 16.847 | (3<-->4) 0.639 |
| | Accompany Person | 0.738 | 0.826 | 21.844 | |
| Attractive Environments | Visiting Day | 0.532 | 0.478 | 15.423 | |
| | Often Visit | 0.738 | 0.711 | 24.135 | |
| | Characteristics Attracts | 0.813 | 0.61 | 17.863 | |
| Traffic Attraction: Class-C Mall | | | | | |
| Tendency of Travel | Parking Preference | 0.732 | 0.810 | 14.787 | (1<-->2) 0.513 |
| | Mode of Travel | 0.785 | 0.627 | 6.826 | (1<-->3) 0.583 |
| Motive of Visit | | | | | (1<-->4) 0.871 |
| | Spending Time | 0.654 | 0.398 | 6.032 | (2<-->3) 0.627 |
| | Origin Zone | 0.649 | 0.483 | 15.15 | (2<-->4) 0.660 |
| | Category of Visit | 0.705 | 0.661 | 15.983 | |
| Duration of Visit | Trip Chaining | 0.804 | 0.797 | 27.062 | |
| | Travel Time | 0.571 | 0.422 | 15.15 | |
| | Visiting Day | 0.662 | 0.460 | 18.962 | (3<-->4) 0.711 |
| | Time of the day visit | 0.702 | 0.523 | 19.198 | |
| Location Dependence | Characteristics Attracts | 0.867 | 0.645 | 18.414 | |
| | Rate of Parking Charges | 0.543 | 0.378 | 6.78 | |
| | Preferred Location to Visit | 0.688 | 0.62 | 10.761 | |
| | Often Visit | 0.754 | 0.467 | 10.662 | |
| Traffic Attraction: Class-D Mall | | | | | |
| Tendency of Travel | Mode of Travel | 0.590 | 0.413 | 16.855 | (1<-->2) 0.417 |
| | Parking Preference | 0.815 | 0.685 | 19.198 | (1<-->3) 0.513 |
| | Accompany Person | 0.617 | 0.416 | 12.626 | (1<-->4) 0.706 |
| | Often Visit | 0.734 | 0.622 | 16.249 | |
| Personal Preferences | Characteristics Attracts | 0.501 | 0.373 | 9.265 | (2<-->3) 0.608 |
| | Visiting Day | 0.920 | 0.842 | 14.882 | (2<-->4) 0.854 |
| | Preferred Location to Visit | 0.599 | 0.632 | 13.598 | |
| Time Reliance | Travel time | 0.839 | 0.782 | 19.633 | |
| | Origin Zone | 0.567 | 0.635 | 15.77 | (3<-->4) 0.568 |
| | Spending Time | 0.722 | 0.766 | 17.663 | |
| Location Dependence | Trip Chaining | 0.659 | 0.571 | 17.882 | |
| | Rate of Parking Charges | 0.791 | 0.584 | 18.432 | |
| | Purpose of Visit | 0.738 | 0.681 | 17.663 | |

Table 8. Second-Order CFA model results

| Constructs and Factors | Standardized Loading | t- Value | Average Variance Extracted | Construct Reliability |
|---|----------------------|----------|----------------------------|-----------------------|
| Traffic Attraction: Class-A Mall | | | | |
| Tendency of Travel | 0.888 | 7.022 | 0.620 | 0.719 |
| Attractive Environments | 0.577 | 3.743 | 0.750 | 0.723 |
| Time Reliance | 0.607 | 8.279 | 0.668 | 0.711 |
| Personal Requirements | 0.656 | 9.665 | 0.666 | 0.715 |
| Traffic Attraction: Class-B Mall | | | | |
| Location Dependence | 0.793 | 10.664 | 0.717 | 0.764 |
| Personalized Preferences | 0.628 | 6.792 | 0.689 | 0.786 |
| Means of Travel | 0.852 | 7.768 | 0.722 | 0.767 |
| Attractive Environments | 0.726 | 11.257 | 0.694 | 0.742 |
| Traffic Attraction: Class-C Mall | | | | |
| Tendency of Travel | 0.699 | 5.743 | 0.759 | 0.731 |
| Motive of Visit | 0.813 | 7.858 | 0.669 | 0.709 |
| Duration of Visit | 0.710 | 11.698 | 0.721 | 0.847 |
| Location Dependence | 0.626 | 0.683 | 0.662 | 0.703 |
| Traffic Attraction: Class-D Mall | | | | |
| Tendency of Travel | 0.842 | 7.589 | 0.689 | 0.786 |
| Personal Preferences | 0.654 | 12.956 | 0.673 | 0.726 |
| Time Reliance | 0.763 | 6.995 | 0.709 | 0.757 |
| Location Dependence | 0.914 | 7.896 | 0.729 | 0.774 |

Table 9. Fit indices of the structural model

| Fit Indices | Recommended Value | Model Result (shopping mall) | | | |
|-------------|-------------------|------------------------------|---------|---------|---------|
| | | Class-A | Class-B | Class-C | Class-D |
| CMIN/df | Less than 5 | 4.191 | 3.681 | 4.674 | 4.843 |
| GFI | Greater than 0.9 | 0.979 | 0.959 | 0.968 | 0.933 |
| NFI | Greater than 0.9 | 0.925 | 0.905 | 0.963 | 0.964 |
| PNFI | 0.5 -0.9 | 0.573 | 0.587 | 0.597 | 0.519 |
| CFI | Greater than 0.9 | 0.976 | 0.954 | 0.999 | 0.984 |
| TLI | Greater than 0.9 | 0.972 | 0.93 | 0.943 | 0.996 |
| RMSEA | Less than 0.08 | 0.043 | 0.052 | 0.053 | 0.055 |
| SRMR | Less than 0.08 | 0.041 | 0.055 | 0.046 | 0.060 |

Table 10. Hypothesis testing results on shopping mall traffic attraction model

| Hypothesis | Path | Standardized Estimate | t- Value | Test Result |
|---------------------|---|-----------------------|----------|-------------|
| Class-A Mall | | | | |
| H1 | Tendency of Travel → Traffic Attraction | 0.456 | 4.347 | Accepted |
| H2 | Attractive Environments → Traffic Attraction | 0.709 | 7.580 | Accepted |
| H3 | Time Reliance → Traffic Attraction | 0.580 | 3.954 | Accepted |
| H4 | Personal Requirements → Traffic Attraction | 0.686 | 4.190 | Accepted |
| Class-B Mall | | | | |
| H1 | Location Dependence → Traffic Attraction | 0.541 | 3.717 | Accepted |
| H2 | Personalized Preferences → Traffic Attraction | 0.682 | 6.790 | Accepted |
| H3 | Means of Travel → Traffic Attraction | 0.715 | 3.743 | Accepted |
| H4 | Attractive Environments → Traffic Attraction | 0.498 | 2.663 | Accepted |
| Class-C Mall | | | | |
| H1 | Tendency of Travel → Traffic Attraction | 0.723 | 4.982 | Accepted |
| H2 | Motive of Visit → Traffic Attraction | 0.562 | 3.470 | Accepted |
| H3 | Duration of Visit → Traffic Attraction | 0.629 | 6.565 | Accepted |
| H4 | Location Dependence → Traffic Attraction | 0.478 | 5.110 | Accepted |
| Class-D Mall | | | | |
| H1 | Tendency of Travel → Traffic Attraction | 0.698 | 8.924 | Accepted |
| H2 | Personal Preferences → Traffic Attraction | 0.819 | 6.115 | Accepted |
| H3 | Time Reliance → Traffic Attraction | 0.461 | 4.531 | Accepted |
| H4 | Location Dependence → Traffic Attraction | 0.528 | 3.432 | Accepted |

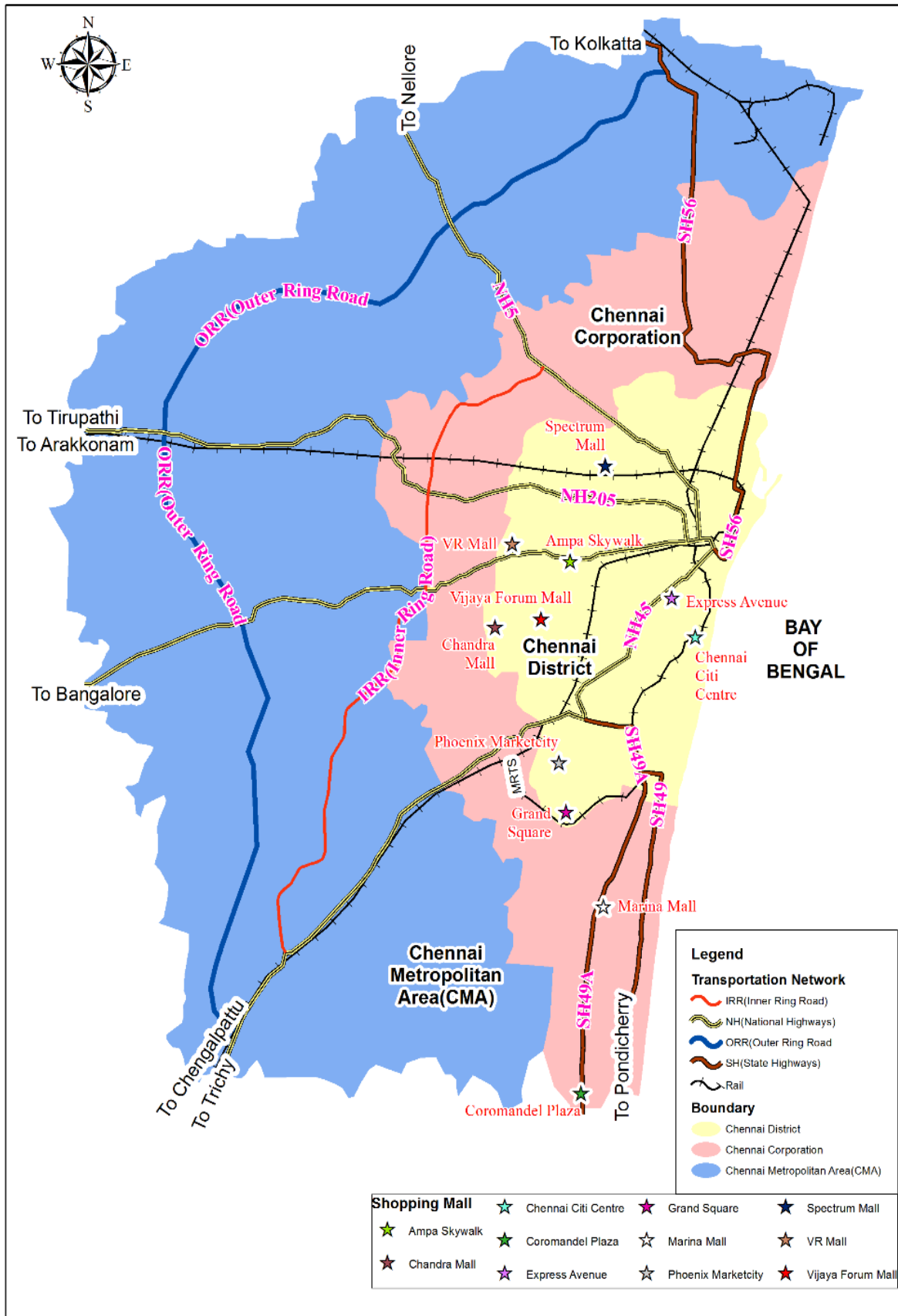


Figure 1. Study area and location of shopping malls in Chennai, India

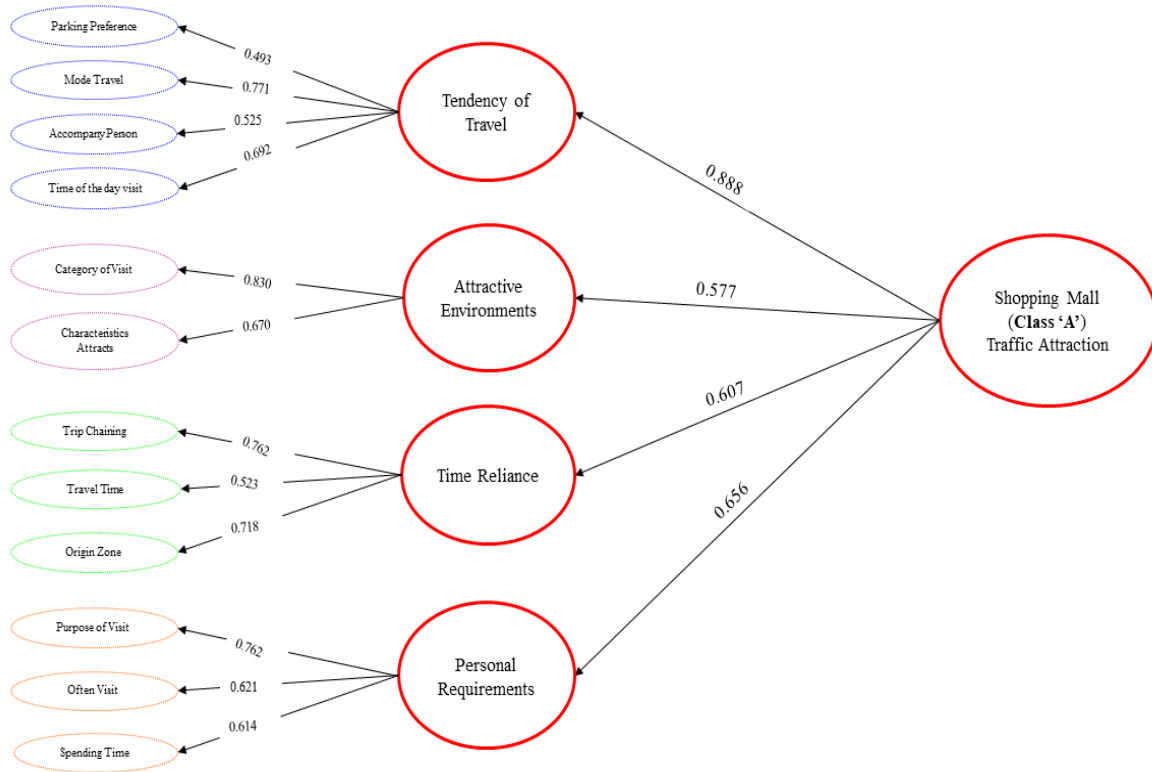


Figure 2. Estimated SEM model of shopping mall traffic attraction (Class-A)

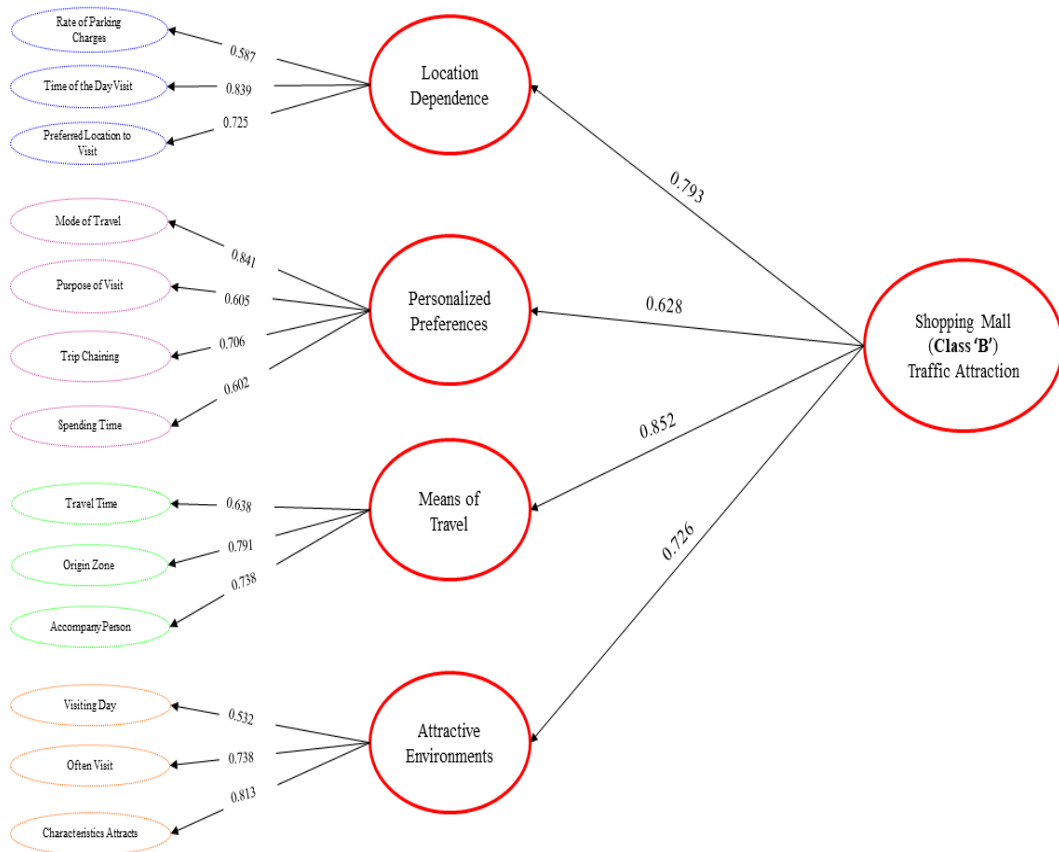


Figure 3. Estimated SEM model of shopping mall traffic attraction (Class-B)

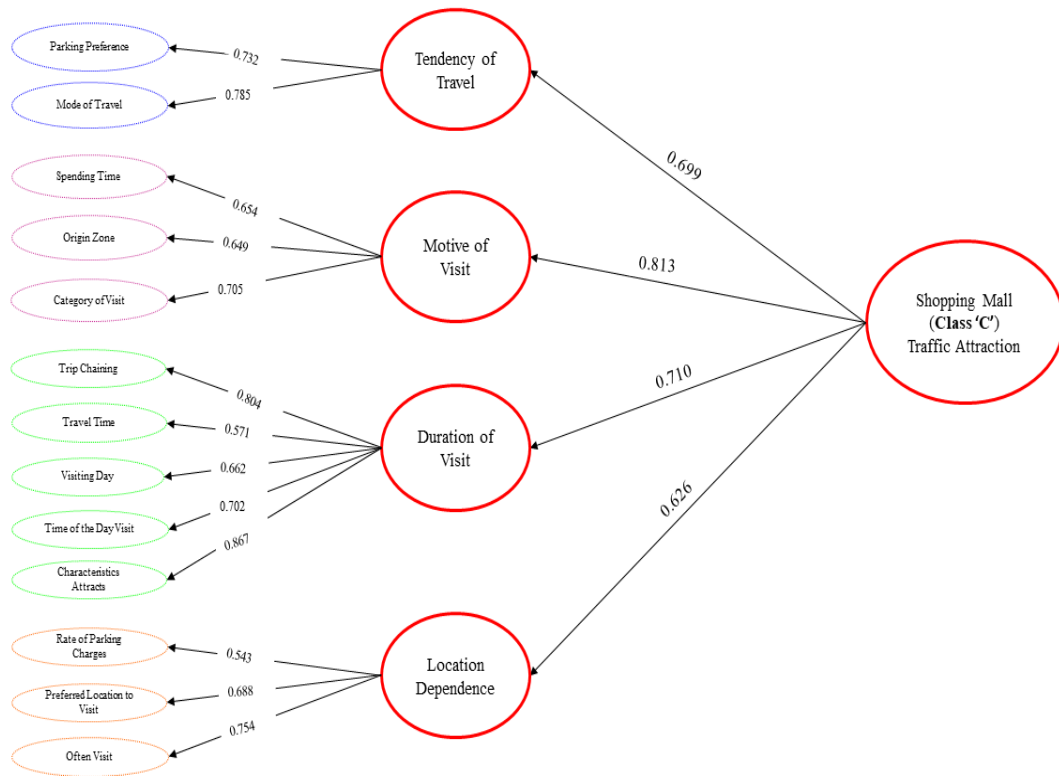


Figure 4. Estimated SEM model of shopping mall traffic attraction (Class-C)

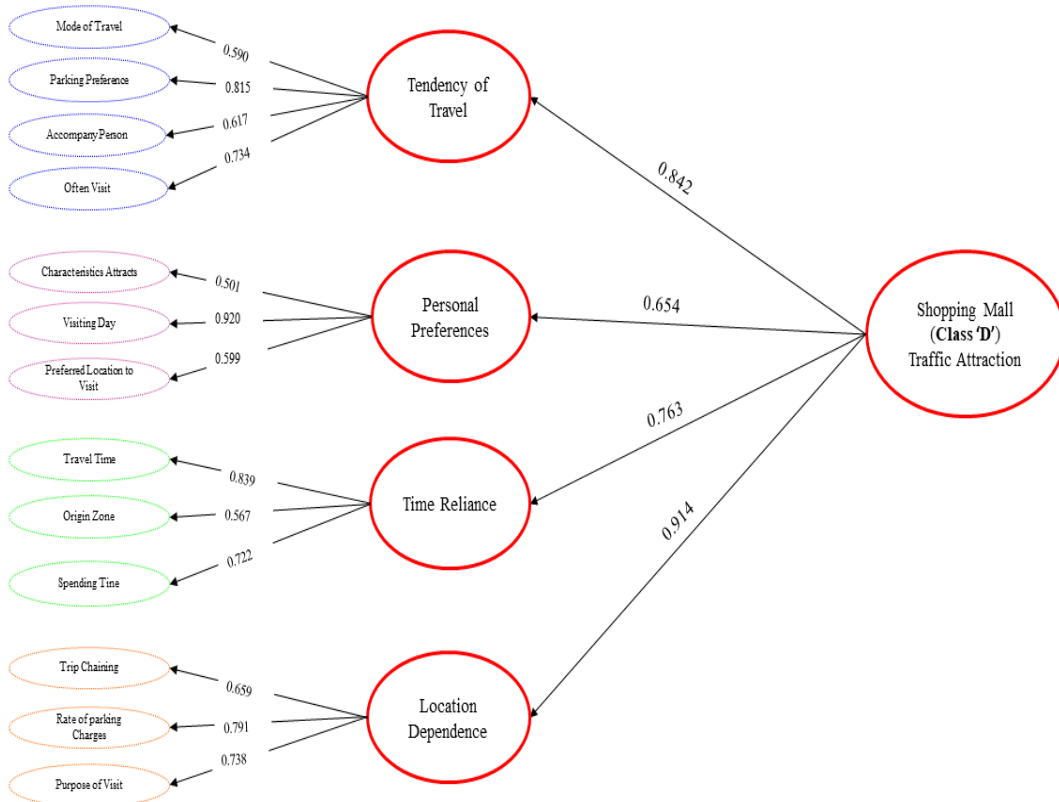


Figure 5. Estimated SEM model of shopping mall traffic attraction (Class-D)