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What drives consumers' sustainable mobility behaviour? An empirical investigation of Delhi consumers

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Keywords: Attitude; Behavioural intention; Consumer; Norms; Sustainable mobility behaviour; Theory of Planned Behaviour; Structural Equation Modelling.

Abstract. *The current mobility behaviour of consumers has threatened the life of people and ecosystems. Thus, it becomes imperative to explore the motives and hurdles blocking the way towards a cleaner, safer and affordable mobility system. This study investigates the determinants of consumers' sustainable mobility behaviour using the extended Theory of Planned Behaviour (TPB). For this, the study incorporates four additional variables (environmental knowledge, government actions, personal norms, and product attributes) into the original TPB model. Using a self-administered questionnaire, data is collected from a sample of 440 Indian consumers, and hypotheses are tested using structural equation modelling (SEM). The result reveals a significant positive impact of the product attributes, perceived behavioural control, attitude, environmental knowledge, and personal norms on the behavioural intentions of consumers to adopt sustainable mobility behaviour, while social norms and government actions are not found to affect the consumer's sustainable mobility intentions. Moreover, the study finds that the respondents do not prefer to pool or share their private vehicles very much and are also reluctant to use public transport for daily commuting to their workplace. They pay greater importance to the quality, trust and user-friendliness of the products while making a consumption decision. The study thus suggests a mix of strategies that can be taken into consideration by producers, marketers, and policymakers to encourage consumers' sustainable mobility behaviour.*

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1. Introduction

Current mobility behaviour poses a serious challenge to the economic, environmental, and social sustainability of nations around the globe (Lanzini & Khan, 2017; Nijhuis, 2013). The increasing preferences of people to own an automobile have relentlessly put pressure on the existing infrastructure and fossil fuel-based economy (WRI, 2019). Road transport accounts for the largest consumption of oil-based fuels and generates around three-quarters of total transport carbon emissions. Over 1 billion passenger cars travel on the streets

and roads of the world today, and this is expected to double in the next twenty years (IEA, 2018). The rapid increase in personal and commercial road transportation has driven up the demand for oil, gas, and petroleum products, leading to a surge in fuel prices. The financial burden of fossil fuels, along with their negative impacts on health and the environment, are major concerns of present time. Urban communities are struggling with escalating issues, including traffic jams, road anger, respiratory ailments, and early mortality. (UN, 2022). The issue of mobility has intensified in emerging economies, which now face the double challenge of ensuring accessible and safe transportation for everyone while also reducing their carbon footprint (WEF, 2020). The transportation sector, which accounts for 23% of CO2 emissions related to energy, is scaling up global warming, thereby exacerbating climate change (UNFCCC, 2019). The efficiency improvement claims by the producers seem to be insufficient in the light of the continued demand for mobility by the people. The reality is that transport emissions are climbing, and the present mobility system has moved beyond sustainable boundaries, leading to an urban sprawl (Holden et al., 2020).

The need for a safer, cleaner, and accessible mobility system first appeared in the EC's Green Paper on the Impact of Transport on the Environment which widely acknowledged the detrimental effect of the transport sector on the environment and underscored the need to reduce urban car traffic. The paper further called for the "fundamental changes in the way societies commute and consume" (EC, 1992; Holden et al., 2020). More recently, the UN's Second Global Sustainable Transport Conference 2021 has also pointed out the key role of consumers' sustainable mobility behaviour in combating climate change and achieving the goal of a 1.5 degrees Celsius increase in temperature for a greener, inclusive and equitable future. Recognizing this, efforts have been placed to develop the necessary infrastructure, strategies, systems, and policies to deal with the multifaceted and tenacious mobility issue. However, the desire to do so is not reflected in consumers' actions (Holden et al., 2020).

The available literature has largely discussed the role of various socio-psychological factors in influencing consumer's sustainable behaviour (Carrus et al., 2021; Dutschke et al., 2022; Pronello and Gaborieau, 2018; Si et al., 2020). However, the role of contextual factors in swaying consumer's sustainable mobility behaviour is less researched. Furthermore, the majority of these studies have been conducted in the westernized world, having different level of education, awareness, norms, and policies. Thus, there is a need for a comprehensive exploration of all the factors determining consumers' mobility behaviour in the emerging economies accounting for majority of the world's

population. With this aim in mind, the present study investigates: a) The current mobility behaviour of consumers in terms of sustainability; b) Factors influencing the behavioural intention of consumers for sustainable mobility behaviour; c) The relationship between the selected factors, behavioural intention and sustainable mobility behaviour of consumers so that appropriate strategies could be formulated to promote sustainable mobility behaviour in India - a country with rapid economic development and home to one-fifth of the total world population.

The failure of the public transportation system to keep up with demand, together with increasing purchasing power and personal convenience, has driven the demand for two and four wheelers among young consumers in India (MORTH, 2019). According to World Road Statistics (2018), the country ranks first in terms of two-wheeler ownership and eighth in terms of total vehicles in use, with 42.5 million vehicles. The country boasts one of the largest road networks in the world, yet every year, an estimated 150.000 people die in road accidents, averaging 422 deaths per day or 18 per hour. Road traffic fatalities are the leading cause of death for people aged 15 to 49. In 2020, India ranked first in the number of deaths from road accidents among 207 countries, with an average of 151,417 fatalities. (MORTH, 2021). Automobile exhaust is a major source of air contamination in cities and metropolitan areas throughout the country. The Centre for Science and Environment reports that they make up the largest portion of PM 2.5 levels in Delhi. The 2021 World Air Quality Report lists Delhi as the most polluted capital city in the world, a rank confirmed for the fourth year in a row (CSE, 2021). However, recognizing the disastrous consequences of this global problem, the country has initiated a series of fledgling sustainability initiatives. This study examines understanding of the global concept of sustainable mobility behaviour SMB at the local level in an effort to understand how to raise awareness and encourage adoption among consumers.

2. Context and previous research

2.1 Conceptual framework

SMB refers to individuals' use of means of transport that does not compromise public health or ecosystems while meeting their own mobility needs (Nijhuis, 2013). It requires linkages among the three pillars of sustainability i.e., economic, environmental, and social. Sustainable mobility thus aims at providing a cost-effective means of transportation to people without putting strain on the country's resources, promoting mobility practices that do not endanger the lives

of people, animals, or any other species, and a safer and healthier mobility way that is accessible to all for a better and improved quality of life (Rodrigue, 2020). In this respect, Banister (2008) emphasized the need to reduce car use through the promotion of walking, cycling, and public transportation. Similarly, Hamidi & Zhao (2020) argued for improving the quality and accessibility of the public transport system coupled with cycling-related perceptions, attitudes and skills for substituting car use and shaping individuals' sustainable travel behaviour. The introduction of electric vehicles also allows consumers to adopt a cleaner and sustainable mobility behaviour by reducing their reliance on fossil fuels and combating climate change (Jansson et al., 2017; Sang & Bekhet, 2015). The negative impact of private mobility on society and the environment can also be reduced by encouraging more people to carpool. Carpooling could play an important role in the transition to a more sustainable way of living (Bachmann et al., 2018; Baptista et al., 2014). Adoption of SMB offers an extensive advantage to commuters which are crucial to the well-being of people as well as the planet. From reducing the levels of energy-consumption, pollution and greenhouse gas emissions to solving the problems of traffic congestion, road accidents, public health, and accessibility, it is often regarded as vital for an improved and sustained life (Rodrigue, 2020; Tight et al., 2011).

The role of private mobility behaviour in driving economic, social and environmental impacts has been long recognized. Around 72% of global GHG emissions are a result of private individual consumption (Hertwich & Peters, 2009; UNEP, 2020), which is difficult to control solely through regulatory policy measures (Hori et al., 2013). Individual consumption decisions incorporate and respond to a variety of psychological, contextual and demographic factors, motivations and preferences, which challenges understanding of their consumption behaviour (Olsson et al., 2019; Spangenberg & Lorek, 2002; UNEP, 2005).

2.2 Model of study and hypothesis development

One of the most promising and widely used cognitive models is the Theory of Planned Behaviour (TPB) developed by Ajzen (1985), which incorporates attitude towards behaviour, subjective norms (SN) and perceived behavioural control (PBC) to predict behavioural intention (BI) of people to perform a given behaviour. The theory further establishes a direct link between BI and behaviour, and PBC and behaviour. Various scholars have tested TPB in different areas of sustainable behaviour, including mobility (Bachmann et al., 2018; Bamberg & Schmidt, 2003; Chen & Chao, 2011; Lane & Potter, 2007), food (Ajzen, 2015;

Vermeir & Verbeke, 2008), housing (Liao et al., 2020; Xu et al., 2017) and other areas (Armitage & Conner, 2001; Chekima et al., 2016; Kaiser & Gutscher, 2003; Wang et al., 2014) of sustainable behaviour. Despite the widespread usage of TPB, the model is criticized for ignoring many other psychological and contextual factors significant in determining the behaviour of people (Peattie, 2010; Steg & Vlek, 2009; Zhou et al., 2013). At the same time, the model itself welcomes the inclusion of additional factors if found to have an impact on the given behaviour (Ajzen, 1991; Alam et al., 2020). In this direction, Heath & Gifford (2002) incorporated factors such as personal norms, environmental values, and perceived responsibility for and awareness of the problems into the original TPB to study public transportation use by university students. It was concluded that the travel behaviour was well predicted by the original TPB, and the addition of all included factors significantly improved the prediction of the study. Similarly, Bachmann et al. (2018) identified that adding personal norms as a direct predictor of carpooling intention to the framework of the TPB enhanced the explained variance in carpooling intention from 68.1 percent to 81.1 percent among carpooling passengers and from 69.5 percent to 84 percent among carpooling drivers. Sang & Bekhet (2015) also found performance attributes, financial benefits, environmental concerns, demographics, infrastructure readiness and government interventions as the key predictors for electric vehicle usage intention. Thus, the extended TPB has gained popularity and acceptability in sustainability studies (Alam et al., 2020; Kritikou et al., 2021; Paul et al., 2016; Santos et al., 2021; Xu et al., 2017; Yadav & Pathak, 2016). To better understand the sustainable mobility behaviour of consumers, it is important to investigate all the external and internal factors influencing the behaviour (Sang & Bekhet, 2015). Based on this premise, the present study has incorporated four additional variables namely, "environmental knowledge", "government actions", "personal norms" and "product attributes" as the direct predictor of behavioural intention for SMB.

2.2.1 Attitude

According to the TPB, a person's attitude has a significant positive influence on his behavioural intention, which in turn affects his actual behaviour. Attitude refers to people's perception of the environment and society and belief that their behaviour will not have significant negative consequences (Ajzen, 1985). A meta-analysis carried out by Lanzini & Khan (2017) identified attitude as a significant predictor of intentions to choose an eco-friendly travel alternative. Similarly, to examine the factors shaping an individual's sustainable travel behaviour, Hamidi & Zhao (2020) found a significant effect of attitude in choosing a sustainable

mode choice such as cycling over personal car use. Paul et al., (2016) established that attitude is the strongest predictor of intention to purchase green products. Therefore, we propose the following hypothesis:

H1: "Attitude towards sustainable mobility positively influences the behavioural intention of consumers for sustainable mobility behaviour."

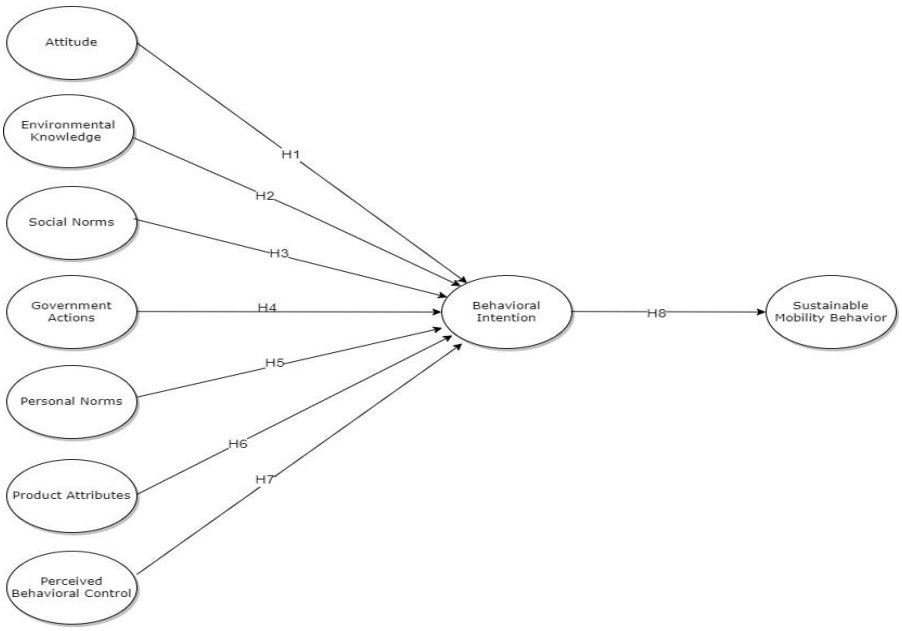

Figure 1. Outlines the conceptual model and the hypothesized relationship, discussed in detail below.

2.2.2 Environmental Knowledge (EK)

In addition to the antecedents of BI as discussed in the "TPB", the literature highlights a number of factors that can significantly affect one's behaviour. EK, which refers to an individual's knowledge of surrounding environmental and social issues and the possible course of action to deal with them, facilitates their decision-making process in a more logical way (Kumar et al., 2017). Zsoka et al., (2012) found EK to be central in shaping the attitude towards sustainable consumption behaviour among school and university students. Similarly, Kanchanapibul et al., (2014) concluded that young generation consumers with more knowledge about green issues had a stronger intention to buy green

products. Maniatis (2016) believed the presence of EK to have a significant positive impact on the consumer's intention to buy sustainable products and that lack of such knowledge often acts as a barrier and prevents consumers to translate their concerns into actual sustainable consumption behaviour (Haron et al., 2005; Lane & Potter, 2007; Tanner & Kast, 2003; Vermeir & Verbeke, 2006). To understand consumers' intention toward green product purchase in India, Yadav & Pathak (2016) found a significant influence of EK on consumers' intention and reported an improvement in the explanatory power of the TPB model with the addition of EK. Available literature thus highlights increased use of EK as one of the significant variables affecting BI for SCB of consumers (Biswas & Roy, 2015; Gatersleben et al., 2002; Hines et al., 1987; Kritikou et al., 2021; Young et al., 2010). Hence, we propose the hypothesis:

H2: "Environment knowledge positively influences the behavioural intention of consumers for sustainable mobility behaviour."

2.2.3 Social Norms (SN)

The TPB defined social norms as the "perceived social pressure to perform or not perform the behaviour" (Ajzen, 1985, 1991). This takes into account the influence of families, relatives, neighbours, co-workers and other reference groups in the decision-making process (Joshi & Rahman, 2015, 2017). It is believed that individuals with strong social or external pressure are more likely to follow group behaviour and can be easily motivated toward performing sustainable behaviour (Kumar et al., 2017; Yadav & Pathak, 2016). Following this, Jansson et al., (2017) concluded that electric vehicle adopters in Sweden exhibited strong levels of social motivation. Similarly, Sang & Bekhet (2015) affirmed a statistically significant positive relationship between social influences and electric vehicle usage intentions among Malaysian consumers. Exploring sustainable mobility behaviour, Donald et al., (2014) revealed that social beliefs have a strong impact on the commuter's intention to use a sustainable travel mode. Similarly, a vast number of studies have observed a positive relationship between SN and the BI of consumers for SCB (Alam et al., 2020; Figueroa-Garcia et al., 2018; Xu et al., 2017). Therefore, we propose the following hypothesis:

H3: "Social Norms positively influence the behavioural intention of consumers for sustainable mobility behaviour."

2.2.4 Government Actions (GA)

This refers to an appropriate form of government that ensures the dissemination of adequate information to consumers, development of necessary infrastructure and facilities, policy measures and other socio-political and legal regulations aiming at influencing the consumption behaviour of consumers more sustainably (Haron et al., 2005; Jackson, 2005). The available literature has highlighted a significant role of economic instruments, pricing policies, rewards and government subsidies in encouraging consumer's pro-environmental behaviour (Hori, 2012; Lorek, 2014; Steg, 2009; Stern, 2000). Government plays a formative role in building infrastructure, availability of sustainable alternatives, and awareness and promotional campaigns that influence the BI of consumers to adopt SCB (Biswas & Roy, 2015; Hori, 2012; Lorek, 2014; Peattie, 2010; Spangenberg & Lorek, 2002; Steg, 2009; Stern, 2000). Chen & Chai (2010) found a significant role for government in preserving the environment and influencing consumers' attitudes towards green products. Similarly, Sang & Bekhet (2015) believed that there exists a significant positive relationship between government interventions and the usage intentions for electric vehicles among Malaysians. Banister (2008) argued that GA in the form of parking controls and road pricing can help in reducing car use and urban traffic. Also, reallocating space to public transport will encourage its wide use, thereby achieving a sustainable mobility system. Lorek and Spangenberg (2014) emphasized strong governmental leadership and the importance of economic and regulatory instruments in enabling SCB among people. Lack of government measures has been reported as one of the factors responsible for the current unsustainable consumption behaviour of people (Jain & Kaur, 2004). Thus, the present study seeks to explore the role of GA in promoting SMB and propose the hypothesis:

H4: "Government Actions positively influence the behavioural intention of consumers for sustainable mobility behaviour."

2.2.5 Personal Norms (PN)

Personal Norms have been defined as "self-expectations that are based on internalized values" (Schwartz, 1977). It reflects an individuals' obligation and responsibility to carry out a particular behaviour (Stern et al., 1999). Thogersen (2006) believes that PN guides human behaviour through the conception of right and wrong behaviour. It helps to develop an individual's sense of moral responsibility and values towards others (Bai & Bai 2020). A large pool of studies concerning pro-social and pro-environmental behaviour have found a significant

influence of PN on an individual's BI for SCB (Chan et al., 2012; Chen & Chai, 2010; Gleim et al., 2013; Joshi & Rahman, 2015; Schwartz, 1977; Wang et al., 2014; Young et al., 2010). Jansson et al., (2018) found electronic vehicle adopters exhibited high levels of personal norms which are more effective in explaining the behaviour as compared to external social norms, due to their lesser level of internalization. Harland et al. (1999) found that PN had an independent contribution to the explanation of BI and its inclusion increased the explanatory power of the TPB model by 10%. Bachmann et al., (2018) also added PN as a direct predictor of carpooling intention to the TPB and found that the intentions of passengers to carpool increased from 68.1 percent to 81.1 percent and from 69.5 percent to 84 percent among carpooling drivers. Recently, Santos et al., (2021) extended the TPB to measure the impact of PN on the purchase intention of organic food in sustainable packaging among Portuguese and found a significant contribution of PN in explaining the intentions towards behaviour. Thus, the available literature underlines the importance of internal values in explaining BI for SCB especially using TPB (Bamberg & Schmidt, 2003). In the light of this, we propose the following hypothesis:

H5: "Personal Norms positively influence the behavioural intention of consumers for sustainable mobility behaviour."

2.2.6 Product Attributes (PA)

This refers to the presence of certain desirable features and the absence of some traits which influence the consumer's purchase and consumption decisions. Product quality in terms of safety, durability, credibility and health benefits is an essential attribute influencing consumers' intention to buy sustainable goods and strongly affects their engagement in pro-environmental and pro-social behaviour (Ahmad & Juhdi, 2008; Joshi & Rahman, 2015; Steg & Vlek, 2009). The presence of clear and user-friendly eco-labels and certifications on the product helps in informing consumers about the sustainable characteristics of the product and often builds their trust which results in more sustainable purchases (Kaufmann, 2012; Liu et al., 2012; Young et al., 2010). Furthermore, ease of using products is an essential criterion that increases their usability by the consumers (Xie et al., 2022). PA are often discussed as contextual factors affecting individual consumption behaviour in several studies (Kaufmann, 2012; Lorek, 2014; Olander & Thogersen, 1995; Peattie, 2010; Steg & Vlek, 2009; Vermeir & Verbeke, 2006; Wang, 2014) and also included as a significant independent factor in Stern's (2000) Attitude-behaviour-context model. The available literature highlights the presence of such factors such as user-friendly, quality products

with clear and informative labelling that fuels consumer's choice and facilitates their demand and consumption of sustainable goods (Alam, 2020; Jain & Kaur, 2004; Joshi & Rahman, 2015; Moser, 2015; Ritter, 2015; Tanner & Kast, 2003). Chen & Chao (2011) found perceived ease of use and perceived usefulness crucial in determining the switching intentions of private vehicle users towards the public transport system. Similarly, Sang & Bekhet (2015) concluded that performance attributes of vehicles such as comfort, and ease of driving act as a key predictor of usage intentions of Malaysian consumers for the adoption of an electric vehicle. Similarly, Biswas & Roy (2015) observed PA as the primary driver of consumer choice behaviour in the consumption of sustainable goods. Maniatis (2016) also found that sustainable product quality and labelling are very effective in increasing sales and are essential for making sustainable consumption decisions. Therefore, the following hypothesis is proposed:

H6: "Product Attributes positively influence the behavioural intention of consumers for sustainable mobility behaviour."

2.2.7 Perceived behavioural control (PBC)

This refers to one's perception of the inner self-efficacy and ease or difficulty in performing a behaviour (Ajzen, 2002; Zhou et al., 2013). Individuals with a strong belief that adopting SMB will help in reducing their burden on the environment and society are more likely to perform various sustainable actions (Straughan & Roberts, 1999). Donald et al., (2014) identified PBC to be one of the strongest predictors of intentions to use public transport. Similarly, Paul et al. (2016) emphasized that PBC is the leading predictor of the intention to consume green products. In a meta-analysis of determinants of travel mode choice, Lanzini & Khan (2017) found PBC to be one of the main predictors of BI to choose a sustainable alternative.

However, the direct impact of PBC on behaviour has not been fully established (Armitage & Conner, 2001; Bamberg & Schmidt, 2003; Gleim et al., 2013; Joshi & Rahman, 2015; Kaiser & Gutscher, 2003) and is also not considered in current work. Therefore, the following hypothesis is framed:

H7: "Perceived behavioural control positively influences the behavioural intention of consumers for sustainable mobility behaviour."

2.2.8 Behavioural Intention (BI)

The available literature has discussed a large number of psychological and contextual factors influencing the BI of consumers for SCB. Thus, BI, which

refers to "an individual's readiness to execute a given behaviour", plays a mediating role between these factors and the actual behaviour and is often discussed as the immediate antecedent of the behaviour in the TPB (Ajzen, 1985, 1991; Bamberg & Moser, 2007). Studies based on TPB have found a significant positive relationship between consumers' green purchase intention and their green purchase behaviour (Jaiswal & Singh, 2017; Kumar et al., 2017). Wang et al., (2014) found BI plays the most dominant role in explaining the SCB of rural residents in China. Xu et al., (2017) have found waste separation intentions of households positively influence their waste separation behaviour. Intentions do have a significant positive impact on consumers' choice to purchase energy-saving appliances (Liao et al., 2019). Similarly, Donald et al. (2014) concluded that the use of public transport and personal car by commuters was greatly influenced by their intentions to use them. In a meta-analysis on psychological and behavioural determinants of travel mode choice, Lanzini & Khan (2017) established that intentions play a key role in the determination of travel mode choice. Therefore, the following hypothesis is developed:

H8: "The behavioural intention of the consumers positively influences their sustainable mobility behaviour."

3. Methodology

3.1 Research Instrument

Data for the study was collected using a questionnaire, designed referring to the existing literature with necessary modifications (Table 2). The study uses eight constructs: "attitude" containing 4 items, "environmental knowledge" having 5 items, "social norms" and "personal norms" and "product attributes" with 3 items each, "perceived behavioural control" with 6 items, "government actions" with 4 items and "behavioural intention" using 9 items. The responses for each statement in the constructs were recorded using a seven-point Likert scale validated in earlier studies of a similar domain where (1) represents "strongly disagree" and (7) represents "strongly agree". The actual mobility behaviour of consumers was measured using 4 statements and the responses were recorded again on a seven-point Likert scale where (1) represents 'Never' and (7) represents 'Every time'.

3.2 Sampling and data collection

To gather the responses from a large audience in a cost-effective and time-saving manner, an online survey method was adopted using a structured questionnaire.

The questionnaire was mailed to consumers, above 18 years of age, educated and residing in Delhi, a large metropolis and the capital of India, representative of the entire nation. Data were collected between April and June 2022 using the judgmental sampling technique. Out of the 510 received responses, 440 were found to be usable, meeting the criteria of applying SEM (Hair et al., 2014). Initially, a pilot study was conducted with thirty-six experts to test the drafted questionnaire and a total of six items were deleted on account of duplicate statements and difficult to be understood by the respondents.

Socio-demographic characteristics of the respondents revealed that both males and females participated almost equally in numbers. Out of the 440 respondents, the majority of them (n=294) belong to the young (18-34) age group. 45% (n=198) of the total respondents have graduate degrees, 40% (n=178) are post-graduates and n=8 with a doctorate. Most of the respondents belong to the area of management (n=172) and engineering (n=102), followed by commerce (n=88), science and law. Around 40% of the total respondents (n=178) are working with the corporate sector whereas (n=74) are associated with their own business, (n=74) are homemakers while (n=52) are students and (n=40) are teachers. A large number of respondents i.e., 82% (n=364) live in their family bungalow or flat followed by a shared apartment and rented house. 44% (n=194) of the respondents have a monthly family income of more than Rs 2 lakh while others have lesser family income. Single and married respondents are approximately equal in numbers.

3.3 Data analysis

The study used SPSS and AMOS, version 22 software to analyse the conceptual framework. A two-stage structural equation modelling (SEM) was applied to test the hypothesis of the study (Anderson and Gerbing, 1988). To begin with, a confirmatory factor analysis (CFA) was carried out to assess the reliability and validity of the measurement model and then the complete model fit, and hypothesized relationships were estimated with the help of standardized regression coefficients (β) and p-values.

4. Results

4.1 Sustainable mobility behaviour: Descriptive analysis

The study measured the SMB of respondents using four statements (Table 1) on a seven-point frequency scale. The mean score of SMB was found to range from 3.73 to 4.06, which shows the present mobility behaviour of households is not

very sustainable. The study found not much variation in different mobility behaviour items. It was found that the respondents do not prefer to pool or share their private vehicle or car with others while going to their destination (SMB 3, mean score= 3.69). The frequency of using public transport by the respondents to travel to their workplace or desired destination is also low (SMB 2, mean score= 3.73). While buying a new vehicle, the respondents do not consider much the environmental friendliness of the fuel type (SMB1, mean score= 3.88). However, the respondents consider a little more walking to their nearby destination or even use a bicycle (SMB 4, means score= 4.06). The standard deviation of the responses indicates the variation in the responses. The Skewness and kurtosis of the responses are found to be less than one, indicating that the distribution of the responses is normal. Since the value of Cronbach alpha is 0.803, the mobility scale represented is quite reliable.

Consumption behaviour: Mobility	Mean (SD)	Skewness	Kurtosis	Cronbach Alpha
SMB 1. I consider buying a vehicle which uses clean fuel (such as CNG, electric or hybrid).	3.88 (1.723)	.217	-.962	.803
SMB 2. I use public transport for going to place of work/college.	3.73 (1.726)	.208	-.867	
SMB 3. I pool or share car /private vehicle.	3.69 (1.440)	.391	-.469	
SMB 4. I prefer to walk or use cycle to go nearby.	4.06 (1.738)	.031	-.951	

Table 1: Descriptive analysis: Sustainable mobility behaviour. Note: Construct items source- Donald et al., 2014; Heath & Gifford, 2002; Potoglou & Kanaroglou, 2007

4.2 Measurement Model: Reliability and validity of the constructs

The CFA method has been applied to test the construct validity and reliability of the measurement scale used to measure the different factors affecting the BI of consumers for SMB. Initially, an assessment of model fitness was made using the following indicators: $\chi 2$ (chi-square), $\chi 2/df$ (chi-square to the degree of freedom ratio), GFI (goodness-of-fit index), AGFI (Adjusted goodness-of-fit index), CFI (comparative fit index), TLI (Tucker–Lewis index), and RMSEA (root mean square error of approximation). In the present study, CFA results depict

CMIN/df estimate to be 2.060, which lies in the required range (value to be between 2 and 5), the GFI and AGFI are found to be 0.859 and 0.835 (these should be greater than 0.8). The CFI, TLI and NFI are found to be 0.952, 0.947 and 0.911 (the required value for each should be more than 0.9). Further, the RMSEA is found to be 0.049 (the required value should be less than 0.08). Hence, all indices are more than in line with the recommended criteria and the model is found to be a good fit (Bagozzi & Yi, 1988).

Next, the construct validity comprising convergent as well as discriminant validity was examined through construct loadings, composite reliability (CR), average variance extracted (AVE), and comparing the AVE of each construct with its maximum shared variance (MSV) using Fornell Larcker criteria. It was found that all constructs in the measurement model have CR above the acceptable value of 0.70, which reveals the model has good reliability. The higher construct loadings (more than the acceptable value of 0.50) signify that the item adequately represents the construct. Results achieved of the factor loadings are shown in Table 2 ranging from 0.71 to 0.91. This indicates that observed items are adequate and correspond to their constructs. Thus, the construct's convergent validity can be confirmed. To assess discriminant validity, the MSV of constructs were compared with their AVE estimates and it is expected that MSV should be less than its AVE estimate. Since the results found MSV to be less than the AVE of the respective constructs, this shows that discriminant validity of constructs has been achieved (Hair et al., 2010).

Constructs	**Source**	**Items**	**Factor loading**	**CR**	**AVE**	**MSV**	**Cronbach Alpha**
Attitude	Joshi & Rahman, 2017; Paul et al., 2016	AT1: It is important to me that my consumption behaviour does not endanger the lives and survival of humans, animals and other species.	0.9	0.927	0.762	0.487	0.924
		AT2: I believe the consumption of sustainable goods will help me in improving my health.	0.804				
		AT3: I believe the consumption of sustainable goods will help in reducing the problems of resource shortage and environmental degradation.	0.87				
		AT4: I am positive about consuming sustainable goods.	0.914				

Environmental Knowledge	Maniatis, 2016; Wang et al., 2014	EK1: Consumption of sustainable products promotes the environment, health and well-being of society.	0.876	0.911	0.671	0.503	0.91
		EK2: Use of too many petroleum products is harmful to the health of people.	0.864				
		EK3: Labelling, trademarks and certifications provide adequate information about sustainable goods.	0.78				
		EK4: Having not received an environmental education, I am not able to understand the benefits of using sustainable goods.	0.763				
		EK5: There is a lack of information and communication about sustainable products in our country.	0.808				
Social Norms	Biswas & Roy, 2014; Jansson et al., 2017	SN1: When choosing a product or service, other people's opinions are important to me.	0.815	0.889	0.728	0.423	0.887
		SN2: Purchase of sustainable products/environment-friendly cars will help me gain respect in society.	0.881				
		SN3: Purchase of sustainable products/environment-friendly cars will make a positive impression on peer groups/neighbours and family.	0.862				
Government Actions	Chen & Chai, 2010; Figueroa-Garcia et al., 2018	GA1: In my city, the government does enough to motivate more sustainable behaviour through subsidies, awareness programs, etc.	0.82	0.926	0.757	0.46	0.925
		GA2: People will not adapt to sustainable practices unless they are penalised under government laws through fines etc.	0.886				
		GA3: If there is a government subsidy, I am willing to purchase sustainable/environment-friendly products such as solar panels, electric cars, etc.	0.86				
		GA4: I can change my consumption to more sustainable products due to government rules and regulations (such as pollution	0.911				

		checks of vehicles, waste segregation, etc.)					
Personal Norms	Prakash & Pathak, 2017; Jansson et al., 2017	PN1: I consider the "well-being of others" while making a purchase decision.	0.916	0.93	0.815	0.438	0.929
		PN2: I feel morally obliged to decrease the negative impact of my consumption/car driving.	0.883				
		PN3: I feel bad to see humans are damaging the environment and society.	0.909				
Product Attributes	Chen & Chao, 2011; Maniatis, 2016; Ritter et al., 2015	PA1. Sustainable products have better quality standards.	0.886	0.904	0.759	0.507	0.904
		PA2. Sustainable products are user-friendly.	0.941				
		PA3. I often doubt the genuineness of labelling on eco-labelled products. (R)	0.779				
Perceived Behavioural Control	Paul et al., 2016; Wang et al., 2014	PBC1: I can protect the environment and help society by buying sustainable products.	0.798	0.932	0.696	0.497	0.932
		PBC2: An individual can have a positive impact on the environment and society by using resources judiciously.	0.798				
		PBC3: I don't have sufficient resources, time and opportunities to buy sustainable products. (R)	0.86				
		PBC4: There are few sustainable product brands available in the market, so it is difficult to choose them as an alternative. (R)	0.831				
		PBC5: Most of the sustainable products I want to purchase are too expensive. (R)	0.842				
		PBC6: My city lacks infrastructure for garbage disposal, public transportation system, etc. (R)	0.874				
Behavioural Intention	Jaiswal & Singh, 2018; Wang et al. 2014	BI1: I will recommend sustainable products to my family/friends or peer groups. family acquiantances family/ friends or peer groups.	0.762	0.915	0.545	0.507	0.914
		BI2: I am willing to spend more money to buy sustainable products.	0.658				
		BI3: I would like to stop buying products from companies that	0.711				

		pollute the environment even though it might be inconvenient.					
		BI4: I would like to participate in community-based programs such as environmental education campaigns etc.	0.747				
		BI5: I would buy sustainable products when they are easily acquirable in proximity.	0.761				
		BI6: If my neighbours or families prefer purchasing sustainable products, I will also want to purchase the same.	0.707				
		BI7: When I have to choose between two similar products, I choose the one that is less harmful to the environment and society.	0.782				
		BI8: I would be willing to buy products from companies that are supporting a social cause (such as any NGO).	0.714				
		BI9: I do not care about environmental or social issues while making a purchase. (R)	0.79				

Table 2: Reliability and Validity Analysis

The results of the Fornell Larcker criteria are reported in Table 3. The table shows that the square root of the AVE of different factors influencing BI for SMB was found to be more than the correlation among the constructs, thereby ensuring the presence of discriminant validity in the measurement scale.

4.3 Analysis of Structural Model and Hypothesis Testing

The structural model is developed indicating the impact of different factors on SMB among consumers. The factors supposed to influence SMB are "Attitude", "Environmental Knowledge", "Social Norms", "Government Actions", "Personal Norms", "Product Attributes", "Perceived Behavioural Control" and "Behavioural Intention". These factors are measured using "selected statements" built into the questionnaire. All the factors are hypothetical to be "reflective" and "zero-order" in nature. First-order SEM analysis is used to examine the hypotheses outlined above.

	Product Attributes	Attitude	Environmental Knowledge	Social Norms	Government Actions	Personal Norms	Perceived Behavioural Control	Behavioural Intention
Product Attributes	**0.871**							
Attitude	0.553	**0.873**						
Environmental Knowledge	0.561	0.615	**0.819**					
Social Norms	0.392	0.377	0.438	**0.853**				
Government Actions	0.451	0.583	0.55	0.65	**0.87**			
Personal Norms	0.485	0.529	0.504	0.546	0.615	**0.903**		
Perceived Behavioural Control	0.581	0.513	0.541	0.439	0.588	0.522	**0.834**	
Behavioural Intention	0.712	0.698	0.709	0.564	0.678	0.662	0.705	**0.738**

Table 3. Correlation among constructs. Note: The diagonal bold values represent square root of the average variance extracted for each construct and the rest of the values are the squared correlation between constructs.

4.3.1 Statistical fitness of the structural model

Table 4 describes the result of SEM carried out for extended TPB. It shows the estimated value of all indicators and the values required. The results show an adequate fit to the data (CMIN/df = 1.911, GFI=0.855, AGFI =0.834, CFI=0.951, TLI= 0.947, NFI=0.903 and RMSEA= 0.046). Hence, the structural model used for the hypothesis testing using SEM analysis is statistically fit (Bagozzi & Yi, 1988).

Statistical Fitness Index	CMIN/df	GFI	AGFI	CFI	TLI	NFI	RMSEA
Estimated value of the index	1.911	0.855	0.834	0.951	0.947	0.903	0.046
Required value of the index#	Less than 3	Greater than 0.8	Greater than 0.8	Greater than 0.9	Greater than 0.9	Greater than 0.8	Less than 0.08

Table 4. Model fit indices. Note: N=440, # source: Bagozzi & Yi, 1988

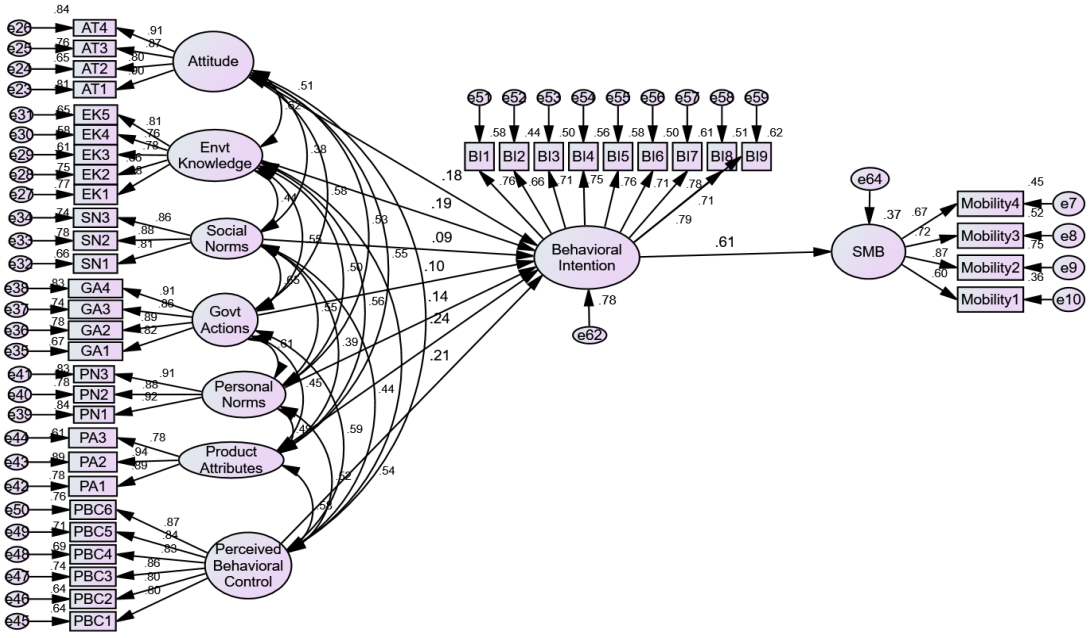

Figure 2. Causal relationship among factors affecting sustainable mobility behaviour using structural equation modelling.

Dependent Variable	Independent Variable	Estimate	S.E.	C.R.	P	Results	R Square
Behavioural Intention	Attitude	.179	.036	4.146	***	Accepted	
Behavioural Intention	Environmental Knowledge	.188	.036	4.392	***	Accepted	
Behavioural Intention	Social Norms	.091	.042	2.157	.031	Rejected	
Behavioural Intention	Government Actions	.096	.048	1.932	.053	Rejected	37 %
Behavioural Intention	Personal Norms	.140	.030	3.391	***	Accepted	
Behavioural Intention	Product Attributes	.237	.036	5.691	***	Accepted	
Behavioural Intention	Perceived Behavioural Control	.208	.043	4.890	***	Accepted	
SMB	Behavioural Intention	.606	.056	9.846	***	Accepted	

Table 5: Regression Weights. Note: *** significant at 0.001 levels

5. Discussion

The objective of identifying the determinants of SMB of consumers was achieved by incorporating the variables "environmental knowledge", "government actions", "personal norms" and "product attributes" into the well-established TPB model. The responses collected from 440 respondents were analysed using SEM and the results are shown in Table 5. These results reveal that except for SN and GA, all other factors have a significant positive impact on the behavioural intentions of the consumers for adopting sustainable mobility behaviour.

Product attributes emerge as the strongest predictor of BI for SMB of consumers in India, which shows the primacy of product characteristics while making a mobility decision. The outcome is in line with the existing literature which indicates that consumers give due consideration to the quality, labelling and ease of use of the proposed mode of transport (Hamidi & Zhao, 2020; Maniatis, 2016; Moons, 2015; Sang & Bekhet, 2015).

The second most important determinant that emerges is the PBC. Consistent with the findings of the available literature (Donald et al., 2014; Lanzini & Khan, 2017; Sulikova & Brand, 2021), the study confirms that consumers' belief about the effectiveness of their efforts and probable ease or difficulty in obtaining sustainable products strongly influences their intention to engage in SMB. The limited availability of sustainable products in the market makes it difficult for them to translate their sustainable motivation into actual consumption behaviour (Wang et al., 2014). Respondents also affirmed that in most cases sustainable products are expensive as compared to other available substitutes, which negatively influences their BI to engage in SMB (Gleim et al., 2013; Joshi & Rahman, 2015). This contradicts the findings of Prakash & Pathak (2017) who argued that Indian consumers are no longer price-sensitive to buying sustainable products. The low level of available infrastructure is also a great challenge before them.

EK has also turned out to be an important factor positively impacting intentions for SMB. This result confirms the findings of the existing literature (Dangi et al., 2020; Figueroa-Garcia et al., 2018; Yadav & Pathak, 2016), stating that consumers have adequate and relevant information and knowledge about various environmental and social issues and the impact of their consumption on environment and society plays an important role in promoting their intentions towards SMB.

The next factor that emerges is the attitude of consumers toward sustainable consumption. Consumers having a positive attitude, care and concern towards

the environment and society are more willing to adopt SMB. This finding is in line with previous studies (Bachmann et al., 2018; Hamidi & Zhao, 2020; Sulikova & Brand, 2021), which concluded that an individual's attitude is one of the most consistent and significant predictors for explaining their BI for SMB.

The study shows that an individuals' value systems, ethics, moral obligations and personal responsibilities are essential in influencing their BI for SMB. This complies with the work of various scholars (Bachman et al., 2018; Bai & Bai, 2020; Jansson et al., 2017) who found a strong effect of PN in fostering environment and socially responsible behaviour.

The results show that SN do not exert any influence on the BI of consumers for SMB, which contradicts the findings of (Chen & Chao, 2011; Donald et al., 2014; Sang & Bekhet, 2015; Sulikova & Brand, 2021) that SN are one of the important determinants of commuters' mobility decisions. However, studies examining sustainable food behaviour (Chekima et al., 2019; Kritikou et al., 2021) support the findings of the current work stating that most individuals do not feel much external pressure to engage in sustainable behaviour.

The results also reveal that GA do not influence the BI of consumers to adopt SMB. This finding complies with the work of various scholars (Gracia et al., 2018; Wang et al., 2014) who argued that government policies lack the sensitivity, appeal and proper enforcement needed to address the everyday mobility issues of the commuters.

Finally, the outcome of the study is in line with the existing literature (Chen & Chao, 2011; Heath & Gifford, 2002; Lanzini & Khan, 2017; Si et al., 2020) in stating that the intention to use sustainable mobility modes is the key predictor of actual sustainable mode choice. The positive intentions of the people towards the sustainable purchase and use of mobility styles positively influence their actual behaviour.

6. Conclusions

The current study extends previous research concerning SMB of consumers' by incorporating the variables "environmental knowledge", "government actions", "personal norms" and "product attributes" to the well-established "TPB model". The empirical analysis discloses that the respondents do not prefer to pool or share their private vehicles much and are also reluctant to use public transport for daily commuting to their workplace. Therefore, it is essential to recognize the

key factors which can significantly influence the intentions of consumers towards SMB.

Consistent with the existing literature, the study establishes a significant positive impact of PA, PBC, EK, Attitude and PN on the intentions of consumers to adopt SMB while the influence of SN and GA are not found to affect them. The study also confirms the major role of BI in stimulating SMB. The result signifies that the inclusion of additional factors to the "TPB model" enhanced the understanding of the current mobility behaviour of consumers and their BI for SMB. This emphasizes the need to extend the current "TPB model" which can be applied to study other environmentally relevant clusters such as food, housing and clothing (Alam et al., 2020; Bachmann et al., 2018; Santos et al., 2021; Si et al., 2020). As time has progressed, there have been shifts in the needs, preferences, and environment of individuals, making it imperative to more fully investigate the significant factors that influence behaviour.

The results also suggest that consumers pay greater importance to quality, trust and user-friendliness of products. Therefore, producers and marketers should focus on the "product attributes" while formulating the 4Ps of marketing. It is also important to trigger the self-worth of people and reduce impeding factors, thereby paving the way for the successful adoption of SMB. Manufacturers and government agencies should use the information available and education-based interventions to make commuters aware of the available sustainable products and the urgent issues threatening life on the planet. Understanding consumers' attitudes towards SMB would assist producers in forecasting the demand for their products, and the government in formulating policies, rules and regulations for a better and sustainable mobility system.

The findings reveal that, despite a high level of education, awareness, concern and general attitude towards environmental and social issues, consumers have not made the same shifts in their SMB. Therefore, it is imperative that consumers share equal responsibilities with producers, marketers and government agencies with a committed adoption of SMB (Holden et al., 2020; Olson et al., 2021). The study thus contributes to promoting the SDG goal twelve of "Responsible Consumption and Production".

The results of the study have provided insights into the SMB of the consumers. However, it may not portray a fully accurate picture, as the respondents tend to overestimate their self-reported behaviour (Armitage and Conner, 2001). Future studies should employ additional methods such as interviews, case studies and group discussions.

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