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# Predicting green product consumption using theory of planned behavior and reasoned action

Justin Paul<sup>a,\*</sup>, Ashwin Modi<sup>a</sup>, Jayesh Patel<sup>b</sup><sup>a</sup> Graduate School of Business Administration, University of Puerto Rico, San Juan, PR, USA<sup>b</sup> V.M. Patel Institute of Management, Ganpat University, Kherva, Gujarat, India

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## ABSTRACT

The extended Theory of Planned Behavior (TPB) incorporates environmental concern, a critical variable in green marketing literature, intending to achieve triple bottom line (TBL). In this context, this study aims to validate TPB and its extended form (mediating role of TPB variables), as well as the Theory of Reasoned Action (TRA), to predict Indian consumers' green product purchase intention. We collected primary data from 521 respondents as input, establishing validity through confirmatory factor analysis (CFA). Our empirical results of structural equation modeling (SEM) show that extended TPB has higher predictability than TPB and TRA in green marketing settings. Consumer attitude and perceived behavioral control significantly predicts purchase intention whereas subjective norm does not. Our findings also suggest that TPB mediates the relationship between environmental concern and green products purchase intention. An additional construct in the new model considerably contributes to improving the understanding of green products purchase intention formation and could become a sustainable mainstream variable.

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## 1. Introduction

Over the past two decades, environmentalism has reflected consumers' embrace of sustainable consumption (Han et al., 2009; Kalafatis et al., 1999). As consumers become aware of their consumption-related environmental problems, they seek to purchase environmentally friendly products (Kilbourne et al., 2009; Laroche et al., 2001) for future generations' benefit. While satisfying personal needs remains central to consumer behavior, environmental preservation has also become a primary concern (De Moura et al., 2012; Verbeke et al., 2007). Pertaining sustainability, balancing the ecosystem (ecological), profit-generation (economic) and people (social) is a core concern (Vermeir and Verbeke, 2008).

This increased awareness and interest in sustainable consumption is expected to influence consumer purchase decisions (De Moura et al., 2012). Moreover, sustainable consumption has drawn more attention from corporate decision-makers due to stricter environmental regulation and growing stakeholder pressures focused on preserving the environment (Hult, 2011; Maignan and Ferrell, 2004; Banerjee et al., 2003; Karna et al., 2003).

Under the operational perspective, sustainable consumption may be achieved by encouraging green product consumption. The term "green products" is defined as "products that will not pollute the earth or deplete natural resources, and [that] can be recycled or conserved" ("Green Products") (Shamdasani et al., 1993). To promote Green Products, marketers must focus on consumer preferences and decision-making processes (Cherrier et al., 2011). Nevertheless, marketers have not succeeded at selling Green Products, due to environmentally concerned consumers' fluctuating preference for these products (Ha and Janda, 2012; Kilbourne and Pickett, 2008) despite remarkable growth rate in these consumers (Schlegelmilch et al., 1996). To tackle this issue, Barber (2010) recommended that scholars investigate consumers' adoptability of sustainable practices, attitudes, and purchase intentions for Green Products.

Meta-analysis reveals that environmental concern is one of the important sustainability variables in green marketing literature (Wiernik et al., 2013). The term "environmental concern" was derived from political discourse and refers to values, attitudes, emotions, perceptions, knowledge and behaviors related to the environment (Ogle, 2004; Bamberg, 2003). Initially, scholars perceived environmental values, perceptions, and knowledge as critical to environmental concern (Maloney and Ward, 1973), but thereafter categorized them as precursors to environmental concern. Subsequently, researchers excluded actual behavior from the

\* Correspondence to: University of Puerto Rico, USA.

E-mail addresses: [profjust@gmail.com](mailto:profjust@gmail.com), [Justin.paul@upr.edu](mailto:Justin.paul@upr.edu) (J. Paul), [ashwin\\_modi@yahoo.com](mailto:ashwin_modi@yahoo.com), [ashwin.modi@upr.edu](mailto:ashwin.modi@upr.edu) (A. Modi), [jayesh.jd@gmail.com](mailto:jayesh.jd@gmail.com) (J. Patel).

definition of environmental concern to avoid circularity (Bamberg, 2003). Fundamentally, environmental concern is a direct predictor of specific environmental behaviors, which in turn are predicted by consumer attitudes toward specific behaviors (Weigel, 1983; Ajzen and Fishbein 1977).

Another factor that affects the degree of environmental concern is consumers' country of origin. Empirically, consumers from developed countries are more concerned about the environment than those from developing countries. Nevertheless, to prevent further environmental degradation more research is needed to understand consumers' Green Product purchase behavior in developing countries that have varied environmental concern, belief, and attitudes than their counterparts across world (Singh and Gupta, 2013). In this context, this study aims to validate TPB and its extended form (mediating role of TPB variables), as well as the Theory of Reasoned Action (TRA), to predict consumers' green product purchase intention in India, the second fastest growing developing economy. The study of Green Purchase behavior in an emerging market like India is important because of four reasons. (a) The country is among the world's ten largest economies, based on absolute gross domestic product (Sharma and Srinivasan, 2008; Gwartney and Lawson, 2007), and is expected to become the world's third largest economy by 2050 (Pillania, 2008). (b) Having a large consumer base, high growth rates, and low inflation and labor costs, India has a competitive advantage that make it an attractive market wherein to invest (The Economic Times, 2014; D'Souza and Peretiakko, 2002). (c) From an economic perspective, industrial growth is crucial to sustain growing populations such as India's, which ultimately results in production of additional environmental problems. This industrial pollution continuously degrades the quality of the India's environment (D'Souza and Peretiakko, 2002). (d) Green Purchase behavior in India has been largely unexplored. Only a few notable studies have been published in the area of Green Product purchase intention with data from the Indian subcontinent (e.g. Singh and Gupta (2013), Paul and Rana (2012)) despite the recent growth in green marketing activities, which has increased consumer knowledge and compelled consumers to purchase Green Products (Rahbar and Wahid, 2011).

Traditionally, scholars perceived Indians as environmentally conscious (Goswami, 2008; Jain and Kaur, 2004). In 2012, Indians were more conscious of their environmental impact and obtained a higher Greendex score than consumers from China, Brazil, Russia, Germany, Canada, Australia and America (Greendex, 2012). However, researchers have yet to identify why Indian consumers exhibit this behavior, and why their low green product consumption is not commensurate with their high environmental consciousness (Sheth et al., 2011).

The models grounded in social psychology such as Fishbein and Ajzen's (1975) Theory of Reasoned Action ("TRA") and Ajzen's (1991) Theory of Planned Behavior ("TPB") have been used to understand consumer green purchasing behavior (Albayrak et al., 2013). Nevertheless, considering the already established role of country-context in green consumption, consumers likely do not have partial or full or partial volitional control in green purchases, and applications of these models ought to be validated.

In sum, consumers' purchase intention ("PI") for green products can be studied by applying the TPB tenets of green consumption. This study aims to compare TRA, TPB, and extended TPB models (inclusion of direct and indirect influence of environmental concern on purchase intention) and their effectiveness in predicting purchase green product purchase intention. The following section describes our conceptual framework. Section 3 presents our methodology, and Section 4 provides a description of the results of reliability and validity tests, through confirmatory factor analysis and hypothesis testing through structured equation modeling.

Section 5 describes the implications and limitations of the study.

## 2. Conceptual framework

### 2.1. Environmental sustainability and green consumption

According to the Norwegian Ministry for the Environment (1994), the term "sustainable consumption" refers to "the use of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, of toxic materials and emissions of waste and pollutants over the life-cycle, so as not to jeopardize the needs of future generations" (De Moura et al., 2012). Sutton (2004) defined environmental sustainability as "the ability to maintain things or qualities that are values in the physical environment" (cited in Jones et al. (2011)). From an environmental perspective, green consumption could aid achieving environmental sustainability, and, for this reason, maximizing sales and consumption of green products was green marketing's main agenda (Bonini and Oppenheim, 2008). Creating a shared sense of responsibility for the environment could incentivize consumers to purchase green products. (Chen and Peng, 2012) in the short run and adopt greener lifestyles in the long run.

In purchase intention formation, the role of personal/social factors were examined via TRA (Park, 2003), while the influence of added non-volitional factors were considered by employing TPB (Han et al., 2010). Despite acceptance of these theories in predicting the relationship between consumer attitude and intention behaviors, such as recycling behaviors (Davis et al., 2009; Newholm and Shaw, 2007; Davies et al., 2002), green purchase behaviors (Chen and Tung, 2014; Ha and Janda, 2012), and organic food choice (Zhou et al., 2013; Paul and Rana, 2012), several researchers doubted these theories' explanatory power in different research settings and contexts, such as (Black, 2010; Armitage and Conner, 2001).

Currently the models developed under these theories are country-specific and cannot be readily applied outside their country-context (Lee and Green, 1991; Green et al., 1983). Moreover, the vast majority of studies have been conducted in the context of "Euro-American" countries (Cheah and Phau, 2011). In addition, consumer attitude towards green consumption vary depending on several factors, including culture, and consumers' expressed environmental concern (Singh and Gupta, 2013).

### 2.2. TRA and TPB

Fishbein and Ajzen (1975) developed TRA to explain customer behavioral intentions. Ajzen and Fishbein (1980) assumed that intentions are the single most important predictor of human behavior, and that humans are rational in making systematic use of any available information (Ding and Ng, 2009). The model was originally developed and concerned with predicting intentions to take reasoned action in ordinary life experiences, such as using birth-control pills. TRA addresses the impacts of cognitive components (Guo et al., 2007).

TRA serves to analyze for nonroutine thinking decisions, for such behavior which requires critical deliberation (Oppermann, 1995). Put differently, TRA is effective at explaining psychological/cognitive processes to comprehend consumers' contextual decision-making. (Han and Kim, 2010). TRA's central tenet is individuals' intention to engage in given behavior. In this context, "intention" refers to willingness or readiness to engage in behavior under consideration (Han and Kim, 2010; Ajzen, 1985). Under this theory, green products purchase intention indicates the extent to which consumers' are willing/ready to purchase green products or adopt green choices/alternatives.

Intention is considered as precursor to and best predictor of behavior (Ajzen, 2002). In social psychology, TRA has been widely studied (Malhotra and McCort, 2001; Eagly and Chaiken, 1993). Various scholars have tested and validated Fishbein and Ajzen's model in different settings, including health behaviors, voting, online mediums, organic food, alcohol use etc. (Netemeyer and Bearden, 1992; Lee and Green, 1991). Having excellent predictability, TRA has been quite useful to predict behavioral intentions and behaviors in the areas of marketing and consumer behaviors (Choo et al., 2004; Lam and Hsu, 2004).

More specifically, TRA has been utilized to predict the intentions in green marketing areas, such as examining energy conservation, recycling behaviors (Davies et al. 2002), and green purchase behaviors (Ha and Janda, 2012; Wahid et al., 2011; Sparks and Shepherd, 1992). However, TRA addresses purely volitional control and fails to address owning of requisite opportunities and resources (Madden et al., 1992). The omission of certain non-volitional factors for determining human behaviors (e.g. resources) questioned the applicability of TRA (Han et al., 2010; Park, 2003). For instance, certain consumers may view green products positively, but may not be able to purchase them due to a low income or product unavailability.

When constraints on action perceived by consumers' behaviors are not predicted well by mere formation of an intention, control factor provides information about constraints perceived by consumers and improve the theory's predictability (Armitage and Conner, 2001). This non-volitional control-perceived behavioral control factor was incorporated into TPB to extend the boundaries of TRA (Ajzen, 1985, 1991). TPB "allows us to examine the influence of personal determinants and social surroundings as well as non-volitional determinants on intention" (Han et al., 2010). *Perceived Behavioral Control (PBC)* ought to exert no influence on the intention-behavior link if should said behavior be under full volitional control; otherwise it moderates the relationship should the behavior not be under full control (Armitage and Conner, 2001).

In particular, TPB improves the purchase intention model's predictability (Jebarajakirthy and Lobo, 2014) for green products. The model optimizes the potential relationship between intention and its determinants by measuring each construct at equivalent levels of specificity. As a conceptual framework, TPB has been applied to model organic food choice (Dean et al., 2012; Paul and Rana, 2012). The TPB model has been validated in several studies investigating recycling behaviors (Davis et al., 2009; Davis, Phillips, Read and Iida, 2006; Oreg and Katz-Gerro, 2006) and green purchase intentions (Chen and Tung, 2014; Zhou et al., 2013; Chen and Peng, 2012; Han et al., 2011; Barber et al., 2010; Han et al., 2009; Mostafa, 2007; Tarkiainen and Sundqvist, 2005). As postulated, TPB assumes three predictors of intentions: attitude towards behavior, subjective norm, and perceived behavioral control. We now turn to a discussion of each of these predictors.

### 2.2.1. Attitude (Att)

Attitude toward the behavior refers to the "degree to which a person has a favorable or unfavorable evaluation of the behavior in question" (Ajzen, 1991). Moreover, attitude includes judgment on whether the behavior under consideration is good or bad, and whether the actor wants to do the behavior (Leonard et al., 2004). Ramayah et al. (2010) pointed that attitude includes perceived consequences associated with behavior. According to Kotchen and Reiling (2000), attitude is the main important predictor of behavioral intention. Attitude is the psychological emotion routed through consumers' evaluations and, if positive, behavioral intentions tend to be more positive (Chen and Tung, 2014).

More specifically, in the context of green products, a positive relationship between attitude and behavioral intention has been established across many cultures (Mostafa, 2007). Birgelen et al.

(2009) observed that consumers prefer environmentally friendly beverage packaging if they hold positive attitude towards preserving environment. In fact, Barber et al. (2010) verified this proposition in wine tourism context. In the green hotel context, many studies determined that intention is positively influenced by attitude (Han and Yoon, 2015; Teng et al., 2014; Chen and Tung, 2014; Chen and Peng, 2012; Han et al., 2011; Han and Kim, 2010; Han et al., 2010, 2009). In organic food choice behavior, scholars investigated positive relationship between attitude and intention (Dean et al., 2012; Ha and Janda, 2012; Zhou et al., 2013), determining that attitude-intention rationale prevails in green consumption settings.

Our literature review reveals the expectation that a shift in attitude towards green product purchase would increase the purchase intention for green products. Thus, we propose that:

**H<sub>1</sub>.** Attitude towards green product purchasing is positively related to green product purchase intention.

### 2.2.2. Subjective norm (SN)

In the TPB model, a second determinant of behavioral intention is subjective norm. The term "subjective norm" is defined as "the perceived social pressure to perform or not to perform the behavior" (Ajzen (1991), cited in Han et al. (2010)). Hee (2000) highlighted the influence of others who are close/important to the person/actor such as "close friends, relatives, colleagues, or business partners." Subjective norm captures individual's feeling about the social pressure they feel about a given behavior. Moreover, consumers having positive subjective norms towards given behavior than the concerned behavior intentions are more likely to be positive (Han et al., 2010; Taylor and Todd, 1995).

In the marketing and consumer behavior context, many studies have documented subjective norm as an important determinant of intention, including participation intention (Lee, 2005), technology-use intention (Baker et al., 2007), organic food purchase intention (Dean et al., 2012; Ha and Janda, 2012), green hotel revisit intention (Teng et al., 2014; Chen and Tung, 2014; Han et al., 2010;) and environmental conscious consumption (Khare, 2015; Moser, 2015; Tsarenko et al., 2013). These studies noted a positive link between subjective norm and intention. When consumers' perceive that their "significant others" endorse the green purchase behavior, they are more prone to adopt these behaviors. It is therefore expected that they will more likely adopt the group behavior such as purchase of green products (Kumar, 2012). Therefore, we propose that:

**H<sub>2</sub>.** Subjective norm is positively related to the intention to purchase green products.

### 2.2.3. Perceived behavioral control (PBC)

Among these three antecedents in TPB, PBC becomes the most important when concerning behaviors are partially under volitional control. The term "perceived behavioral control" refers to "the perceived ease or difficulty of performing the behavior" (Ajzen, 1991) and reflects past experiences and anticipated obstacles. Zhou et al. (2013) stated that behavioral control (i.e. ability) and motive determines behavior. Hence, the inclusion of non-motivational factors viz. concept of resources (Ajzen, 1989), opportunities (Ajzen, 1989; Sarver, 1983;), facilitating factors (Triandis, 1977), and action control (Kuhl, 1985). Contrary to Bandura (1992)'s concept of self-efficacy is referred as "individual judgments of a person's capabilities to perform a behavior". Self-efficacy considers internal control factors (Bandura, 1992); PBC emphasizes external and general factors (Armitage and Conner, 2001).

Many studies have shown that PBC is positively linked with intention in various research contexts, such as recycling (Taylor

and Todd, 1995), conservation (Albayrak et al., 2013), green hotels (Han et al., 2010; Chen and Tung, 2014; Teng et al., 2014; Chang et al., 2014), organic foods (Thøgersen, 2007; Tarkiainen and Sundqvist, 2005), and green products in general (Moser, 2015). In light of the above, we propose that:

**H<sub>3</sub>**. PBC is positively related to intention to purchase green products.

### 2.3. Derivation of extended TPB

Though the model specified by Ajzen (2002) has received much empirical support, based on our literature review we find that other variables must be added to better understand consumers' green product purchase intention comprehensively. Though ample consumer research on purchase intention in green marketing exists, few studies focus on the environmental effect of consumers' green product purchase intention.

#### 2.3.1. Environmental concern (EC)

Hu et al. (2010) referred to environmental concern ("EC") as "the degree to which people are aware of problems regarding the environment and support efforts to solve them and or indicate the willingness to contribute personally to their solution (Dunlap and Jones, 2002)." Studies explored the consumers' growing attention towards environmental concern and willingness to pay for sustainable products (Van Doorn and Verhoef, 2011). According to several studies, consumers may be willing to pay a small price premium for ethical product attributes (Trudel and Cotte, 2008; Caruana, 2007). From a chronological standpoint, early EC research focus was on ecological issues such as pollution and energy conservation (Kinnear et al., 1974), whereas recent focus is on overall environmental concern (Zimmer et al., 1994). Growing public environmental public concern highlights the importance of studying this relationship. Moreover, the literature highlights the use of ecological (Kinnear et al., 1974) and environmental concern (Van Liere and Dunlap, 1980) interchangeably.

Increasingly more research has used multiple measurements scales to assess consumers' environmental concern with respect to various issues (Synodinos, 1990), including the New Environmental Paradigm (NEP) scale (Van Liere and Dunlap, 1981; Dunlap and Van Liere, 1978). Hu et al. (2010) advocated general environmental concern as a construct used to measure green consumption (Alwitt and Pitts, 1996). Bang et al. (2000) applied TRA to green energy, showing that attitude mediates the EC→PI relationship. Meta-analysis revealed a weak relationship between EC and behavior (Eckes and Six, 1994; Hines et al., 1987). Thus, we suspect an indirect influence through some other variable. In a study by Hansla et al. (2008), EC is significantly related to green behaviors; i.e. consumer readiness to pay premium for green electricity.

Consumers view energy conservation more favorably as their intrinsic EC increases and they develop a positive attitude towards green energy, and become amenable to paying a premium for green energy (Hartmann and Apaolaza-Ibáñez 2012). In addition, Hartmann and Apaolaza-Ibáñez (2012) also determined the direct and indirect effect of EC, finding that environmental concern affects attitude and purchase intention towards green energy brands positively. This study supported the direct and indirect influence of EC through attitudes on green behavioral intentions particularly.

More specifically, purchase intention towards environmentally sound products is strongly motivated by EC (Hutchins and Greenhalgh, 1997). Individuals who are environmentally concerned also influence others' behavior via peer group/family pressures, acting as "significant others" who accept or reject the green purchase behavior displayed by others. Thus, consumers' subjective norm is influenced by increased EC, reducing the

perception of difficulty in terms of resources, time, as well as other factors. Individuals themselves are more concerned towards environment knowing the positive benefits of green consumption.

More recently, Chen and Tung (2014) developed the extended TPB to predict consumers' intention to visit green hotels, observing that TPB variables serve as mediators in environmental concern-intention relationship. Their mediation analysis showed that intention to visit green hotels was indirectly influenced by EC, through attitude towards green hotels, subjective norms, and perceived behavioral control. However, EC is a component of attitude and therefore a direct influence of EC on purchase intention must better explain intention for green products. This direct link between environmental concern and purchase intention was overlooked in Chen and Tung (2014). Therefore, we intend to extend the theory of TPB and TRA in the context of green products. Accordingly, we propose the following hypothesized:

**H<sub>4</sub>**. Environmental concern is positively related to attitude towards the purchase of green products.

**H<sub>5</sub>**. Environmental concern is positively related to subjective norms.

**H<sub>6</sub>**. Environmental concern is positively related to perceived behavioral control.

**H<sub>7</sub>**. Environmental concern is positively related to green products purchase intention.

Based on the aforementioned literature review, following is our research model (Fig. 1).

## 3. Methodology

### 3.1. Target population

The ideal sample for this study consists of adults (age 18 or over). The green context under investigation is very difficult to understand and comprehend for minors (Chan, 2001) because of its conceptual complexity. For this reason, adults are attributed greater ability to compare and evaluate the available choices and make a selection. Indeed, as evidenced in the environmental literature, highly educated people can easily understand the topic under consideration and help provide accurate data compared to less educated (Hedlund, 2011; Han et al. 2010; Han and Kim, 2010; Alwitt and Pitts, 1996) Therefore, we collected data from the sample of highly educated consumers.

We used quota sample to select respondents of or over 18 years

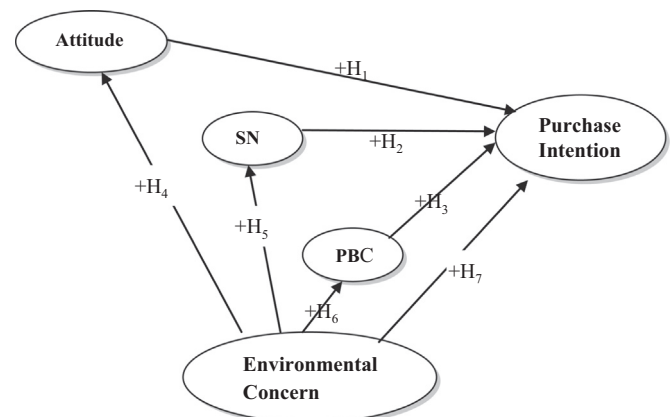


Fig. 1. Proposed research framework.

of age that resided in India. We collected responses through personal interviews and via the internet. We choose personal interview surveys as instruments, because these are highly accurate and allow respondents to enough time to think before filling up the questionnaire (Sekran, 2000), reducing the non-response rate (Kinnear and Taylor, 1996). This study covered a wide geographical area, and for this reason we chose online surveys to reach maximum number of respondents across India in a cost-effective fashion (Zikmund, 1997).

### 3.2. Sample size and composition

The sample size required for this study was computed based on Hair et al. (1998) recommendation of a desired level of 15–20 observations per studied variable. Our study has five constructs (3 items for attitude, 4 items for subjective norm, 7 items for PBC, 5 items for environmental concern and 5 items for purchase intention, totaling 24 items) resulting into ideal sample size of 480 ( $=24 \times 20$ ) respondents. However, 521 responses were considered for analysis, which was much higher than the recommended value of at least 400 (Boomsma, 1987) for structural equation modeling (“SEM”).

From descriptive statistics, Table 1 summarized that majority of the respondents in sample are male, married, educated, with a family size of three–five persons, and a monthly income higher

than Rs. 30,000 per person. Most of the sample fell in the 20–35 age group. The sample's mean age was 32.91 ( $\sim 33$ ) years-old, representing the Indian population.

### 3.3. Measures

The study used measurement scales that have been validated in earlier studies. A 3-item, 5-point Likert type scale was operationalized to measure attitude towards green products purchase based on Taylor and Todd (1995), Chan (2001) and Mostafa (2006, 2009). We measured subjective norm on a 4 items, 5-point Likert type scale which was adopted from (Dean et al., 2012; Chen and Peng, 2012; Arvola et al., 2008; Sparks et al., 1997). The validated 7-item, 5-point likert type scale was used to measure perceived behavioral control taken from these studies (Dean et al., 2012; Chen and Peng, 2012; Armitage and Conner, 1999; Sparks et al., 1997). Environmental scale was measured on a 5-item, 5-point Likert type scale adopted from Kilbourne and Pickett (2008). Moreover, a 5-item, 5-point Likert type purchase intention for green products scale was adopted from Taylor and Todd (1995), Li (1997), Mostafa (2006, 2009) and Chang and Chen (2008). Refer Annexure 1 for detailing of each statement.

Factor analysis using all independent and dependent variables entered with unrotated solution (Yi et al., 2012) showed that six factors having Eigenvalues over “1” accounted for 69.55 percent of total variance. However, the single factor accounted for only 38.51 percent indicating absence of general factor (Podsakoff et al., 2003).

### 3.4. Scale reliability

We established scale reliability through computation of Cronbach's  $\alpha$  using SPSS 20.0. As depicted in Table 2, item-to-total statistics revealed that two items (PBC5 and PBC7) did not meet the threshold value of 0.3 (Nurosis, 1993), thus deleted for further analysis. Excluding these two variables, Cronbach's  $\alpha$  of all constructs were found greater than the threshold of 0.7 (Kline, 2005; Nunnally and Bernstein, 1994) for basic research (Nunnally, 1967).

## 4. Data analysis

Following Arbuckle (2006) and Anderson and Gerbing (1988), we used two-stage procedure to perform SEM analysis through AMOS 19.0. In first stage, we established quality and adequacy of measurement through CFA by ensuring reliability, convergent and divergent validity, followed by using SEM to test causal relationships among latent variables in the second stage. In each stage, maximum likelihood estimation (“MLE”) method was employed (Byrne, 2001). Assessment of goodness-of-fit (“GOF”) was made by multiple indicators:  $\chi^2$  (chi-square),  $\chi^2/df$  (chi-square to degree of freedom ratio), CFI (comparative fit index), GFI (goodness-of-fit index), TLI (Tucker–Lewis index), and RMSEA (root mean square error of approximation). According to Browne and Cudek (1993) and Hair et al., 1998, model fit is good when indices  $\geq 0.90$ ,  $\chi^2/df$  between 2 and 5 and RMSEAs  $\leq 0.08$ .

### 4.1. Validity of measurement model

To test measurement model, CFA was performed using maximum likelihood estimation (“MLE”). All the GOF statistics were very close to the acceptable limit ( $\chi^2=650.94$ ;  $df=199$ ;  $p < 0.001$ ;  $\chi^2/df=3.271$ ; GFI=0.892; TLI=0.925; CFI=0.935; RMSEA=0.066). In order to improve the fit-statistics, we added paths that produced largest decrease in chi-square value, based on modification indices (“MI”) (Chou and Bentler, 1993). Based on Jöreskog and

**Table 1**  
Sample characteristics.

Variable	Categories	Frequency	Percentage*
Gender	Male	349	67.0
	Female	172	33.0
Age	Less than 20 years	15	3.44
	20–35 years	345	65.71
	36–50 years	132	25.33
	More than 50 years	29	5.52
Marital Status	Single	192	36.85
	Married	322	61.80
	Divorced/Widow	7	1.35
Family size	1 person	10	1.9
	2–3 persons	203	39.0
	4–5 persons	255	48.9
	More than 5 persons	53	10.2
Employment status	Full-time job	168	32.2
	Part-time job	24	4.6
	Student	59	11.3
	Housewife	71	13.6
	Unemployed	116	22.3
	Business	83	15.9
Education	High school	162	31.1
	Diploma	54	10.4
	Graduate	102	19.6
	Post-graduate	148	28.4
	Doctorate	55	10.6
Personal income- monthly (Rs.)	Less than 10,000	67	12.9
	10,000~30,000	101	19.4
	30,001~50,000	146	28.0
	More than 50,000	207	39.8

Note: \* The percentages are computed based on total usable sample of 521.

**Table 2**  
Reliability of scales.

Variable	Item	Corrected Item-to-total correlation	Cronbach's $\alpha$	$\lambda$	AVE	Composite Reliability
Attitude	Att1	0.814	0.897	0.890	0.747	0.898
	Att2	0.815		0.877		
	Att3	0.761		0.824		
Subjective norm	SN1	0.793	0.896	0.936	0.730	0.915
	SN2	0.830		0.856		
	SN3	0.786		0.889		
	SN4	0.676		0.722		
Perceived behavioral control	PBC1	0.590	0.819	0.701	0.502	0.831
	PBC2	0.577		0.849		
	PBC3	0.574		0.727		
	PBC4	0.654		0.700		
	<b>PBC5</b>	<b>0.158<sup>a</sup></b>		–		
	PBC6	0.529		0.522		
	<b>PBC7</b>	<b>-0.057<sup>a</sup></b>		–		
Purchase intention	PI1	0.706	0.908	0.726	0.649	0.902
	PI2	0.798		0.808		
	PI3	0.765		0.785		
	PI4	0.798		0.840		
	PI5	0.788		0.861		
Environmental concern	EC1	0.612	0.787	0.816	0.526	0.762
	EC2	0.571		0.807		
	<b>EC3<sup>b</sup></b>	0.553		–		
	EC4	0.606		0.512		
	<b>EC5<sup>b</sup></b>	0.518		–		

Note 1: Att=attitude; SN=subjective norm; PBC=perceived behavioral control; PI=purchase intention; EC=environmental concern.

<sup>a</sup> Deleted due to item-to-total correlation < 0.3 (Nurosis, 1993).

<sup>b</sup> Deleted due to lower standardized factor loadings.

Sörbom's (1993) recommendations, we found that all items were significant ( $t > 2.58$ ) with factor loadings values ( $\lambda > 0.5$ ) except two items i.e. EC3 ( $\lambda=0.49$ ) and EC5 ( $\lambda=0.45$ ). These two items were deleted in measurement model and CFA was performed again. This produces excellent model fit ( $\chi^2=324.71$ ;  $df=151$ ;  $p < 0.001$ ;  $\chi^2/df=2.15$ ; GFI=0.942; TLI=0.967; CFI=0.973; RMSEA=0.047).

We established *unidimensionality* of all constructs through CFI (recommended  $\geq 0.9$ ; Kline, 1998) and standardized root mean square residual (SRMR  $\leq 0.08$ ; Hu and Bentler, 1998). All the constructs were uni-dimensional (CFI=0.973; SRMR=0.03). Furthermore, construct validity was achieved through establishing convergent validity and discriminant validity (Hair et al., 1998). E attained *convergent validity* through two approaches: (a) all factors loadings were significant and above 0.5 (Bagozzi et al., 1991) and

(b) all Average Variance Extracted ("AVE") values were above 0.5 (Ruvio and Shogam, 2008; Fornell and Larcker, 1981), and composite reliabilities were above 0.7 (Hair et al., 1998). This statistics evidenced strong convergent validity (please see Table 2 above). In addition, we used Fornell and Larcker's (1981) methodology to establish *discriminant validity* by comparing  $\sqrt{AVE}$  for each construct with squared correlations between constructs. Table 3 showed that  $\sqrt{AVE}$  exceeds the squared correlations that demonstrate discriminant validity.

**Table 3**  
Discriminant validity.

Constructs	AT	SN	PBC	EC	PI
<b>Attitude (AT)</b>	<b>0.864</b>				
<b>Subjective Norm (SN)</b>	0.249	<b>0.854</b>			
<b>Perceived Behavioral Control (PBC)</b>	0.458	0.325	<b>0.708</b>		
<b>Environmental Control (EC)</b>	0.321	0.228	0.367	<b>0.725</b>	
<b>Purchase Intention (PI)</b>	0.432	0.229	0.454	0.373	<b>0.805</b>

Note: Diagonal values show square root of AVE for each construct.

**Table 4**  
Explanatory power and fit indices of models.

Fit indices and $R^2$	Recommended value <sup>a</sup>	TRA	TPB	Extended TPB
$\chi^2$		546.559	318.835	377.149
$df$		106	104	151
$\chi^2/df$	2–5	5.156	3.066	2.498
GFI	$\geq 0.9$	0.907	0.934	0.934
CFI	$\geq 0.9$	0.924	0.963	0.965
RMSEA	$\leq 0.08$	0.089	0.063	0.054
$R^2$				
PI		0.46	0.49	0.55
AT		0.25	0.26	0.43
SN		–	–	0.24
PBC		–	0.35	0.51

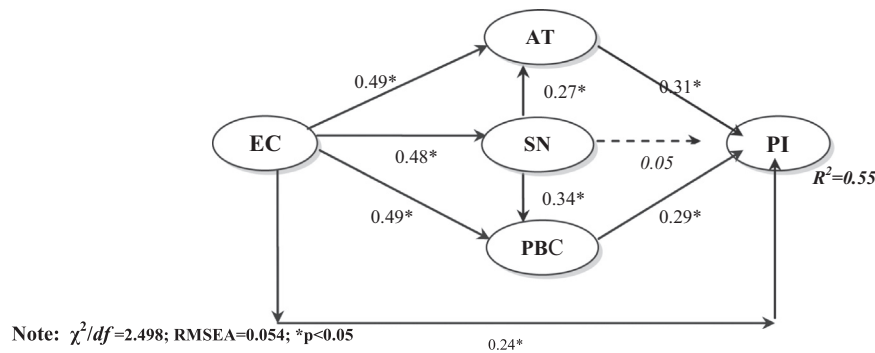


Fig. 2. Structural extended TPB model.

#### 4.2. Test of a structural model

Before examining the structural model, we computed three models, comparison of which is depicted in Table 4. We carried out SEM was first carried out for independent TRA, TPB and extended TPB models. The results of the TRA model were very close to the acceptable fit to the data ( $\chi^2=546.559$ ;  $df=106$ ;  $p<0.001$ ;  $\chi^2/df=5.156$ ; GFI=0.907; TLI=0.903; CFI=0.924; RMSEA=0.089). The results of the TPB model showed the adequate fit to the data ( $\chi^2=318.835$ ;  $df=104$ ;  $p<0.001$ ;  $\chi^2/df=3.066$ ; GFI=0.934; TLI=0.952; CFI=0.963; RMSEA=0.063). So, inferences can be made that consumer purchase intentions for green products were well predicted by applying both TRA and TPB frameworks. After a satisfactory model evaluation, we compared both models' explanatory power (Han et al., 2010). As depicted in Table 4 TPB had superior fit-statistics ( $\chi^2/df=3.066$ ; RMSEA=0.063) than TRA  $\chi^2/df=5.156$ ; RMSEA=0.089) and had better explanatory power ( $R^2=0.49$ ) than TRA ( $R^2=0.46$ ) (Table 4).

Attempts have been made by researchers to refine TRA/TPB frameworks by adding/altering relevant variables to enhance the explanatory power of these models (Ryu and Jang, 2006; Han et al. 2010). Thus, as a next step, TPB model was compared with extended TPB model by testing the direct EC→PI link and indirect relation through TPB variables as mediators. The extended model exhibited excellent fit to the data ( $\chi^2=377.15$ ;  $df=151$ ;  $p<0.001$ ;  $\chi^2/df=2.498$ ; GFI=0.934; TLI=0.956; CFI=0.965; RMSEA=0.054), had better explanatory power ( $R^2=0.55$ ) than TPB ( $R^2=0.49$ ), and better fit-statistics (extended TPB:  $\chi^2/df=2.498$ ; RMSEA=0.054 vs. TPB:  $\chi^2/df=3.066$ ; RMSEA=0.063) (see Table 4).

Finally, we used the extended TPB model for further analysis (see Fig. 2).

Standardized coefficients estimates pointed that path between attitude and purchase intention ( $\beta=0.31$ ;  $t=5.805$ ,  $p<0.01$ ), between PBC and purchase intention ( $\beta=0.29$ ;  $t=4.430$ ,  $p<0.01$ ), between subjective norm and attitude ( $\beta=0.27$ ;  $t=5.676$ ,  $p<0.01$ ), and between subjective norm and PBC ( $\beta=0.34$ ;  $t=6.458$ ,  $p<0.01$ ) were significant and positive (Table 5). However, path for subjective norm and purchase intention was non-significant ( $p>0.05$ ).

Furthermore, the direct influence of EC on attitude ( $\beta=0.49$ ;  $t=7.727$ ,  $p<0.01$ ), subjective norm ( $\beta=0.48$ ;  $t=8.183$ ,  $p<0.01$ ), PBC ( $\beta=0.49$ ;  $t=6.887$ ,  $p<0.01$ ), and purchase intention ( $\beta=0.29$ ;  $t=3.478$ ,  $p<0.01$ ) were found to be positive and significant (Table 5). We also found that the direct effect of attitude on PI was greater than subjective norm, PBC and environmental concern. The influence of EC on attitude was equal to PBC and higher than subjective norm and purchase intention. Table 5 also depicted that subjective norm has significant indirect effect on purchase intention (0.181) than direct and more specifically EC. Moreover, the most interesting finding was the indirect effect of EC on purchase intention (0.404) than direct effect (0.242) in green marketing

realm.

#### 5. Discussion and implications

Our findings indicate that extended TPB has higher utility than TPB and TRA to predict green product purchase intention in India. This study confirmed the efficacy of an extended TPB as a research model useful for explaining consumers' green product purchase intentions and validates the claim that, should attitude and perceived behavioral control be positive, consumers will be more likely to have purchase intentions for green products.

The study's main contribution is that EC was found to be significant and positive for attitude, subjective norm, PBC, and purchase intention for green products; and importantly indirect through TPB variables than direct. Of these three TPB variables, attitude was found to be strongest predictor of intention to purchase green products followed by perceived behavioral control. Consumers in India who are highly concerned about environment should be targeted first to sell green products as they held positive attitude towards green product purchasing. When consumers' attitude is positive and they display higher concern for environment, they will more likely make efforts to reduce their environmental impact (Singh and Gupta, 2013).

Another significant question that emerges from our study is whether or not a significant relationship exists between Indian consumers' perceived behavioral control and green product purchase intention. Responding to this question is of great relevance in the green marketing field, since perceived behavioral control has been considered a good predictor of individuals' intentions to buy green products (Cheng et al., 2006; Baker et al., 2007). Intentions were positively influenced by perceived behavioral control, as consistent with the previous studies (Chen and Peng, 2012; Chen and Tung, 2014).

To reduce perceived difficulty, green marketers must focus on communicating availability of green products, mode of acquisitions, and variety of green products with a view to enhance the perceived availability beliefs and consumers' convenience by stressing its logistic efficiency (Vermeir and Verbeke, 2008). Both green choices and thus green consumer base in India are low and therefore marketers make an attempt to increase their controllability in the form of increasing R&D efforts for offering more green choices, so more potential consumers may be converted into "sustainable mainstream". Further strengthening the PBC, companies can develop infomercial ads demonstrating the performance of green products so as initial trial behavior can be motivated.

Furthermore, we found subjective norm a non-significant predictor of purchase intention, just as Tarkiainen and Sundqvist (2005) did, and unlike Chen and Tung (2014), Chen and Peng (2012), Han et al. (2010). Subjective norm had already been

**Table 5**  
SEM results of extended TPB model.

Paths	Coefficients ( $\beta$ )	t-Value	Direct effect	Indirect effect	Total effect	Hypothesis Supported
AT→PI (+)	0.31	5.805*	0.313	–	0.313	Yes
SN→AT (+)	0.27	5.676*	0.266	–	0.266	Yes
SN→PBC (+)	0.34	6.458*	0.337	–	0.337	Yes
SN→PI (+)	0.05	1.024	0.047	0.181	0.228	No
PBC→PI (+)	0.29	4.430*	0.290	–	0.290	Yes
EC→AT(+)	0.49	7.727*	0.487	0.129	0.616	Yes
EC→SN (+)	0.48	8.183*	0.485	–	0.485	Yes
EC→PBC (+)	0.49	6.887*	0.488	0.163	0.652	Yes
EC→PI (+)	0.29	3.478*	0.242	0.404	0.646	Yes

\*  $p < 0.001$  level.

identified as the weakest link in intention models by earlier researchers, who had applied TPB frameworks in general (Ajzen, 1991), and also specifically to green marketing (Tarkiainen and Sundqvist, 2005). Consumers feel that approval of “significant others” is not that important a factor for buying green products. Their friends/family members/peer group failed to provide any positive thrust concerning a reason for buying green products to consumers.

Therefore, consumers perceive that adoption of green products may not be socially acceptable behavior (Fransson and Gärling, 1999) as “significant others” are not fully aware of benefits of adopting environmental behavior. Being vocal on environmental issues, the role of these “significant others” is very important to translate this concern into a group norm. Policy makers should develop interventions highlighting do's and don'ts to create awareness and develop a separate campaigns that dramatize the detrimental impact of certain routine behaviors using “opinion leaders” like celebrities, sports star etc. in sequential manner and more importantly to realize the long term impact to develop favorable social pressure to stimulate intentions for green products. Companies may support such campaigns as part of their corporate social responsibility (Parsa et al., 2011).

Present research also provides additional information on the importance of EC and its weak influence on green-purchase behaviors. Social norm prevents consumers from act upon their attitude towards green products, weakening the direct relationship between EC and PI for green products, which is consistent with Newhouse (1990). Hence the efforts of Green Product marketers are to promote green campaigns to change individuals' perception of green products (Han et al., 2010), so they can understand the long-term effect of green consumption on the environment. If “significant others” start accepting this phenomena, social pressure will encourage others to purchase green products.

Furthermore, policy makers must develop public interventions showcasing the messages about how consumption of eco-friendly products by environmentally concerned consumers potentially reduces environmental problems. Green consumers would be the first starting point in this regard. More importantly, consumers' EC has more of an indirect than direct effect through TPB variable on PI for green products wherein EC has equal influence on attitude and PBC. Considering attitude as a mediator between the EC-PI link, Indian consumers who are highly concerned and have positive attitudes toward green purchase make favorable environmental adjustments in their purchase behaviors, realizing that nature has reached to its critical level (Singh and Gupta, 2013). For the long-term sustainable effects, consumers with favorable attitudes towards green consumption, such as the LOHAS (lifestyles of health and sustainability) segment (Natural Marketing Institute,

2008) would be pursued first and convinced them to increase their green consumption.

Moreover, EC also influences Indian consumers' perceived behavior control. The plausible reason is that this raised EC motivates consumers to search for sustainable alternatives yield great knowledge about availability of options. This searching behavior also makes consumers aware about many green choices, which are compatible to their existing brand preferences. This will reduce the perception of non-availability of green products to the extent. Furthermore, policy makers must develop public interventions showcasing messages about how consumption of eco-friendly products by environmentally concerned consumers potentially reduces environmental problems. Green consumers would be the first starting point in this regard.

## 6. Limitations and future directions

The limitations of the study can be classified into four points. First, this study considers green products in general, and therefore, findings may be different – i.e. intensity of each path in model if specific green products are considered. Future research should test this proposed model in various green product settings, including recyclable products, organic products, green certified products, laundry and hotels. Second, more relevant variables like self-identity; environmental locus of control can be added to test model's sufficiency in predicting green product purchase intentions.

Third, arbitration is used in deciding TACT elements – i.e. Target, Action, Context and Time (Han et al., 2010) – and therefore, interesting consideration can be made by fixing the time frame (e.g. 'coming times' and 'near future' were used in this study). Fourth, this study has employed convenience sampling, thus the limitations of this method are also implied, and should be taken into account while replicating this study. Finally, this study has not monitored the behaviors, which are of full knowledge to the respondents, and therefore future research can use panel or scanner behavior data to counter the erroneous assumption of behaviors following intention.

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## Annexure 1. : Study constructs with measurement items

### *Attitude towards purchasing green products*

1. I like the idea of purchasing green.
2. Purchasing green is a good idea.
3. I have a favourable attitude toward purchasing green version of a product.

#### **Subjective norm**

1. Most people who are important to me think I should purchase green products when going for purchasing.
2. Most people who are important to me would want me to purchase green products when going for purchasing.
3. People whose opinions I value would prefer that I purchase green products.
4. My friend's positive opinion influences me to purchase green product.

#### **Perceived behavioural control**

1. I believe I have the ability to purchase green products.
2. If it were entirely up to me, I am confident that I will purchase green products.
3. I see myself as capable of purchasing green products in future.
4. I have resources, time and willingness to purchase green products.
5. Green products are generally available in the shops where I usually do my shopping.
6. There are likely to be plenty of opportunities for me to purchase green products.
7. I feel that purchasing green products is not totally within my control.

#### **Environmental concern**

1. I am very concerned about the environment.
2. I would be willing to reduce my consumption to help protect the environment.
3. Major political change is necessary to protect the natural environment.
4. Major social changes are necessary to protect the natural environment.
5. Anti-pollution laws should be enforced more strongly.

#### **Purchase intention for green products**

1. I will consider buying products because they are less polluting in coming times.
2. I will consider switching to environmental friendly brands for ecological reasons.
3. I plan to spend more on environmental friendly product rather than conventional product.
4. I expect to purchase product in the future because of its positive environmental contribution.
5. I definitely want to purchase green products in near future.

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**Justin Paul** is known as an author of text books titled – Business Environment (4th edition), International Business (6th edition), Export – Import Management (2nd edition) by McGraw-Hill, Prentice Hall, Pearson and Oxford University Press respectively. He has served as a faculty member with the University of Washington, Nagoya University of Commerce and Business-Japan, prior to his position with the University of Puerto Rico, USA. He has also co-authored books namely International Marketing and Services Marketing published by McGraw-Hill. He served as Department Chairperson at Indian Institute of Management (IIM), and has taught full courses at Aarhus University – Denmark, Grenoble Eco le de Management, France, Universite De Versailles – France, ISM University, Lithuania, SP Jain, Dubai and Warsaw School of Economics, Poland. He has also published over 25 research papers in reputed journals and four case studies with Ivey & Harvard. His website is [drjustinpaul.com](http://drjustinpaul.com) and email is [profjust@gmail.com](mailto:profjust@gmail.com).

**Ashwin Kumar Modi** is a Post Doctoral Fellow at Graduate School of Business Administration, University of Puerto Rico, PR, USA. He has been awarded for the “Best Doctoral Award” by the AIMS (Association of Indian Management School) – India in April-2005. Dr. Modi has published & presented many articles and research

papers in national and international peer reviewed and refereed journals included in the Australian Business Deans Council (ABDC) Journal quality list. He can be contacted at ashwin.modi@yahoo.com.

*Services, International Journal of Management and Enterprise Development, International Journal of Technoentrepreneurship, International Journal of Business and Emerging Markets and South Asian Journal of Management.* He is a recipient of "Journal of Service Management: 2015 Highly Commended Award" by Emerald Literati Network. He is an adhoc reviewer of MIP, IJoEM and APJML (Emerald Publishing). He can be contacted at jayesh.jd@gmail.com.

**Jayesh D. Patel** is an Assistant Professor at V.M. Patel Institute of Management, MBA Department, Ganpat University, Gujarat, India. He has published research papers in the *Marketing Intelligence and Planning, Journal of Retailing and Consumer*