# Consumer Green Purchasing Intention: A Case in Energy-Saving Light Bulbs

## Paya Y.C. Hsu* and S. Fiona Chan**

*Scholars in green marketing expected the market for environmentally friendly products would mature and substantially expand after the year 2000. Today, although many people express their concern about the environment, environmentally friendly products are still not the first choice for most consumers. Grounded in the Theory of Planned Behaviour, this research investigates the factors which may influence consumers' decision when buying energy-saving light bulbs. Descriptive norm, self-identity and past behaviour were hypothesised to influence consumers' purchasing intention and behaviour. Survey data (N=313) were collected online from New Zealand residents between late 2011 to early 2012. Structural equation modelling was employed for testing the theoretical model. Given the study context and operational definitions of the constructs, all indicators in this study are specified as reflective. Results of the analysis confirm that people with positive attitudinal affections and beliefs, identify themselves as pro-environmental, and have purchased the environmentally friendly products before, tend to have stronger intention to purchase the products. Findings also suggest that most people hold a positive purchasing intention and attitude towards the behaviour (buying energy-saving light bulbs). Practitioners may emphasise these factors when developing marketing strategies to promote similar green products. However, the cross-sectional nature of this study does not allow any causal inference. Further research is needed to examine the causal relationships, as well as the intention-behaviour link.*

**JEL Codes:** Marketing research, Green marketing, Consumer purchasing intention

## 1. Introduction

*Silent Spring* was published in 1962, and induced the public awareness towards human-caused environmental degradation (Bekoff and Nystrom, 2004). People realised that the causes of the environmental degradation (e.g. pollution and resource depletion) could be man-made. Hence, the initial concept of green marketing emerged (Fisk, 1974): if people consumed less resource and there were more environmentally harmless products in the market, the resources for future use could be more sustainable. In 1980s, the United Nations defined the term 'sustainable development' (World Commission on Environment and Development, 1987). The 1990s were identified as the *power in the marketplace* era (Kalafatis et al., 1999). Companies had to respond to the pressure from consumers and their investors by being considerate to the environment. Hence, scholars expected that the market for green products would mature and sustainably expand after the year 2000 (Menon and Menon, 1997).

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However, green marketing was not seen to be as prosperous as predicted. Pickett-Baker and Ozaki (2008) suggested people being aware of the fragility of the ecosystem and the need to do something for the environment; but such recognition was not translated fully to their purchasing decision. Johnson, Fryer, and Raggett's report (2008) echoed Pickett-Baker and Ozaki's point; they found that almost every New Zealander agreed that protecting the environment is everyone's responsibility. Further, half of them considered that urgent action was needed to protect the environment. However, only 3% of their respondents transformed their environmental concerns into purchasing decision. So, what could be the possible reasons that influence consumers making their green purchasing decision?

Though there were many studies investigating consumers' green purchasing intentions, empirical research in purchasing behaviour towards green products in New Zealand was little (Gan et al., 2008). The aim of this study: to explore why people in this country buy (or do not buy) green products, especially when their environmental concerns are strong.

Next section presents the literature relating to green marketing and decision making, and the proposed model. Methodology will address methods used for examining the model, including data collection and data analysis; and followed by the Findings for illustrating and discussing the results from the data analyses. Conclusion section summarises and provides the limitations of this study, and also recommendations for future research.

## 2. Literature Review

The World Business Council for Sustainable Development (2008) suggested reasons for the discrepancy between consumers' stated willingness to help and their inaction when it came to purchasing for the environment. They are: product availability, affordability and performance, consumers' conflicting priorities, consumers' scepticism towards the products, and force of purchasing habit. Though the reasons suggested by the Council may not apply to every context, they indicated a direction of which the influences for consumers' decision making can be both external (e.g. product availability provided in the market) and psychological (e.g. scepticism towards the products).

Often, psychological determinants are more influential than the external settings in influencing people's decision making (Cialdini et al., 1990). Therefore, this research will explore New Zealand consumers' green purchasing decision from psychological perspective. When investigating from psychological perspective, many researchers usually addressed one or two factors only (e.g. Lee, 2008, Gan et al., 2008, Pickett-Baker and Ozaki, 2008, Rahbar and Wahid, 2011). For example, Hong Kong teenagers were influenced by their peers to buy green, New Zealand consumers would tend to buy green products when their environmental consciousness was strong, and London and Malaysian consumers tended to buy green products when they trusted the products/brands. However, human behaviour would not only be influenced by one or two specific factors (Ajzen, 1991). Further, factors that influence consumers making purchasing decision could be different from country to country (Kalafatis et al., 1999). A comprehensive theoretical model is thus needed.

### 2.1 Proposed Theoretical Framework

Theory of Planned Behaviour (TPB), is a widely discussed and applied in the social behaviour field, providing a good framework to explain how individuals decide to act from a cognitive perspective (Ajzen, 1991). The theory suggests that behaviour is an explicit expression of an individual's intentions, thus is preditable. Further, such behvioural intentions are positively

influenced by three variables: relevant attitude, subjective norm (i.e. injunctive norm, the perceived expectations from others), and perceived behavioural control (i.e. the perceived ability to carry out the behaviour).

However, assessing information through one's own attitude, perceived expectations from others and perceived controllability before making a purchasing decision may take too much time and effort. If there is not enough time nor effort, the person may derive quick decision according to clues presented in the situation (Petty and Cacioppo, 1996). Factors such as descriptive norm (Cialdini et al., 1990), self-identity (Rise et al., 2010), and past behaviour (Foxall, 1997) are found to have influence on people's behaviour, including consumers' purchasing intention and behaviour (Armitage and Conner, 2001).

As noted by Ajzen (1991), decision making is based on various factors, and integrating other variables beyond the above mentioned into the TPB is acceptable, even advisable. In the marketing field, researchers have been integrating other variables into the TPB for examining consumer behaviour (Armitage and Conner, 2001). This study incorporates descriptive norm, self-identity, and past behaviour to examine New Zealand consumers' intention to purchase green products. It is hypothesised that New Zealand consumers' green purchasing intention will are influenced by attitudinal and normative (both injunctive and descriptive) factors, and the variables of perceived behavioural control, self-identity and past behaviour.

Attitude reflects a person's relevant beliefs (i.e. thinking), and can be expressed as a person's affective disposition (i.e. feeling) (Smith et al., 2008). However, thinking and feeling are two different concepts, and their effects on intention can differ as well (Golden and Johnson, 1983). As such, in the current study, attitude will be measured from two perspectives: affective feelings and beliefs towards green purchasing. These two attitudinal aspects are hypothesised to have their own and positive influences on intention.

Both injunctive (what is expected by others) and descriptive (what is commonly done by the majority) norms are types of social norms; they provide the explicit and implicit rules and standards of a group that guide and constrain social behaviour without the force of laws (Cialdini and Trost, 1998). These two norms have different influences on behaviour. Further, willingness of following the norms can also influence decision making. Therefore, the normative influences in this study are operationalised as: perceived expectations, willingness to follow the expectations, perceived behaviour of the majority, and willingness to fit into the majority.

Perceived behavioural control in the TPB refers to the perceived self ability to carry out the behaviour, i.e. perceived self-efficacy and controllability (Ajzen, 2002). People who consider they are able to carry out the target behaviour, in theory, will have stronger intention to act. Carrington, Neville and Whitwell (2010) suggested that situational context (i.e. settings in the shopping environment) could either block or enhance people's perceived ability of purchasing the product (e.g. when expensive products are on sale), hence influnces people's purchasing intentions. Therefore, this study investigate the influences of perceived behavioural control on intention in two key domains: (1) perceived self-efficacy and controllability, and (2) situational context.

Self-identity refers to the 'me-identification', which includes the meanings, expectations, and activities related to that identity (Rise et al., 2010). In theory, individuals wil have a stronger intention to buy environmentally friendly products when they identify themselves as a buyer of the products, as hypothesised in this study.

Past behaviour in this study refers to the behaviour individuals have conducted in the past. This factor is presumed to influence consumers' green purchasing intention (Foxall, 1997). People will have a stronger intention to buy environmentally friendly products, if they purhcased such products before.

Figure 1 illustrates the proposed model to examine New Zealand consumers' intention to purchase environmentally friendly products. Next section presents the methods used for examine the model proposed in this study.

**Figure 1: Proposed model**
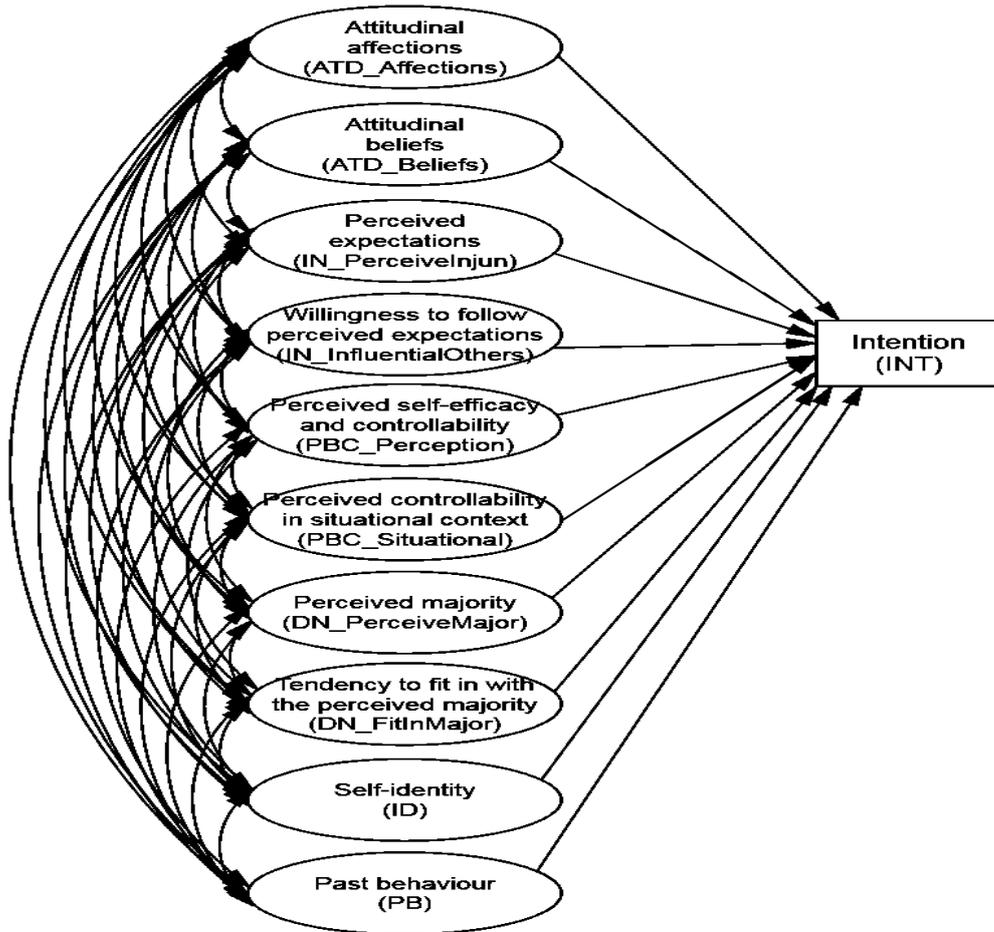


## 3. The Methodology

### 3.1 Survey Respondents and Design

The research was cross-sectional online survey, launched in December 2011 to February 2012, due to the limited research timeframe. The response rate was 26.8% (402 out of 1,500 respondents accepted the invitations). After sorting the missing value analysis and normality, 313 usable cases (132 females, 167 males, and 14 not reported) were left for data analysis. The age range of the respondents was from 16 years old to over 65, as they have completed their compulsory schooling and could have started working (New Zealand Statutes, 1989, 1992) thus be capable in making their purchasing decision.

## 3.2 The Selection of Product Category

The range of green products is very broad, from a hybrid car to a roll of toilet paper made from recycled materials. To avoid ambiguity, energy-saving light bulbs were chosen as the product presented in the survey. There were three reasons for choosing energy-saving light bulbs as the product for the survey, and they provided excellent backgrounds for this study:

(1) Light bulbs are a necessary consumer good in every household in New Zealand nowadays.

(2) Light bulbs can be categorised into two groups: traditional incandescent bulbs and energy-efficient bulbs. According to the New Zealand Energy Efficiency and Conservation Authority [EECA] (2012c), traditional bulbs consume more electricity than energy-efficient ones, when the light output is at similar level. Both traditional and energy-saving bulbs are readily available in the market. However, the energy-saving ones are slightly more expensive than the traditional ones.

(3) At the time of data collection, there was a nationwide advertising campaign under the ENERGYWISE$^{TM}$ programme (EECA, 2009), to increase the public's awareness of energy efficiency in households. This also included promoting a switch to energy-efficient light bulbs away traditional ones (EECA, 2012a, 2012d). Two main benefits given by EECA were savings on electricity bills and that reduced energy consumption is good for the environment (EECA, 2012d).

## 3.3 Instrumentation: Questionnaire

Items were measured on a seven-point Likert scale (1=*strongly disagree* to 7=*strongly agree*), except the five items assessing the *perceived majority* construct. All items were treated as reflective indicators to their representing constructs. This study measured the constructs through respondents' perceptions: perceptions of their attitudes, intentions, perceived expectations, perceived purchasing behaviour of the majority, etc. These perceptions, in a way, are the manifestations of the to-be-measured constructs, thus more in line with the definition of a reflective measurement model (Jarvis et al., 2003). Reliability (Cronbach's alpha, α) of the items in measuring their respective constructs was assessed.

The intention construct had nine items (INTBH, α=.947). Some items measured the intention consturct by asking resondents if they intend to or will buy (Ajzen, 2006, Dodds et al., 1991, Smith et al., 2008), e.g. '*The likelihood that I will buy energy-saving light bulbs is high*' etc. Some examined the respondents' purchasing intentions from their motives, i.e. to protect the environment or reduce electricity bills (Chan and Lau, 2000), e.g. '*I intend to buy energy-saving light bulbs because they are friendly for the environment*'.

There were four items under the attitudinal affections construct (ATD_Affections, α=.902), using suggested adjectives to capture respondents' emotional attitude towards the purchasing behaviour (Ajzen, 2006). The measure started with a leading statement, '*For me, choosing energy-saving light bulbs would be ___*'; with four predefined adjectives (e.g. '*pleasant*'). Eight indicators in the attitudinal beliefs construct (ATD_Beliefs, α=.834) were adopted from research that explored consumer beliefs and related attitudes (Antil, 1984, Whitmarsh and O'Neill, 2010), e.g. '*Consumers should be made to pay higher prices for light bulbs that consume more energy*'.

Four items in the perceived expectations construct (IN_PerceiveInjun, α=.915) were adopted from Smith and colleagues' consumer behaviour research (2008), e.g. '*my family thinks I should purchase energy-saving light bulbs*'. Another four items in the willingness to follow perceived expectations construct (IN_InfluentialOthers, α=.899) were adopted from prior research (Bearden et al., 1989, Whitmarsh and O'Neill, 2010), e.g. '*If other people can see me using a product, I often purchase the brand they expect me to buy*'.

Four items were adopted from prior studies to assess people's perceived self-efficacy and controllability (PBC_Perception, α=.706) (Abrahamse and Steg, 2011, Carrington et al., 2010, Cleveland et al., 2005, Smith et al., 2008), e.g. '*It is easy for me to find energy-saving light bulbs whenever I need to buy them*'. Five items used for assessing the influence from the situational context (i.e. the PBC_Situational construct, α=.776) were constructed according to Carrington and colleagues' suggestion, which started with a statement: '*While purchasing light bulbs, ___ (the factors below) usually affect my purchasing decision*' and followed by five predefined options (e.g. '*affordability*').

There were five items measuring the percieved majority construct (DN_PerceiveMajor, α=.897), constructed in accordance with the concept illustrated by Cialdini and colleagues (1990). There was a statement in the beginning asking the respondents to recall their perceptions, '*Thinking about the following groups, I assume that about ___% of them generally purchase energy-saving light bulbs*', followed by five predefined options (e.g. '*my neighbours*'). These five items were the only items measured on a sliding scale from 0% to 100%. Three items in the tendency to fit in with the perceived majority construct (DN_FitInMajor, α=.711) were adopted from Lennox and Wolfe's study (1984), e.g. '*When I am uncertain which light bulb is better in a store, I look to other people's product choice for clues*'.

There were six items in the self-identity construct (ID, α= .892), adopted from prior research (Bearden et al., 2011, Smith et al., 2008, Terry et al., 1999). For example, '*I consider myself as an energy saver*'. Three items adopted from prior research for measuring the past behaviour construct (PB, α=.966) (Gardner and Abraham, 2010, Norman, 2011, Smith et al., 2008), e.g. '*During the past 12 months, I generally purchased energy-saving light bulbs, whenever there was this option*'.

## 3.4 Data Analysis Strategies

Data analysis strategies were planned according to Byrne's (2010), Kline's (2011), and Tabachnick and Fidell's (2013) suggestions. Preliminary data analyses were conducted first to identify and had resolved issues relating to missing data and data's normality. Then the relationships between the variables and their related underlying concepts were assessed, and were confirmed the items' validity in measuring their respective constructs. The next inspection, which was confirmatory factory analysis (as Figure 2; $x^2_{(31)}$ = 34.014, p=.324; RMSEA=.018, PCLOSE=.968; TLI=.998, CFI=.999), focused on the relationships among the constructs to assess the discriminant validity of the examined variables, and confirmed that the constructs were distinct from each other (none of the intercorrelations among the exogenous latent variables are greater than .90; Kline, 2011). The final step was model testing, using structural equation modelling, using the criteria listed in Table 1 to inspect model fitness. The results are in Section 4.

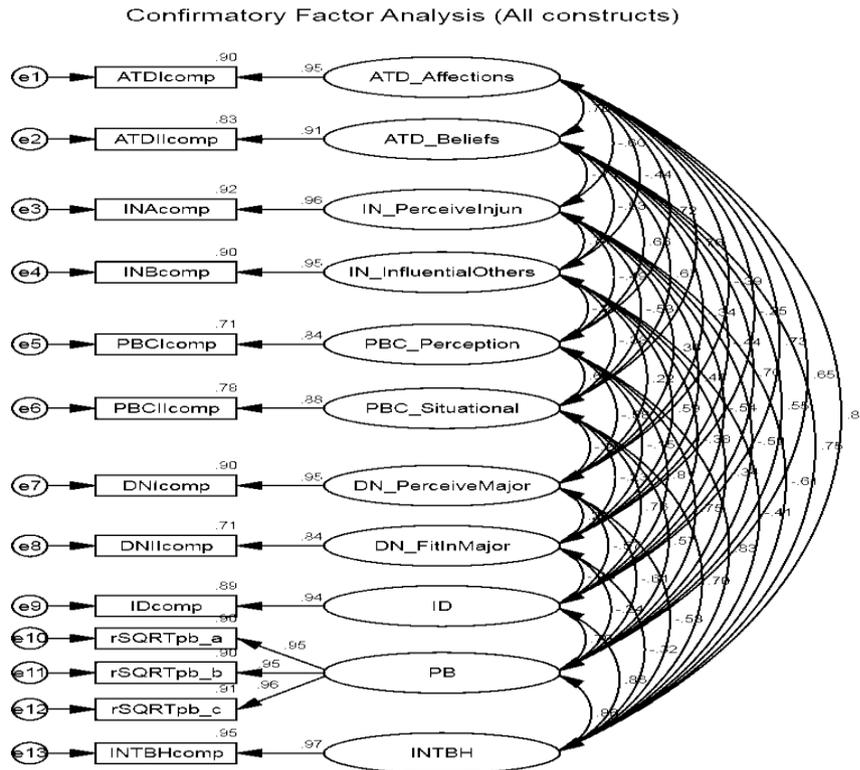**Figure 2: Confirmatory factor analysis (all constructs)**



Confirmatory Factor Analysis (All constructs)

**Table 1: Indices of inspecting model fitness**

| Index | The desired results | Sources |
|---|---|---|
| *Chi-square* with its *p*-value | A smaller chi-square value with a *p*-value greater than .05 | Byrne (2010) |
| The root mean square error of approximation (RMSEA) with PCLOSE | RMSEA < .06 indicates good model fit. PCLOSE > .05 | Byrne (2010) |
| The Tucker-Lewis index (TLI) | A value greater than .95 | Byrne (2010) |
| The comparative fit index (CFI) | A value greater than .95 | Byrne (2010) |

## 4. The Findings

### 4.1 Statistical Results

The examination of the model (as Figure 3 and Table 2) suggests that the model fits the data well and the discrepancy between the proposed model and the data was not statistically significant. The *p* value for the model's chi-square is .280 ($x^2_{(30)}$ = 34.014, N=313). The fit indices also support the chi-square result (CFI=.999, TLI=.997, RMSEA=.021 and PCLOSE=.956).

The proposed model is able to explain about 90% of variance in the *intention* construct (INTBH). Although every proposed antecedent of *intention* (i.e. INTBH) influences *intention,* only the effect from the *attitudinal affections* (ATD_Affections), *attitudinal beliefs* (ATD_Beliefs), *self-identity,* and *past behaviour* are statistically significant and positive. That is, people who have positive attitudinal affections and beliefs, identify themselves as pro-

environmental, and have purchased energy-saving light bulbs before are more likely to have a positive intention to purchase the bulbs. The normative influences (i.e. injunctive and descriptive norms), perceived controllability (i.e. the perceived self-efficacy and the situational influence on the perception of the controllability) are not found to have statistically significant influence on *intention*.

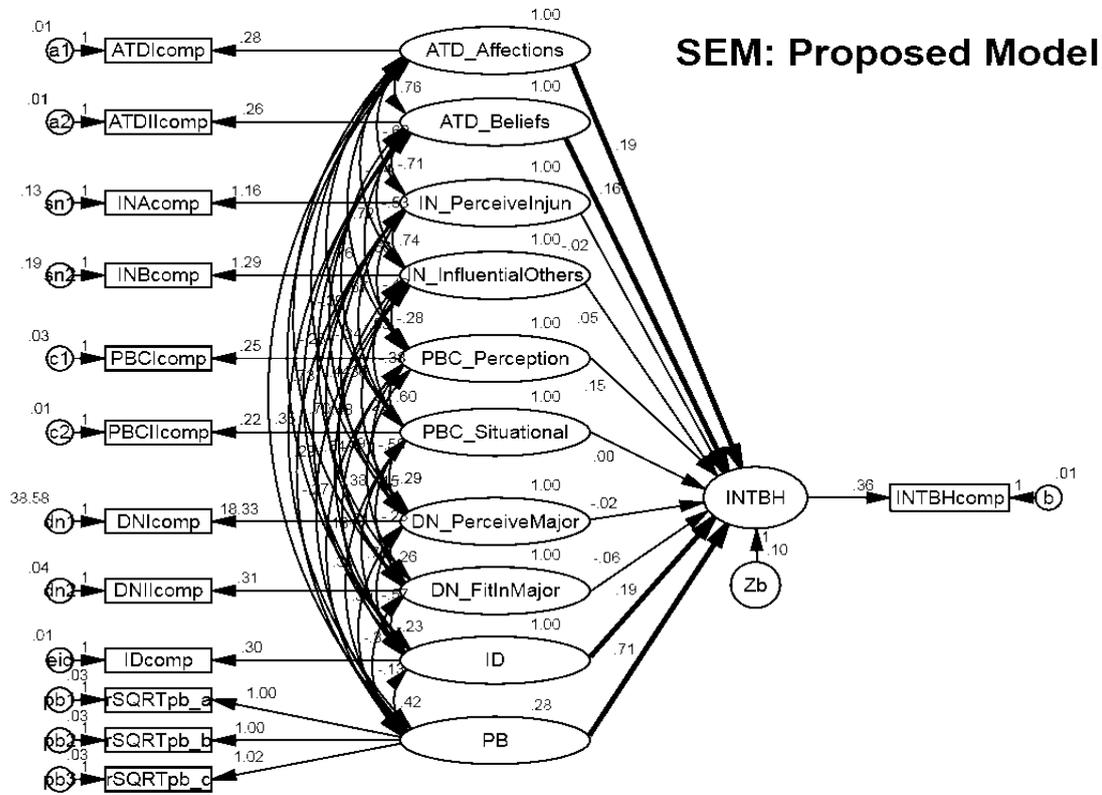### Figure 3: Proposed model (standardised regression weights)



## Table 2: Structural model parameter estimates

| Construct | | Construct | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| INTBH | ← | PBC_Perception | 0.148 | 0.083 | 1.785 | 0.074 |
| INTBH | ← | PBC_Situational | -0.001 | 0.069 | -0.018 | 0.986 |
| INTBH | ← | DN_PerceiveMajor | -0.019 | 0.041 | -0.458 | 0.647 |
| INTBH | ← | DN_FitInMajor | -0.061 | 0.046 | -1.331 | 0.183 |
| INTBH | ← | ID | 0.185 | 0.091 | 2.038 | 0.042 |
| INTBH | ← | PB | 0.707 | 0.1 | 7.088 | < 0.001 |
| INTBH | ← | ATD_Affections | 0.186 | 0.066 | 2.831 | 0.005 |
| INTBH | ← | ATD_Beliefs | 0.158 | 0.071 | 2.235 | 0.025 |
| INTBH | ← | IN_PerceiveInjun | -0.025 | 0.056 | -0.445 | 0.656 |
| INTBH | ← | IN_InfluentialOthers | 0.052 | 0.051 | 1.021 | 0.307 |

## 4.2 Discussion

This research has contributed to the body of knowledge regarding consumers' green purchasing behaviour by providing empirical support to attitudinal affections and beliefs, self-identity, and past behaviour having a significant influence on consumers' purchasing intentions.

These findings are in line with prior studies (e.g. Berger and Heath, 2007, Petty and Cacioppo, 1996, Rahbar and Wahid, 2011)

However, the results were inconclusive about how much influence the other factors (i.e. normative influences and perceived behavioural control) had on consumers' purchasing intentions. The inconclusive of injunctive and descriptive norms, which were not in line with prior studies (e.g. Cialdini et al., 1990), may be due to that the respondents did not perceived much social expectations and/or perceptions of 'many people are doing so' (less than 40% of respondents reported them being expected to do something, and around 40% of respondents reported them perceiving many people were purchasing green products). However, further research is needed to explore this notion. Regarding the perceived behavioural control, result resonates with Kalafatis et al.'s findings in the UK and Greek markets (1999). They also found that perceived behavioural control was not a significant factor to the UK consumers, where green products were easy to obtain (similar situation applies to New Zealand consumers; EECA, 2012b); but it was significant to the Greek consumers, as the products were not easy to buy.

## 5. Conclusion

This study adopts Fishbein and Ajzen's theory, and incorporates descriptive norm (Cialdini et al., 1990), self-identity (Rise et al., 2010), and past behaviour (Foxall, 1997) into an extended model to explain consumers decision on buying energy-saving light bulbs. The proposed model fits the data well, supporting some, but not all hypotheses. Only attitudinal influences (i.e. *attitudinal affections* and *attitudinal beliefs*), self-identity, and past behaviour were confirmed statistically to have influences on New Zealand consumers' intention to purchase energy-saving light bulbs. From a practical perspective, variables found significant in this study can be incorporated when designing marketing strategies to encourage consumers to buy green products in New Zealand.

The cross-sectional nature of the survey limited the generalisability of the results. To address the limitations of such survey study, further research, such as using experiment and/or longitudinal designs, would be valuable and necessary to understand the phenomena. The unstable relationships between intention and its antecedents, as specified in the TPB, could imply that formation of intention is context dependent, as signalled in the UK and Greek studies (Kalafatis et al., 1999). Thus, replicating the study in a different context (e.g. different country) or using other green products (e.g. hybrid cars) may be worthwhile.

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