FACTORS INFLUENCING GREEN ENERGY PURCHASE INTENTION AND BEHAVIOUR: AN EMPIRICAL STUDY

A Thesis submitted by

AL Sadat Ibne Ahmed, BBA, MBA

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Abstract

This research examines the factors influencing consumers' purchase intentions and actual behaviours concerning green energy. Although consumers are indicating much more interest in green energy, not enough research has been done on this topic. This thesis employed the Theory of Planned Behaviour (TPB, Ajzen, 1991) to understand and examine the factors influencing green energy purchase intention and behaviour. Most of the studies that have used TPB as the theoretical framework concluded that there is always a gap between purchase intention and actual behaviour. The present thesis addresses this gap. Although consumers express concern about the environment and have positive attitudes and intentions to respect and purchase green energy, they do not actually buy green energy despite wanting to (Hobman & Fredrick, 2014; Palandino & Pandit, 2019). Yet, the ways to minimise or explain this gap or that can reduce the intention-behaviour gap and its magnitude are poorly understood. In order to push the understanding of the intention-behaviour gap from the social psychology and consumer behaviour literature, this research endeavoured to answer the call from researchers to investigate such a gap. In line with that, this research aims to examine reciprocal determinism and view several factors as determinants of green energy purchase intention and behaviour (GPIB). This is done to generate a better understanding of green energy consumption behaviour, explore intention-behaviour relationships, and understand their respective structure and relative importance in an Australian setting. The research framework devised for this PhD thesis has a two-fold aim:

1. To investigate the factors influencing consumers' purchase intention and purchase behaviour of green energy.
2. To reduce the gap between purchase intention and actual behaviour.

In line with the above research aims, the researcher puts forth two specific research questions, which are:

a) What factors determine green energy purchase intention and behaviour?
b) What can reduce the gap between purchase intention and actual behaviour?

The research model for this study was conceptualised by considering environmental concern, moral norm, green brand perception, retail service quality and green promotion in addition to the core variables of TPB, including attitude, subjective norm, perceived behavioural control, intention and actual behaviour. Thus, the extended TPB model was developed for further empirical examination. A postal survey was employed in this study to examine the hypothesised associations. The postal survey was administered using a self-addressed prepaid envelope which was mailed randomly to 1200 residential consumers across Sydney, NSW. Respondents were randomly selected using the White Pages telephone directory for multiple suburbs of NSW. A total of 386 responses were collected in Sydney, NSW as data input. Data were analysed using a partial least squares-structural equation modelling (PLS-SEM) technique. The study results indicated that the modified TPB model had a satisfactory fit to the data and the inclusion of these constructs significantly enhanced the predictive power of Australian household consumers' intention to buy green energy: R^2 = 0.521 from i.e., R^2 = 0.420 as well as green energy buying behaviour R^2 = 0.570 from i.e., R^2 = 0.259. This indicates the increased predictive power of the added constructs (environmental concern, moral norm, perceived green brand, moral norm, retail service quality and green promotion) in the modified TPB framework. Established here is the practicality and applicability of the proposed model to generate a decent overall data fit for predicting consumers' purchase intention and behaviour. Thus, results show that this thesis's extended TPB model has a strong predictive power compared to the original TPB model with the same set of data. It emerged that "green promotion" had a significant mediational effect between intention and behaviour, and additionally, reduced the gap between purchase intention and actual behaviour. Therefore, the novel theoretical contributions include the predictive ability of the extended TPB model relative to the original TPB model with the same dataset, and an explanation about how "green promotion" can address the intention-behaviour gap. This is the first study that measures five novel constructs, i.e., perceived behavioural control, moral norm, green energy brand, service quality and green promotion. They are validated as the antecedents of GPIB for a sustainable green energy product. This study is also one of the first to attempt a comprehensive study of GPIB using the TPB framework, combining both behavioural intention and behaviour so that it can be employed in an Australian context and thus expand the marketing literature on this topic. By understanding the relationships between future behavioural intentions and their determinants, policy makers and energy marketers preferably should know how to strengthen an attractive image towards green energy consumption and improve their marketing efforts in order to maximize the market share of green energy. The researcher suggests that the Australian government should strengthen the marketing of green energy and promote effective communication strategies to improve the environmental value of green energy to consumers.

Certification of Thesis

This thesis is entirely the work of Al Sadat Ibne Ahmed except where otherwise acknowledged. The work is original and has not previously been submitted for any other award, except where acknowledged.

Principal Supervisor: Dr. Ranga Chimhundu

Associate Supervisor: Dr. Joe Zhou

Associate Supervisor: Dr. Parves Sultan

Student and supervisor's signatures of endorsement are held at the University.

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List of abbreviations

Australian Renewable Energy Agency: ARENA

Attitude: ATT

Average variance extracted: AVE

Carbon emissions: CO_2

Central Business District: CBD

Cronbach's alpha: α

Clean Energy Council: CEC

Clean Energy Regulator: CER

Composite reliability: CR

Consumer attitude: ATT

Covariance-based structural equation modelling: CB-SEM

Environmental concern: EC

Goodness of Fit: GoF

Green energy: GE

Greenhouse gas emissions: GHG

Green energy purchase intention: GPI

Green energy buying behaviour: GEB

Green energy purchase intention and behaviour: GPIB

Green energy brand: GEB

Green promotion: GP

Heterotrait-monotrait ratio of correlations: HTMT

Mandatory Renewable Energy Target: MRET

Moral norm: MN

Multiple group analysis: MGA

Norm-activation theory: NAT

Normed fit index: NFI

Partial least squares structural equation modelling: PLS-SEM

Perceived behavioural control: PBC

Renewable energy Target: RET

Retail service quality: RSQ

Standardised root mean square residual: SRMR

Subjective norm: SN

Theory of planned behaviour: TPB

Variance inflation factors: VIFs

List of publications arising from PhD thesis

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Ahmed, A. S.I., Sultan, P., & Williams, G. (2018). Service quality and brand effects on green energy purchase synopsis for future research. In the *Australian & New Zealand Academy of Management* (ANZAM) (pp.1–27). New Zealand, Massey University.

Ahmed, A. S.I., Sultan, P., & Williams, G. (2019). Factors influencing green energy purchase intention: future research agenda. In the proceedings of the *Australian and New Zealand Symposium on Academic Research* (ANZSAR), 18–19 January 2019, Adelaide, South Australia.

Ahmed, A. S.I., Sultan, P., & Williams, G. (2019). What determines Australian consumers' motivations to buy green energy? In the *Proceedings of Australia and New Zealand Marketing Academy Conference* (ANZMAC 2019), 2–4 December 2019, Victoria University of Wellington, New Zealand.

Ahmed, A. S.I & Sultan, P (2021). Understanding people's pro-environmental behavioural intention towards green energy – a mitigation strategy in the fight against climate change. *American Marketing Association (AMA)-Marketing and Public Policy Conference*, 24–25 June 2021, Washington-USA.

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CHAPTER 1
INTRODUCTION

This chapter introduces the background of the topic, research problem followed by the research aim, questions, objectives, research model, proposed hypotheses, research design and outline of this study.

Chapter outline:

- Introduction
- Sustainable consumption practices with green energy
- Research context
- Research problem
- Research aim, questions, and research objectives
- Research scope
- Research model
- Hypotheses overview and analysis
- Research design
- Thesis outline
- Chapter summary

1.1. Introduction

Electricity production produced from fossil resources is one of the most significant contributors to environmental problems such as global warming, climate change, greenhouse gas emissions (GHG) and carbon emissions (CO_2) globally (Environmental Protection Authority, 2018; Judge et al., 2019; Santamouris, 2020; Palandini & Pandit, 2019). Notably, household consumption is responsible for a large part of environmental degradation and global warming, GHG, CO_2 associated with electricity generation, etc. (Alderson et al., 2012). According to the Intergovernmental Panel on Climate Change (IPCC) report (2016), energy consumption and associated GHG emissions can be significantly mitigated by changing consumption patterns including energy savings practices, ethical consumption, waste management, green consumption and especially through household electricity consumption patterns such as turning to green energy. Green energy is a type of electricity produced from renewable resources that do not produce harmful emissions (i.e., CO_2) and send them into the environment (Palandino & Pandit, 2012, 2019).The term “green energy” is energy derived from a broad spectrum of resources, all of which are based on self-renewing energy sources such as sunlight, wind, flowing water, the earth’s internal heat, and biomass such as energy crops, agricultural and industrial waste, and municipal waste. These resources can be used to produce electricity for all economic sectors, fuels for transportation, and heat for buildings and industrial processes.

The burning of fossil fuels such as coal for energy generation (i.e., non-green electricity) is the main source of carbon emissions and environmental degradation, and scholars believe that green energy can mitigate such environmental degradation (Deepak & Nayak, 2017; Palandino & Pandit, 2019; Xu & Buyya, 2020; Herbes & Ramme, 2014). Consumers can reduce the level of CO_2 and fight climate change by signing up to green energy products. However, despite growing environmental awareness and an apparent preference for green consumption, green energy consumption (i.e., electricity) is not moving well into the household market compared to other green products such as organic food (Palandino & Pandit, 2012, 2019; Hanimann et al., 2015; Ahmed, I et al., 2020). Environmental degradation demands serious attention, and this means understanding that green energy consumption behaviours can determine the likelihood of purchasing green energy. However, research on green energy consumer behaviour is scarce, as it is a new area of research (Alola et al., 2019).

Consumer-oriented research on green energy adoption has been recognised as still scant in the literature (Ozaki, 2011; Ivanova, 2013, 2015; Palandino & Pandit, 2019; Ahmed, I et al., 2021a). This limits the ability of marketers and policymakers to make accurate decisions when dealing with the complexity of the green energy consumption paradigm. This justifies investigating the factors that influence consumer decisions to purchase green energy. This research responds to these challenges by identifying the key predictors or factors affecting green energy purchase decisions and investigates the determinants behind these decisions to understand how the residential market decides on behavioural choices. The scholarly work done on this topic (see Chapter 2) is in the context of both developed and developing countries. However, the lack of research, especially in Australia is also part of the context of this study.

This chapter introduces the research topic, background of the research and the rationale for taking it up, and is organised as follows: Section 1.2 conceptualises green energy as a sustainable consumption product. Section 1.3 discusses the research context and justifies the current research in several perspectives. Section 1.4 covers the research problem, followed by the research aim, research questions and objectives in Section 1.5. The discussion relevant to the research scope is highlighted in Section 1.6. Section 1.7 highlights the importance of understanding the factors affecting green energy buying behaviour. Section 1.8 gives an overview of the research model followed by proposed research hypotheses in Section 1.9. The research design is illustrated in Section 1.10 and how the thesis' structure is presented in 1.10.1. Finally, Section 1.11 summarises the chapter.

1.2. Green marketing and sustainability through green energy

Green marketing is a concept referring to the effort to design, promote, price and sell products in a way aimed to protect the environment (Papadas et al., 2020). Green marketing practices are important because they focus on actions related to education, communication, and promoting sustainable products, such as organic food, organic meat and green energy. Academic research on green marketing has traditionally centred on understanding the role of important cognitive factors (e.g., consumer attitudes, norms, beliefs) affecting consumers' green behaviour. Although there is research explaining the factors affecting consumer behaviour to tangible green products such as organic food (e.g., Sultan et al., 2020), research on how these factors apply to green energy is relatively scarce (Palandino & Pandit, 2012, 2019; Ahmed, I et al., 2019a). Further, much research across numerous green research contexts draws attention to a better understanding of consumers' green purchase intention, to provide an improved understanding of green buying behaviour. Yet, the factors that can reduce the intention-behaviour gap and its magnitude have not been systematically examined, particularly in a green energy context. This research investigates this issue to bind the green marketing and consumer behaviour literature, to understand the key factors behind sustainable consumption of green energy in Australia. Using such knowledge, energy marketers and retailers can help understand people's intention to consume green energy which, in turn, can stimulate the market share of green energy and thus contribute to environmental sustainability (Ahmed, I et al., 2020). issues involved in sustainable consumption such as green energy is significant. Sustainable consumption refers to consuming sustainable products that possess social, economic, and environmental benefits (Joshi & Rahman, 2019). For example, the purchase of sustainable products can curtail environmental from a marketing perspective, understanding consumers' perceptions by exploring cognitive degradation.

The term "green electricity" is one that incorporates green energy (Rowland, 2003; Hansla, 2007; Gerpott, 2010; Oliver, 2011; Ozaki, 2011; Hobman & Frederiks, 2014), green power (Arkesteij, 2005; Tang & Medhekar, 2011), renewable electricity (Palandino & Pandit, 2012, 2019), renewable energy (Ivanova, 2013; Claudy et al., 2013; Masoud et al., 2015) and bioenergy (Halder et al., 2016). Green energy is a specific type of electricity product claimed to have environmental benefits (Hast et al., 2016). In brief, green energy can be defined as the type of energy where the sun is the prime source of its production (Yusaf & Borserio, 2011). Green energy, in general, can be defined as energy derived from natural resources including wind, solar or biomass, while geothermal energy is not associated with carbon emissions into the environment (Tang & Medhekar, 2011; Palandino & Pandit, 2019). Notably, green energy can be defined as a type of energy produced by technology that does not send harmful emissions into the atmosphere and which is derived from environmentally advanced sources (Larsen & Gudlaugsson, 2016). Green energy can also be supplied by energy retailers generated from the electricity grid and subsequently contributes to reducing carbon emissions.

Conventional electricity or non-green energy, also known as “grey energy”, is considered to be a harmful or non-sustainable product and sends high carbon emissions into the atmosphere (Walsh et al., 2005; Watson et al., 2002). Green energy differs from grey energy in that it can be characterised as a result of the association with carbon emissions. The production and usage of green energy aims to reduce emissions, thereby earning the right to be marketed as an environmentally friendly source (Bird et al., 2005). The characterisation of green energy in terms of strengths and limitations is illustrated in Table 1.1.

Table 1.1: Characterising green energy.
Source: Sarkis, 2016

Reinforcing Strengths:

- Support for a public good environmentally & economically
- Emotional appeal for achieving a “warm glow” with consumers.
- Exhibits characteristics of social pressure.
- Low emissions

Persistent Limitations:

- Low participation rates
- Market challenges
- Provider confidence
- Intangible benefits.
- Extra expense

1.3. Research context

The following section deals with the background of the present research and includes a discussion about the importance of choosing the topic – ‘green energy buying behaviour’ – and a justification of the research in the Australian context.

1.3.1. Green energy buying behaviour

In the current globalised economy, consumers and stakeholders have become more conscious about environmental degradation include pollution, global warming, climate change and therefore are turning to green consumption practices (Laroche et al., 2001; Wei et al., 2017; Jaiswal & Singh, 2018). The issue of green buying or green consumption has become a focus for academics and researchers in recent times. After a careful review of the literature see Chapter 2, (2.3), a great deal of effort has been made to understand consumers' psychology and green buying behaviour. However, the main limitation is most research is focused on green products generally (e.g., Yadev & Pathak, 2017; Jaiswal & Singh, 2018), and not a specific type of green product. In looking at this issue, many researchers (e.g., Narula & Desore, 2016; Liobikien & Bernatonien, 2017) also suggest that green consumer behaviour research is basically generic.

It is worth noting that the intricate nature of the consumer decision-making process to buy green products is associated with different types of products. Research (e.g., Yadev & Pathak, 2017; Chaudhary, 2018; Jaiswal & Kant, 2018; Jaiswal & Singh, 2018) suggests that each green product has its own features, benefits, and quality attributes or problems. The determinants of consumers' buying behaviour are determined by different categories and distinct factors (Liobikien et al., 2016; Liobikienė & Bernatonienė, 2017). Therefore, it is important to investigate the circumstances under which a consumer is willing to purchase a particular green product or good/service. This research attempts to investigate this issue to understand the key factors behind sustainable consumption of green energy.

Most research has focused on organic food behaviours, identifying links between organic food purchase intention and behaviour (e.g., Sultan et al., 2020; Papadas et al., 2020), recycling behaviour (Sorkun, 2018; Khan et al.2019). Surprisingly only a few researchers examined intangible product green energy consumer perception (e.g., Palandino & Pandit, 2012, 2019). Research on the possibilities of green energy exists in the literature, mostly from a technical viewpoint (Han & Ansari, 2013; Tan et al. 2019; Wang et al.2019) or an economic viewpoint (Yoshino, 2019; Hao et al.2020), concerning green energy policy (Wüstenhagen & Bilharz, 2006) or a willingness to pay for green energy (Ivanova, 2013, 2015). Relatively little research has examined the role of consumer perception, factors affecting purchase intention, or actual behaviour or also the intention-behaviour gap that exists regarding the purchase of green energy. In this research, attention is paid to the behaviour regarding an intangible product – ‘green energy’ – as currently an imbalance is evident between understanding the intention and the behaviour regarding green energy purchases. Promoting green energy practices is critically essential to increasing environmental sustainability and societal well-being.

1.3.2. Australian context

Research related to green energy buying behaviour has mostly been about identifying the various factors that motivate consumers to engage in such buying behaviour. Even though such studies (discussed in chapter 2) exploring the concept in its length and breadth are largely available in the current literature, a significant gap is visible. In addition, the role of certain factors identified as critical enablers of green energy buying behaviour (GEB), in the context of a developed economy such as Australia is relatively scarce in the marketing literature. The ability of green-energy consumption practices to create confusion among households and prevent an urge for green energy products has been explored and investigated by many researchers, but in such attempts, measurement and estimation of the conceptualised model was done in a different manner. The literature is visibly silent about defining and operationalising the key factors related to green energy fear in the framework that explains the GEB. Keeping the above observations in the background, the objectives of this study were finalised to identify critical factors that act as enablers to green energy purchase intentions and behaviour (GPIB) of customers in the context of a developed country – Australia – and to understand the linkage among major enablers to green energy purchase intention and behaviour. Accordingly, the study focuses on examining both the purchase intentions and subsequent behaviour regarding green energy in NSW (Sydney), Australia (see 4.4.1.1: the sampling location). We expect that a consumers’ decision to purchase green energy will create a significant market for ensuring a sustainable environment. The reasons for choosing Australia are further summarised below:

1. Australia has been identified to be one of the world's biggest greenhouse gas emitters per capita due to the high (76%) use of coal to generate electricity (Clean Energy Regulator 2015; Howard et al., 2018). Of the G20 nations that ratified the Paris Agreement, Australia is still one of the world's highest per capita emitters of GHSs (Howard et al., 2018; United Nations, 2015). This motivated the investigation of consumers' attitude towards green energy.

2. Australia's household market is still insubstantial for stakeholders, i.e., energy retailer, policymakers and marketers (Mydock et al., 2017; Palandino & Pandit, 2019).

3. Empirical studies related to green energy consumers buying behaviour was mostly about identifying the various factors that motivate consumers to engage in such buying behaviour. Even though such studies exploring the concept in its length and breadth are largely available in developed and developing countries (United States, Bang et al., 200, United Kingdom, Claudy et al., 2013, India Halder et al., 2016), where green energy consumer behaviour has helped to enhance green energy consumption practices in some of those countries' communities. However, a significant gap is visible in the literature in the context of Australia. To the best of the researcher's knowledge, research that has examined the factors influencing the green energy buying behaviour of consumers is scarce in Australian marketing literature (Palandino & Pandit, 2019; Ahmed et al., 2019, 2021). Most of the earlier studies in Australia primarily dealt with issues like consumers' attitude towards the brand (Palandiono & Pandit, 2012), willingness to pay for green energy (Galina, 2012), barriers and challenges in green energy consumerism (Hobman & Frederik, 2014), and government policy (John, 2009). Only a few researchers (e.g., Tang & Medhaker, 2011; Paladino & Pandit 2019) have investigated the green energy purchasing practices of Australian consumers. To the best of our knowledge, there is barely any comprehensive research that has analysed the impact of factors (i.e., personal, and contextual) on green energy purchasing practices of consumers in Australia. Notably, the work of Paladino & Pandit (2019) is the only relevant study, and it focused, in particular, on assessing the consumer attitude – but the direct impact and/or relationship of several important psychological factors to the green energy purchase intention and behaviour remains unexplored. We argue that the study (i.e., Paladino & Pandit 2019) had a lack of focus on the direct impact of psychological factors on intention and points to an alternative

view, namely, the factors like attitude, social influence, control belief have a *direct* impact by strengthening intention (Ajzen, 1991) and the indirect impact of these factors on behaviour and /or the effect of any mediation (in the presence of intentions) was also unexplored to reduce the intention-behaviour gap. It is thus still unclear whether consumers' green energy purchase intention is consistent with their actual buying behaviour and what factors play major roles in the decision-making process of Australian households.

4. The review of the literature (see Chapter 2) also reveals that prior studies had some inadequacies with regard to theoretical robustness as well as the generalisability of the results. The detailed organisation of the critical personal and contextual determinants is currently lacking, which gives us immense scope for further research from an Australian standpoint.

5. Research has indicated that Australian consumers are concerned about environmental degradation, but not much has been done about actual purchasing of eco-friendly green energy or any other substantial initiatives (Tang & Medhaker, 2011; Hobman & Frederiks, 2014). For example, the current Australian market share of green energy is only approximately 18.9% (Australian Energy Statistics, 2019 from Clean Energy Council, 2019). It is therefore essential to explore why Australian consumers demonstrate this low consumption behaviour, why their green energy consumption practices do not reflect their strong environmental awareness, and finally assess what motivates Australian households to purchase green energy.

6. Reviewing the current literature on consumers' green energy buying behaviour reveals that their practices regarding green energy are based on distinctive cultural values, customs, expectations, and the level of economic development. Research in Australia can help us to better understand how consumers' practices, norms, social values, environmental psychology, and culture differ from those in other nations.

7. Finally, by focusing on a developed nation, it is important to examine whether or not the intention-behaviour gap reported in the literature (e.g., Bang et al., 2000; Claudy et al., 2013) is relevant to Australia and how to reduce such a gap involved in the green energy context.

In the light of the above reasons, the study explores the factors that determine green energy purchase intention and buying behaviours (GPIB) and how diverse these are in the Australian context. As the market share of green energy remains minimal, consumption of green energy could be stimulated in Australia to facilitate the renewables industry.

1.4. Research problem outline

An extensive literature review has been conducted in Chapter 2 to address the possible research gaps in the current literature. Based on the review of the literature, significant research gaps motivated this PhD research. The following section highlights some of the key problems also see Chapter 2, (2.4).

1.4.1. Elucidating the factors influencing the GPIB

The review of the literature reveals that underlying factors affecting consumers' green energy buying behaviour mostly focused on common factors and are consistent across studies (depicted in Table 2.8) which produced mixed results in terms of the associations between adoption factors affecting green energy purchase intention and behaviour (GPIB). Although scholars have scrutinised several factors affecting green energy purchase intention (GPI) including attitude, social norms, perceived behavioural control, and environmental concern to some extent, no similar research has evaluated the additional important factors viz. green brand perception, moral norm, retail service quality as the antecedents of GPI, their impact on green energy buying behaviour (GEB) and the mediating role (green promotion) in predicting any actual behaviour. Although several common factors (e.g., attitudes, norms, behavioural controls, environmental concerns) affecting the GEB were identified in the extant literature, understanding determinants/factors affecting the GEB is still critical and important theoretically (Paul et al., 2017; Joshi & Rahman, 2015, 2019; Kumar & Muruganandam, 2020). Understanding these factors is likely to differ due to a country's cultural characteristics, socio-cultural differences, the samples used and how they are engaged (Hassan, 2014; Van der Linden, 2015) leaving substantial room for rigorous research.

In addition, the review of past studies (e.g., Halder et al., 2016; Palandino & Pandit, 2019) has provided a substantial theoretical examination of conditions under which consumers' green purchase intentions may or may not directly affect their actual behaviour or better understand the inconsistency in the relationship between intention and observed behaviour. This study seeks to contribute to the literature on sustainable behaviour in the context of green energy consumption by investigating the integrative effects of several factors on their intention and actual behaviour associated with green energy. Different research constructs/factors were established and divided into two main categories, according to their area of influence: – personal and contextual factors discussed in Chapter 3, (3.3). A literature review was conducted on the proposed constructs and justified in Chapter 3 (3.4), analysed in Chapter 5 (5.7) and discussed in Chapter 6 (6.2).

1.4.2. The intention-behaviour gap

Most studies on green consumer research concluded there is always a gap between purchase intention and actual behaviour. While many studies reveal that consumers' psychological factors towards green consumption significantly enhance their intention and behaviour, empirical studies broadly also reported that many people do not actually buy green products despite displaying a positive intention to do so. This discrepancy has been labelled the "intention-behaviour gap" (Carrington et al., 2010; Agag et al., 2020). Recent literature (e.g., Godin et al., 2005; Hassan et al., 2016; Echegaray & Hansstein, 2017; Palandino & Pandit, 2019; Qi, X et al., 2020), demonstrates that consumers' intention of obtaining green products significantly enhances their decisions and activities, but many consumers do not actually mean to carry this intention out (see review Section 2.3.2). Thus, in exploring green buying behaviour, researchers have reported the "intention-behaviour gap" between peoples' expressed positive intention and their actual buying. However, studies exploring the intention-behaviour relationships and ways to minimise or explain these gaps are scarce in current literature (Nguyen et al., 2019; Sultan et al., 2020; Agag et al., 2020; Qi, X et al., 2020; Sultan et al., 2020).

Take kerbside green energy buying behaviour in particular, the intention-behaviour gap was also reported in the literature. Although consumers express concern about the environment and have positive attitudes and intentions to respect and purchase green energy, they do not actually buy green energy despite wanting to (Hobman & Fredrick, 2014; Palandino & Pandit, 2019). Yet, the ways to minimise or explain these gaps or that can reduce the intention-behaviour gap and its magnitude are poorly understood. Our review identifies that only a few studies captured green energy buying behaviour at the primary data collection point. Only six articles in the context of green energy consumption measured intention to purchase and they were limited to the actual behaviour. Take kerbside green energy buying behaviour, six studies (see Chapter 3, Table 3.4) have been found for this review, with only one analysis (i.e., Palandino & Pandit, 2019) undertaken in Australia reporting there was an association between intention and behaviour, although it was not a statistically significant intention-behaviour gap. Our review (for details see Chapter 2 -2.3.2 and 2.4.1.2) reveals that there is no or little explanation for the discrepancy between intention and behaviour in green energy consumption settings. Studies exploring intention-behaviour relationships and ways to minimise or explain these gaps are not explored in a green energy context.

In order to push the understanding of the intention-behaviour gap from the social psychology and consumer behaviour literature, this research endeavoured to answer the call from researchers to investigate such a gap. Importantly, there is a need to examine the role of a motivator that would help to reduce the intention-behaviour gap. This research seeks to address the key shortcomings of the intention-behaviour relationship by exploring the mediating effect presented in Chapter 5 (5.7.2, Fig 5.5, 6.6) and Chapter 6 (6.2.2).

1.4.3. Psychological model in predicting the behaviour

A literature review was conducted to understand the explanatory power (R^2) of the social-psychological model on green energy purchase intention and behaviour (GPIB) perceptions in a global context. Of research conducted relevant to green energy consumer behaviour and published up until 2020, only two studies were built on a robust theoretical model which explained the R^2 (see Table 2.9). Studies conducted overseas (Yazdanpanah, 2015; Halder et al. 2016) provided robust evidence of the influence of socio-psychological factors and predicted a weak amount of variance (33% variance in behavioural intent, Yazdanpanah, 2015) in using green energy. The existing models explored green energy consumption perception (i.e., behavioural intent only), no coherent effort has been made to understand the explanatory power of the model which can explain a substantial amount of the variance predicting the actual behaviour, making it difficult for both marketers and policymakers stipulating suitable strategies to uptake the green energy market. This study endeavours to integrate several factors into one conceptual model predicting both the intention and the behaviour (i.e., GPIB). Marketers then can tune their marketing strategies for green energy consumption. To overcome the limitations inherent in the prior cognitive research model of green energy consumer decision-making, this research proposes a parsimonious model of GPIB that further develops this cognitive approach, as presented in Chapters 5 (5.6.4), 6 (6.4), and 7 (7.2.2).

1.5. Research aim, question, and objectives

1.5.1. Research aim

Research on understanding consumers' green energy buying behaviour (GEB) has garnered significant scholarly attention worldwide due to its ability to reduce environmental degradation (Sangroya & Nayak, 2017). Consumer response to a sustainable intangible product like green energy has long been identified as an emerging area in the marketing literature (Prothero et al., 2011; Caludy et al., 2013). Despite the fact there is widespread support among consumers for an environmentally friendly product - 'green energy' - energy marketers have not been particularly successful in ensuring it is being purchased by the residential market (Rader & Norgaard, 1996; Bang et al., 2000; Larsen & Gudlaugsson, 2016; Hartmann et al., 2018). Reasons may include government support policy, market barriers, lack of knowledge and understanding the key factors influencing the process of consumption and buying behaviour of green energy (Ahmed & Ramsaran, 2014; Ahmed, I et al., 2019a, 2021). Understanding the factors influencing consumers' green energy buying behaviour (GEB) is an imperative because these factors directly influence consumer's purchase intention which is the result of many personal (e.g., attitude, belief, values) and contextual factors (e.g., cost, information, service, brand). These factors need to be examined as they ultimately affect buying behaviours and any underlying motivational factors.

However, the current literature is holistically weak in examining the factors explaining the predictive relationship between the determinants of green energy purchase intention and behaviour (GPIB) which may influence the process of consumption and purchase of green energy (Ahmed, I et al., 2019ab, 2021). Therefore, academic research on green energy consumerism has attracted much interest about what determines consumers' intention and behaviour to be pro-environmental (Bang et al., 2000; Hartmann et al., 2005; Herbes & Ramme, 2014; Palandino & Pandit, 2019). Although intention is examined as a core predictor to influence the actual behaviour (Velnampy & Achchuthan, 2016; Ahmed, I et al., 2019b), empirical studies in the field of green consumerism broadly report that consumers' intention does not always translate literally into actual buying behaviour, known as the intention-behaviour gap (Grimmer & Miles 2017; Saleki et al. 2019; Sultan et al., 2020).

The intention-behaviour gap reflecting the disagreement to translate consumers' positive intention into actual green consumption behaviour, also includes the consumption of green energy (e.g., Claudy et al., 2013; Hobman & Fredrick, 2014; Halder et al., 2016; Palanadino & Pandit, 2019). This is despite displaying a positive intention to purchase it. Although several studies (e.g., Sheeran & Webb, 2016; Echegaray & Hansstein, 2017; Sultan et al., 2020; ElHaffar et al., 2020; Ismael & Ploeger, 2020) have explored the intention-behaviour relationship, these studies exploring ways to minimise or explain these gaps are scarce. Moreover, the current context green energy consumer behaviour fails to explain how such a gap might be closed to increase desirable actual behaviours. It is worth noting that understanding the mechanisms of intention and subsequently enacting behaviours, can allow marketers and policymakers to devise effective interventions to induce the actual behaviour.

Based on the above discussion, arguments and the research problem outlined above (in Section 1.4), this research aims to examine reciprocal determinism and view several factors as determinants of GPIB. This is done to generate a better understanding of green energy consumption behaviour, explore intention-behaviour relationships, understand their respective structure and relative importance in an Australian setting. The research framework devised for this PhD thesis has a two-fold aim:

1. To investigate the factors influencing consumers' purchase intention and purchase behaviour of green energy.
2. To reduce the gap between purchase intention and actual behaviour.

In more detail, this study investigates the integrative effects of consumers' personal and contextual factors on their intention and buying behaviour of green energy (see Chapter 3, 3.3). Intention is viewed as an immediate antecedent of the behaviour, indicating an individual's readiness/willingness to engage in a specific behaviour or action (Ajzen, 2009, 2011). This research offers a systematic approach to evaluate the determinants of green energy purchase intention and GPIB; and extends the theoretical and empirical evidence on the causal relationship between determinants of the intention and behaviour to purchase green energy. Using the Theory of Planned Behaviour (TPB, Ajzen, 1991) as a conceptual framework, this doctoral research is aimed at revealing Australian consumers' (in Sydney, NSW) intention to purchase green energy and provide a better understanding of factors that can trigger the actual buying decision. Consequently, the empirical research establishes a conceptual model to identify how the influencing factors and intention can predict the observed behaviour (see Chapter 3).

1.5.2. Research question

This research examines the factors influencing consumers' purchase intentions and actual behaviours concerning green energy. Although consumers are indicating much more interest in green energy, not enough research has been done on this topic. This thesis employed the Theory of Planned Behaviour (TPB, Ajzen, 1991) to understand and examine the factors influencing green energy purchase intention and behaviour. Most of the studies that used TPB as the theoretical framework concluded that there is always a gap between purchase intention and actual behaviour. The present thesis addresses this gap. The intention-behaviour gap reflecting the disagreement to translate consumers' positive intention into actual green consumption behaviour, also includes the consumption of green energy (e.g., Claudy et al., 2013; Hobman & Fredrick, 2014; Halder et al., 2016; Palanadino & Pandit, 2019). This is despite displaying a positive intention to purchase it. Although several studies (e.g., Sheeran & Webb, 2016; Echegaray & Hansstein, 2017; Sultan et al., 2020; ElHaffar et al., 2020; Ismael & Ploeger, 2020) have explored the intention-behaviour relationship, these studies exploring ways to minimise or explain these gaps are scarce. For example, a recent study in Australia by Palandino & Pandit (2019) reported an attitude-behaviour gap in adopting green energy. Although consumers express concern about the environment and have positive attitudes and intentions to respect and purchase green energy, they do not actually buy green energy despite wanting to (Hobman & Fredrick, 2014; Palandino & Pandit, 2019). Yet, the ways to minimise or explain these gaps or that can reduce the intention-behaviour gap and its magnitude are poorly understood. In order to push the understanding of the intention-behaviour gap from the social psychology and consumer behaviour literature, this research thus endeavoured to answer the call from researchers to investigate such a gap.

In line with above facts, this research aims to examine reciprocal determinism and view several factors as determinants of green energy purchase intention and behaviour (GPIB). This is done to generate a better understanding of green energy consumption behaviour, explore intention-behaviour relationships, understand their respective structure and relative importance in an Australian setting. Investigated here are firstly, the factors influencing consumers' intention and purchase behaviour of green energy; and secondly, reducing the gap between purchase intention and actual behaviour. To explore these themes two research questions are posed:

(i) What factors determine green energy purchase intention and behaviour?

(ii) What can reduce the gap between purchase intention and actual behaviour?

The first research question is concerned with understanding the factors (see Chapter 3, 3.3 and Chapter 6, 6.2) that encourage or discourage green energy purchasing intentions and behaviour in Australia, an advanced market economy. From a marketing perspective, the factors that may encourage and discourage consumers' GPIB can help to influence marketing strategies to make the green energy industry viable (Sovacool, 2014; Stern et al., 2016; Palandino & Pandit, 2019). Such findings are important to educate relevant stakeholders in the green energy industry, as there is currently a critical lack of enough important data (Ahmed, I et al., 2021).

The real challenge of this research lies in investigating the second research question (see Chapter 3, 3.4.2.5 and Chapter 6, 6.2), to reduce the 'intention-behaviour gap'. Its magnitude has not been systematically examined up to now (especially in green energy context). Findings will certainly provide scientific evidence on reducing the intention-behaviour gap and subsequently help practitioners, policymakers and energy retailers devise and implement appropriate green marketing strategies that ultimately help to mitigate the climate change crisis.

The research question is discussed in Chapter 6 (6.2). The research question has important industry and policy implications for green energy programs, which are also discussed in Chapter 6 (6.7).

1.5.3. Research objectives

In line with the above research aim and question, the objectives of the research are:

Research objective 1:

To identify and validate the predictive power of factors affecting the green energy purchase intention and behaviour among residential consumers in Sydney, Australia.

Research objective 2:

To empirically examine the TPB model to explain green energy purchase intention and behaviour.

Research objective 3:

To examine the extended TPB model that may close the gap between green energy consumption intention and actual behaviour.

Research objective 4:

To assess the impact of demographic factors (e.g., age, gender, income, education, usages etc) that may determine the likelihood of purchasing green energy by Australian households.

By tailoring research on consumers' green energy buying behaviour and what triggers them, this thesis offers important information and a vital theoretical basis for promoting the consumption behaviour of green energy in targeted areas. Findings relevant to the research objectives are discussed in Chapter 6 (6.3).

1.6. Research scope

The research highlights and test both the personal and contextual factors that can predict the green energy purchase intention to the actual behaviour. Towards this direction, the research focused on developing a comprehensive model green energy purchase intention and buying behaviour (GPIB) to better understand the motivations, leading to green energy consumption with the goal of helping policy makers and energy retailers utilize more effective green marketing strategies. The lack of understanding in current literature about consumer behaviour of purchasing green energy necessitates the urgency of developing and examining the consumer behaviour model which could broaden the scope of research on the subject by incorporating and understanding relevant factors related to buying behaviour for green energy, thus helping the energy marketers, policy makers holistically to understand various nuances attached to it. Therefore, developing and examining the research model have been considered as the scope of the current research.

The present research examines the determinants of consumers' decisions to purchase green energy and understand how and why they do so. The lack of understanding about consumers' buying behaviour broadens the scope by incorporating and understanding relevant factors affecting such behaviour. Offered here is a new strategic approach to linking green energy purchase intention (GPI) and green energy buying behaviour (GEB), thus helping energy marketers, practitioners, policy-makers, etc., to better understand the nuances attached to them Therefore, examining the key determinants of GPIB as part of a theoretical model is key to this research scope.

Data collection was done via the postal mail method and overall, the sample was confined to residential energy consumers in Sydney, NSW, Australia. This was due to time and budget constraints encountered by this research. Another important aspect of limiting the scope of this study was to obtain ethical clearance. Ethical clearance is a crucial aspect of this type of study and it must be gained beforehand. The ethical clearance as made possible by CQU indicates that this study is confined to the residential consumers of Sydney, NSW, Australia (see Appendix 3).

1.7. Determinants of green energy buying behaviour – research importance

To understand the research's significance, this section discusses the importance of investigating the factors affecting green energy buying behaviour. Consumer response to green products like green energy systems has long been identified as a top research priority in marketing (Prothero et al., 2011; Claudy et al., 2013). From a marketing perspective, understanding the factors influencing consumers' green energy buying behaviour is an imperative because these factors directly influence consumer's purchase intentions which are the result of many personal (e.g., attitude, belief, values) and contextual factors (e.g., cost, information, service, brand). These factors need to be examined as they ultimately affect buying behaviours and underlying motivational factors. In fact, the essence of creating strong motivation for consumers is understanding how consumers intend to purchase green energy and what factors influence their doing so.

Knowing the factors that motivate consumers' green energy purchase intentions (GPI) may help researchers and practitioners to encourage or discourage information assimilation on green energy consumption. Once these potential factors are understood through expanded research, steps can be taken by marketers and policymakers to encourage consumers to purchase green energy.

Since the nature of this research is more focused on marketing approaches, the following benefits are assumed:

- Investigating the factors that affect the purchase intention of green energy (GPI) can contribute to good policy recommendations for simulating GEB in the wider society.

- By understanding the determinants of GPI and their effects on behaviour, policymakers and energy marketers will know how to create and promote an attractive image for green energy consumption and improve green energy's market share.
- Consumers' personal values, norms (i.e., personal factors) and contextual factors are relevant to understanding which policies are supported, while personal factors determine how consumers evaluate and weigh the various consequences that stem from implementing new energy policies and strategies.
- Understanding the predictors of the green energy buying behaviour will make it possible to frame appropriate green marketing strategies, to bridge the gap between intention-behaviour gap and stimulate green energy purchases.
- The empirical findings can help us to understand why consumers are predisposed to accepting green energy and thus would impart valuable data for academia, relevant government agencies and marketers to design policies and strategies that are ideal for Australia.

1.8. Research model overview

To answer the research questions, the study builds a parsimonious research model for consumers' green energy purchase intentions and buying behaviour (GPIB), as elaborated in Chapter 3. In sum, the core construction of the conceptual model is based on the widely accepted psychological model of an intention-behaviour relationship, which is part of the TPB framework (Ajzen, 1991). The TPB model is the most widely used framework and overshadows other social psychologists' models (e.g., VBN theory, the norm activation model, ABC theory, complexity theory) developed in the past three decades (Yazdanpanah & Masoumeh, 2015; Ahmed, I et al., 2017). All these theories have different emphases, and there are overlapping factors that influence green product adoption decisions (Table 3.1). Notably, these theories take into account both personal and environmental variables (e.g., Kalafatis et al., 1999; Salmela & Varho, 2006; Ahmed, I et al., 2017) but do not explain how consumers can translate their intention into green buying behaviour effectively (Kalafatis et al., 1999; Moser, 2015, Paul et al., 2015, Halder et al., 2015: Ahmed, I et al., 2017; Wang et al., 2019). A study of Thompson et al. (1994), using meta-analysis technique indicates that measures of TPB constructs – attitude, subjective norm, and perceived behavioural control, explains 40-50 percent of the variance in intentions and that behavioural intentions explain between 19 and 38 percent of the variance in behavior. Thus, in contrast with other theories, the TPB framework is well established in predicting intentions and behaviours (Ajzen, 1991; Bilic, 2005; Ahmed, I et al., 2019a; Canova et al., 2020; Sultan et al., 2020). Furthermore, prior research demonstrated the validity and applicability of TPB in predicting consumers' green behaviours in different cultural contexts (Paul et al., 2015; Halder et al., 2015; Moser et al., 2015; Yadav & Pathak, 2015, 2016; Khan & Sridhar, 2018; Canova et al., 2020; Liu et al., 2020; Chan et al., 2020; Sultan et al., 2020). In addition, the appropriateness of this theoretical framework also has already been tested and validated to explain intention-behaviour to consume green products and other pro-environmental behaviours (e.g., Sultan et al., 2020). We, therefore, applied the TPB framework to look at what affects consumers' decisions when purchasing green energy and if that provides a reasonable likelihood of answering the research questions.

Further debate about the TPB addresses the inclusion of additional constructs to the main elements – attitude, SN, and PBC – to improve the predictive ability of the model (Sultan et al. 2020). Ajzen and Fishbein (1980) argue that the effect of other factors on behavioural intentions is mediated through the main constructs, or their relative weights. However, in recognition of debate about this aspect of the TPB, Ajzen (1991) also explicitly welcomes research that includes additional constructs to test improvements to the model's predictive ability. Hence, additional explanatory constructs are often incorporated into studies to attempt to achieve this. This research extends application of the TPB beyond the standard variables to include the additional variables environmental concern, moral norm, green brand perception, retail service quality and green promotion. Thus, the research model for this study is conceptualised by considering environmental concern, moral norm, green brand perception, retail service quality and green promotion, in addition to the core variables of TPB, including attitude, subjective norm, perceived behavioural control, intention and actual behaviour. Thus, the extended TPB model was developed for further empirical examination. The concept developed aims to measure the exploration of reciprocal determinism and view both the personal and contextual factors as determinants of GPIB. Reviewing the determinants of green buying behaviour, it was observed that the determinants could be classified. Consequently, the study proposed a classification system dividing the factors into: (a) personal factors, which encompass attitude, subjective norm, environmental concerns and moral norms; and (b) contextual factors which incorporate perceived behavioural control, green brand perception, retail service quality, and green promotion. These both serve as indicators of external motivation to accept green energy.

For research purposes, the conceptual model of this study comprises seven independent research constructs as the antecedents to green energy purchase intention-GPI: attitude, subjective norm, PBC, moral norm, retail service quality, environmental concerns and green brand perception. Three variables to the GEB are: moral norm, perceived behavioural control and green promotion. In addition, to overcome the limitations in intentional models and close the gap between intention and behaviour, the model incorporated the mediating effect via green promotion (elaborated in 3, (3.4.2.5.1) and Sections 5.6, 6.4, 7.2.3) of precipitating events on the relationship between intentions and behaviour. The key factors take into account the GPI and GEB in general and are graphically presented in Figure 3.4. The structural model with outer loading, path coefficients and p-values is depicted in Figures 5.5 and 5.6.

1.9. Hypotheses development and analysis

The partial least squares structural equation modelling (PLS-SEM) tested the hypothesised relationships between the research constructs (see Chapter 4). A conceptual model of the hypothesised relationships (H1~H20) of this doctoral thesis is developed underpinning the TPB framework and establishes twelve hypothesised relationships which are direct, and eight mediating hypothesised relationships elaborated in Chapter 3, (3.6), outlined in Table 1.2, 3.6, 3.7, depicted in Figure:3.5 and the outcome presented in Figure 5.5, 5.6 and 5.7.

The hypotheses were confirmed by evaluating the path coefficients, p-values and t-values obtained from the output of the bootstrapping method of 2000 resamples (Sultan et al., 2020) analysed in Chapter 5, Section, 5.7.

1.10.Research design

To answer the research question stated in Section 1.5.2, this study adopted a six-step procedure. First, reviewing relevant literature is the fundamental step to identify the research gap, then develop the research aim and question. Second, based on the review of the extant literature, this study aims to understand the psychological factors that can explain the purchase intention and actual behaviour concerning green energy. Third, the study generates a discussion in relation to a robust theory for formulating a parsimonious model which aims to understand how consumers intend to act in an ethical way when purchasing green energy and how to reduce the intention-behaviour gap. Used here is the basic framework of Ajzen's Theory of Planned Behaviour (TPB, 1991) to develop a new framework on the antecedents of GPIB. The research model elaborates the direct and indirect relationships among the factors which formulate the research hypotheses that seek to explain green energy purchase intentions and buying behaviour (GPIB).

Fourth, the research methodology and research procedures were developed. A survey questionnaire was distributed to examine the determinants of green energy buying behaviour. Its focus was the demographic profiles of participants and their responses to green energy use in the first part. The second consisted of questions about the constructs formulated for the hypotheses. Fifth, the theoretical model underpinning the hypothesised association was then tested using several statistical methods including partial least squares (PLS), an aspect of the structural equation modelling (SEM) approach. Sixth and lastly, the results of the research were discussed to provide valuable marketing data and information, revealing a number of factors that affect the GPIB.

Table 1.2: Research hypotheses

Research Hypotheses – The Direct Effect

H1: Consumers' attitude to green energy positively influences their intention to purchase green energy.
H2: Subjective norm positively influences the consumers' intention to purchase green energy
H3: Consumers' greater behavioural control significantly increases their intention to purchase green energy.
H4: Environmental concern positively influences consumers' intention to purchase green energy
H5: Green brand positively influences the consumers' intention to purchase green energy
H6: Service quality of energy retailer influences consumers' intention to purchase green energy
H7: Moral norm significantly and positively influences consumers' intention to purchase green energy.
H8: Moral norm significantly and positively influences consumers' actual buying behaviour regarding green energy.
H9: Consumers' greater behavioural control significantly influences consumers' actual buying behaviour regarding green energy.
H10: Green energy purchase intention influences green promotion positively
H11: Green promotion influences green energy buying behaviour positively
H12: Green energy purchase intention generates a positive relationship with consumers' actual buying behaviour

Research hypotheses – The Indirect/Mediation Effect

H13: Consumer attitude has a positive effect on green energy buying behaviour through the mediator green energy purchase intention.
H14: Subjective norm has a positive effect on green energy buying behaviour through the mediator green energy purchase intention.
H15: Perceived behavioural has a positive effect on green energy buying behaviour through the mediator green energy purchase intention.
H16: Environmental concern has a positive effect on green energy buying behaviour through the mediator green energy purchase intention.
H17: Perception of green brand has a positive effect on green energy buying behaviour through the mediator green energy purchase intention.
H18: Retail service quality has a positive effect on green energy buying behaviour through the mediator green energy purchase intention.
H19: Moral norm has a positive effect on green energy buying behaviour through the mediator green energy purchase intention.
H20: Green promotion mediates the positive relationship between consumers' purchase intention and buying behaviour towards a green energy product.

1.10.1. The thesis outline

This thesis comprises eight chapters. Figure 1.1 illustrates how the thesis is structured and each chapter is described in more detail below.

Chapter 1 (Introduction)

This chapter (1) provides an overview of the research, introduces the research background, and explains the nature and meaning of the term ‘green energy’. A justification of researching the Australian context is also presented. The chapter outlines the research problem, research aim, research questions, and objectives upon which the study is based. The chapter closes with the thesis outline and chapter summary.

Chapter 2 (Literature review)

This chapter (2) provides the literature review on this topic. It examines previous studies relating to green energy purchase intention and buying behaviour (GPIB) in the global sense and discusses and identifies what is missing in the literature. The available empirical literature on green energy purchasing is analysed and an attempt is made to identify the factors influencing purchase intention and buying behaviour for green energy purchases. Previous green energy consumer behaviour-related conceptual models and relevant important theories used to investigate consumers’ buyer behaviour of green energy are covered in this chapter, which also describes the green energy industry and how it developed. The chapter in particular, discusses the Australian energy market, green energy production and consumption, the market penetration of green energy, market barriers of green energy and a green energy policy framework and government initiatives.

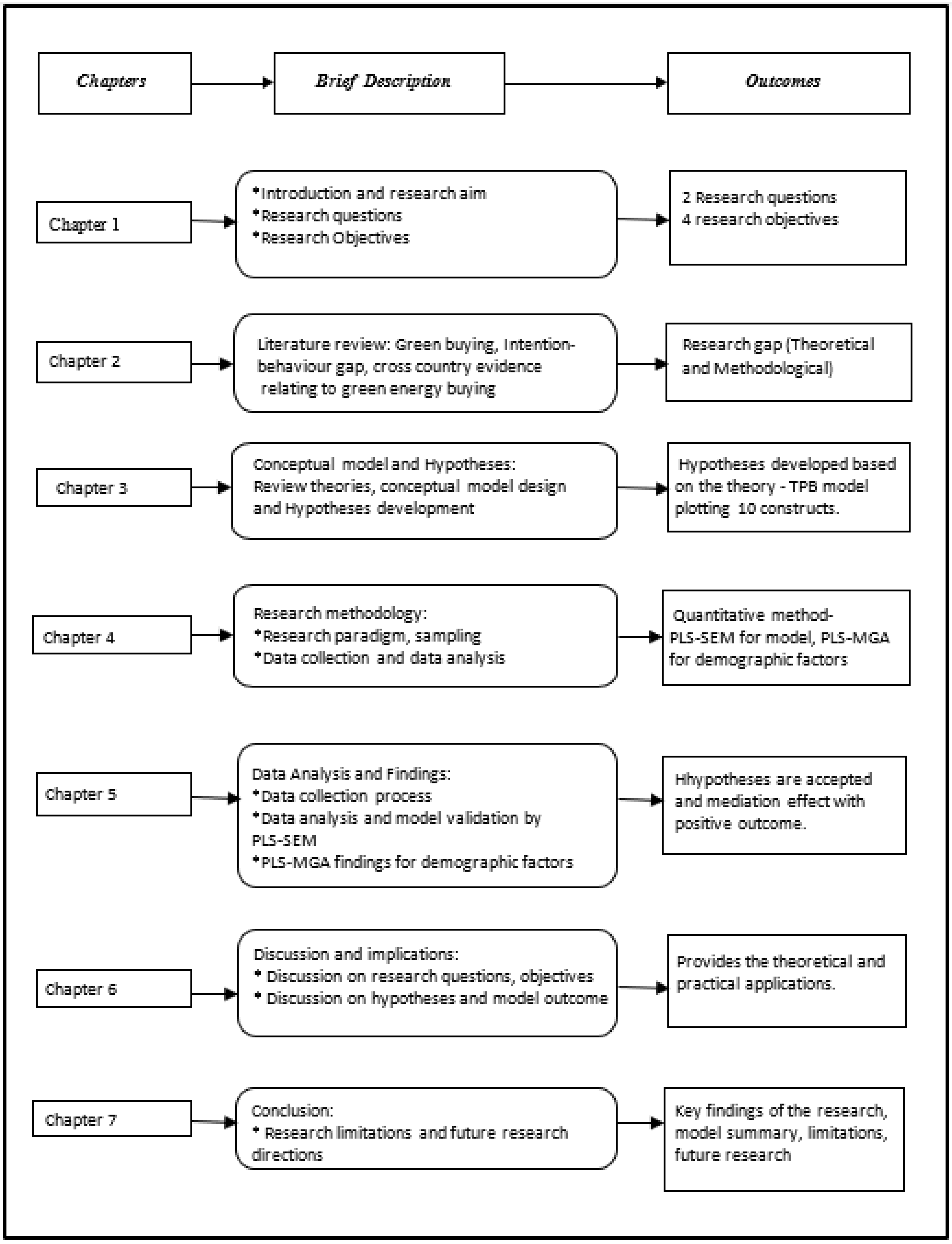


Figure 1.1: Structure of the thesis

Chapter 3 (Development of research model and hypotheses)

This chapter (3) develops a unique theoretical model. This chapter also compares and analyses existing behavioural theories employed in studies on green energy consumption; the outcomes of the thesis will be based on a theoretical framework. A brief description of the structural model to be tested is presented here. All relevant constructs are introduced alongside how they explain what influences consumers' green energy purchase behaviour. Definitions of all the constructs, along with their hypothesised relationships, are explained. It also covers the development and selection of scales and items for each of the constructs.

Chapter 4 (Research method)

This chapter (4) describes the methodology and in particular the quantitative research method. The chapter presents details about the sampling methods, development of the survey instrument, data collection procedures, data analysis techniques including partial least squares (PLS)-based structural equation modelling (SEM).

Chapter 5 (Data analysis and findings)

This chapter presents the results of the research and findings of the proposed model using the PLS-SEM approach. Firstly, the outliers and generality tests are described, followed by the results of non-response preferential data to clear the data. Then the chapter discusses the population sample of respondents and brief descriptive statistics. This chapter looks at the measurement models and analyses of structural models with their varied but appropriate steps. Finally, the results of the hypotheses are offered in this chapter.

Chapter 6 (Discussion, contributions, and implications)

The research questions and objectives are the focus of this chapter. Also covered here are the research contributions, including theoretical and methodological aspects. The chapter concludes with implications and recommendations.

Chapter 7 (Key research findings, conclusion, limitations, and future research directions)

This is the final chapter and the conclusions are explained. First, it presents the key findings, followed by an acknowledgement of the limitations. Then future research directions are proposed.

1.11. Chapter summary

This chapter provided an overview of the research topic and how important it is. Research examining consumers' green energy has been well developed in many countries to gain a better understanding of green energy buying behaviour and toadied in the formulation of policy recommendations for simulating green energy consumption in society. However, such is not the case for Australia despite it being an advanced market economy. This research aims to enrich the literature on green energy consumer behaviour, where research in the Australian context is scarce in any marketing literature. Therefore, the thesis aims to develop a conceptual model of GPIB, its determinants and their impact in the context of green energy marketing in Australian settings. In order to understand the green energy market background, the following chapter discusses the green energy industry including consumption patterns, production, and the prospects for green energy in Australia.

CHAPTER 2
LITERATURE REVIEW

The chapter identifies the inconsistencies and gaps in the literature to provide a rationale for the current research. This chapter reviews the literature about green product buying behaviour, intention-behaviour relationship and empirical studies on consumers' green energy buying behaviour.

Chapter outline:

- Introduction
- Reviews on Australia's green energy market, production, consumption, current market barriers, government policy framework
- Review on green product buying behaviour
- Review on Intention–behaviour gap
- Review on empirical studies: cross-country evidence and Australia
- Research gap: Theoretical and Methodological
- Chapter summary

2.1. Introduction

This chapter highlights the gaps in the existing literature and explains the context that has led to the research aim, question, and objectives as discussed in Chapter 1. Provided here is a comprehensive review of the extant literature both in the global sense (i.e., cross-country evidence) and in Australia with reference to green energy consumer behaviour, consumer’s understanding and choices they make in order to identify gaps in current knowledge. The chapter reviews green buying behaviour including green products, organic food and the like. Literature indigs related to intention-behaviour inconsistencies in the context of green purchasing are also highlighted in the review section. In addition, the chapter also reviews Australia's green energy market, production, consumption, current market barriers, government policy framework and initiatives to expand the green energy market.

The chapter is structured as follows: First a review on Australia's energy market, production, consumption, current market barriers, government policy framework and initiatives discussed in Section 2.2. Section 2.3 presents a comprehensive literature review which serves to establish this study’s research questions, objectives and the current gap in knowledge. Specifically, Section 2.3.3 is linked to the research question which was in turn influenced by the literature review. The gaps in the research are broached under Section 2.4. Finally, the chapter concludes with a summary in Section 2.5.

2.2. A review of green energy industry background

Research indicates that the green energy market has been consistently growing. For example, the annual investment in green energy has increased from 104 billion US$ in 2007 to 150 billion US$ in 2009 with countries such as Germany, China, United States, Italy and Spain being the top investors (Palandino & Pandit, 2012). The existing global green energy capacity at the end of 2010 is currently at 312 GW (Giga Watts) with developing countries having an existing capacity of 94 GW, Europe 135 GW, followed by the United States at 56 GW (Burrett et al. 2009). Green energy programs have become extremely popular around the globe include Europe, German, the U.S and Australia. In the European Union, the market consumption for the green power market was 22.1 per cent in 2010 and is expected to rise to 50 per cent after 2050 (Palandino & Pandit, 2019). Green energy contributes as much today to U.S. energy production. Of the green energy consumed in the U.S in 1998, hydropower comprised 55%; biomass, including municipal solid waste, 38%; geothermal, 5%; solar, 1%; and wind, 0.5% (Palandino & Pandit, 2019). Renewable resources currently account for about 10% of the energy consumed in the United States, most of this is from hydropower and traditional biomass sources. Wind, solar biomass, and geothermal technologies are cost-effective today in an increasing number of markets and are making important steps to broader commercialization (Bull, 2001).

The following section provides a brief background to the green energy industry in Australia. It sets out to improve our understanding of the green energy market scenario by outlining Australia’s green energy production, consumption, barriers, government policy framework and initiatives. This section is structured as follows. Green energy consumption and the market in Australia are discussed in Section 2.2.1. Then in Section 2.2.2 the market barriers to green energy acceptance are examined and finally the green energy policy framework. Government initiatives are discussed in Section 2.2.3.

2.2.1. Green energy production, consumption and market development

The Australian National Electricity Market (NEM) includes the six states of New South Wales (NSW), Victoria, Queensland, South Australia and Tasmania, and the Australian Capital Territory (ACT). Despite its present coal dependence, Australia has huge green energy resources. Two Australian states, Tasmania and South Australia, already generate the vast majority and over 40% respectively of their annual electricity from green energy (Palndino & Pandit, 2019). Tasmania's green energy (and almost all of its electricity generation) is mostly hydro, supplemented by wind, while South Australia's green energy is mostly wind, supplemented by rooftop solar. However, the eastern mainland states e Queensland, New South Wales and Victoria e each generate the vast majority of their electricity from coal. On a national scale, as indicated in Table 21. And 2.2.

Australia is blessed with an abundant supply of green energy resources such as solar, wind, wave, tidal, biomass and geothermal energy. The country is also renowned as one of the sunniest countries in the world and therefore, has the potential to develop its green energy needs to meet increasing energy demand meanwhile reducing greenhouse gas emissions (GHGs) to proactively respond to climate change (BREE, 2018). Sun-derived radiation in Australia is very high compared with many other developed countries. This indicates that Australia has great potential to use a lot of green energy for the required power needs in many communities, and this could have important environmental policy agenda implications. However, the demand for green energy in the liberal market economy is progressing only slowly compared to the demand for other green products. Even though consumers generally hold positive attitudes about green energy (Ek, 2005; Krohn & Damborg 1999), in Australia and in many other countries, only a few residential consumers choose to purchase eco-labelled energy. According to the Department of the Environment and Energy report 2019 (Clean Energy Council, 2019), fossil fuels (coal, oil and gas) accounted for 94% of Australia's primary energy mix in 2017–18. In contrast, the consumption rate (see Table 2.1) of green energy in Australia is only 6.2%. (Clean Energy Council, 2019). Table 2.2 below summarises the penetration of green energy throughout Australia in comparison with the fossil fuels-based energy.

Table 2.1: Energy consumption rate - Australian energy statistics
Source: Clean Energy Council, 2019

	2017–18		Average annual growth	
	PJ	share (per cent)	2017–18 (per cent)	10 years (per cent)
Oil	2,387.8	38.7	3.2	2.0
Coal	1,847.2	29.9	-4.3	-2.6
Gas	1,554.6	25.2	3.8	2.4
Renewables	382.1	6.2	0.9	5.3
Total	**6,171.7**	**100.0**	**0.9**	**0.6**

Table 2.2: Green energy penetration by state
Source: Clean Energy Council 2020

STATE	TOTAL GENERATION (GWh)	FOSSIL FUEL GENERATION (GWh)	TOTAL RENEWABLE GENERATION (GWh)	PENETRATION OF RENEWABLES
TAS	10,786	473	10,313	95.6%
SA	15,062	7213	7849	52.1%
VIC	47,780	36,352	11,428	23.9%
WA	19,264	15,242	4022	20.9%
NSW	71,011	58,851	12,160	17.1%
QLD	66,068	56,747	9321	14.1%
NATIONAL	**229,971**	**174,879**	**55,093**	**24.0%**

2.2.2. Green energy market barriers in Australia

Global warming, climate change and the threat of green gas emissions have triggered much interest in Australia in the move to a more sustainable energy consumption practice. Although Australia is endowed with abundant renewable energy resources and opportunities because it possesses such vast green energy sources, Australia falls behind other developed countries in embracing green energy. Various initiatives and policies have been devised and implemented by Australian governments. However, the consumption rate of green energy in Australia has not increased significantly (see section 2.2.1). There are several barriers that cause this.

The following discussion seeks to explain why Australia has difficulties in adopting green energy including political, retail market and consumers' attitudes and perceptions; these have to some extent blocked the taking up of green energy in Australia. Table 2.3 sums up the several key obstacles hindering the development and deployment of green energy in Australia.

Table 2.3: Green energy barriers in Australia
Source: Byrnes et al., 2013

- Administrative hurdles such as lengthy, regulatory approval and permit procedures
- Non-transparency and costly procedures for grid connection
- Policy instability with sudden policy changes and stop-and-go situations
- Lack of social acceptance
- Cost competitiveness
- Government support for existing electricity sources
- Institutional familiarity and acceptance, and (praxis of the hegemony)

a. The barrier: Political obstacles to green energy development

Although Australia has enormous potential for green energy sources, Australia is far behind other developed nations. The political aspect is one of the core issues that hinders deployment of the green energy market in Australia. Politics regarding green energy have been identified as poor political administration, lack of harmonisation between federal and state governments (Jones, 2009), lack of investment in new technology (Effendi & Courvisanos, 2011), slow government processes in implementing or planning a green energy national target (Kent, 2006), disruption to financials or funding arrangements (Kann, 2009), and conflict between political parties (Byrnes et al., 2013).

b. The barrier: Consumers' adoption of green energy development

Australia has the capacity for a large green energy market but few consumers have adopted green energy. In recent years, consumers concerned with the environment are increasingly considering the environmental and social impact of products and services. However, higher generation cost and the consequently higher market prices discourage consumers from accepting green products (Salmela & Varho, 2006; Ibáñez, 2006; Hartmann & Apaolaza, 2012). For example, green energy market surveys find that up to 30% of consumers are willing to pay a price premium in the adoption of green energy (Zarnikau, 2003). To date, participation in the green energy market remains low (Gan et al., 2007: Hartmann, 2018), and it is 20% more expensive than non-green energy. A national survey conducted by Hobman & Fredrick (2014) identified several factors underpinning the low subscription rate to green energy reported significant barriers in Australia – including financial costs, limited knowledge, awareness and availability of green electricity programs, etc. Palandi & Pandit (2012, 2019) identified the reasons for customer inertia as lack of awareness, lack of government initiatives, poor retail marketing and variable service quality.

2.2.3. Green energy policy framework and government initiatives

The initiatives into green innovations were launched in Australia as early as the 1950s, but it was the late 1990s that the Australian government adopted a series of policies to support demand and supply green energy (Rossiter & Singh, 2006). In order to increase the green energy demand, security of energy supply and reduction of emissions, the legislative policy framework is underpinned by several programs and initiatives. For example, a household aid package worth AUD 14.9 billion over four years has been introduced that will assist to uptake the green energy market (Department of Climate Change and Energy Efficiency, 2011). To support this plan tax cuts, higher family payments, increases in pensions and allowances was implemented. The policy framework (see Table 2.4) structured by the Australian federal government in the deployment of green energy structure is classed as explained more detail below.

- Renewable Energy Target (RET)
- Relevant government authority (RGA)
- Non-government organisation and
- Legislation and regulation

a. Renewable energy target (RET)

In 2000 the Australian government issued the Mandatory Renewable Energy Target (MRET) by establishing 9500 GWh by 2010. This was done to encourage green energy investment through mandatory renewable energy certificates. In 2007, this legislative assembly's goal was met. In 2009, the Australian government implemented the extended Renewable Energy Target (RET) from the MERT. The RET is a Commonwealth Government scheme designed to mandate the proportion of electricity generated from selected renewable sources. The policy aims to reduce the emissions of greenhouse gases and to promote the development of green energy industry in Australia. In January 2011, the RET was divided into two parts: Large-scale Renewable Energy Target (LRET) and Small-scale Renewable Energy Target (RET) (Azad et al., 2014). This change aims to create separate incentives for large-scale green energy projects and small scale-based project, which can decrease the competition with each other in the RET scheme (Hua et al., 2015). All these initiatives related to Renewable Energy Target summarised in Table 2.4

b. Relevant government authority

Green energy policy in Australia is subject to regulations and influenced fiscally by all three levels of government – federal, state and local (Hua et al., 2015). These three levels of government are coordinated by the Council of Australian Governments (COAG) (Kuwahata & Monroy, 2011). In Australia, the state governments play a significant role in green energy use and deployment. The other government organisations involved in green energy deployment are the Clean Energy Regulator (CER), Department of Industry (DOI), and Australian Renewable Energy Agency (ARENA). All these initiatives Relevant government authority related to summarised in Table 2.4

c. Non-government organisations

In Australia, there are also several non-government institutions involved in of green energy deployment. These are the Clean Energy Council (CEC), Australian PV Institute (APVI), and Australian Solar Council (ASC). All these initiatives summarised in Table 2.4

d. Legislation and regulation

To facilitate the implementation of the renewable energy target (RET) scheme, the Australian government has enacted national laws to ensure that such a goal can be achieved in the future. Several pieces of legislation have been introduced, such as Renewable Energy (electricity) Act 2000, Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010, Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000 and Renewable Energy (Electricity) Regulation 2001. All these initiatives summarised in Table 2.4.

Table 2.4: Government initiatives towards green energy in Australia

Types of Government structure	Example
Renewable energy target	• Renewable Energy Target (Large-scale • Renewable Energy Target (LRET) • Small-scale Renewable Energy Target (SRET))
Relevant government authority	• Federal government, State government, local government; • Clean Energy Regulator (CER) • Department of Industry (DOI); • Australian Renewable Energy Agency (ARENA)
Non-government organization	• Clean Energy Council (CEC) • Australian PV Institute (APVI) • Australian Solar Council (ASC)
Legislation and regulation	• Renewable Energy (electricity) Act 2000 • Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act • 2010Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act • 2000Renewable Energy (Electricity) Regulation 2001 • Renewable Energy Certificates (RECs)

2.3. Review of empirical studies

This research aims to examine reciprocal determinism and view several factors as determinants of green energy purchase intention and behaviour (GPIB). Investigated here are firstly, the factors influencing consumers' intention and purchase behaviour of green energy; and secondly, reducing the gap between purchase intention and actual behaviour. To explore these themes two research questions are posed:

(i) What factors determine green energy purchase intention and behaviour?

(ii) What can reduce the gap between purchase intention and actual behaviour?

In line with above research question, this section aims to explore the extensive literature surrounding the factors as determinants of green energy buying behaviour (GEB) in a global context. In addition, the section also provides a review of factors affecting the green product buying behaviour and findings related to intention-behaviour inconsistencies in the context of green purchasing.

For the purposes of this review, the following discussion is divided into three subsections. Section 2.3.1 highlights a general review on green product buying behaviour. Then Section 2.3.2 explores a review of intention-behaviour inconsistencies in the context of green purchasing. Finally, Section 2.3.3 in particular attempts to investigate this issue and bind the green marketing and consumer behaviour literatures relating to green energy consumption, in order to understand the key factors behind sustainable consumption of green energy. This section (2.3.3) emphasises two perspectives: cross-country and Australian. A succinct summary of the literature review on green energy consumer behaviour can be found in Appendix 1.

2.3.1. Review of green product buying behaviour

This section provides both an overview of and the basic trends associated with green product consumption, to understand the context of green energy and how consumers perceive it. Before focusing attention on the key factors behind sustainable consumption of green energy, it is important to first review and discuss what affects changes in consumer behaviour concerning green products in various contexts.

The term "green products" can be defined as those goods and services which will not pollute the environment (Paul et al., 2016). Green buying behaviour (GEB), referred to as consumers' pro-environmental actions and decisions, constitutes a set of behaviours that mitigate damage being done to the environment by reducing the consumption of energy, preventing waste, saving water, and abstaining from buying goods that simply pollute the natural world (Kollmuss & Agyeman, 2002; Sharma & Lal, 2020). The issue of green buying or green consumption has become a focus for academics and researchers in recent times. Research on green marketing began in the 1960s but the main period was marked by a rise in publications at the end of the 1980s, when green purchasing gained traction in many societies (Min & Galle, 1997; Dubey et al., 2013; Uddin & Khan, 2018). Current research on consumption behaviour has gained momentum. Marketing scholars have called for innovative research related to green products to better understand the complexity of green consumer behaviour (Sing & Verma, 2017; Sultan et al., 2020; Jose et al., 2020) and this includes: green product buying behaviour (Kumar & Ghodeswar, 2015; Suki, 2016; Khare, 2015; Tan et al., 2019), organic meat buying behaviour (Rabadán et al., 2020; Nguyen et al., 2021), organic food buying behaviour (Yazdanpanah & Forouzani, 2015;Sultan et al., 2020), recycling behaviour (Muniandy & Anuar, 2020; Knickmeyer, 2020), and sustainable purchasing (Joshi & Rahman, 2019; Kronthal-Sacco, 2020; Śmiglak-Krajewska et al., 2020). These kinds of studies have investigated factors affecting consumers' green product purchase decisions and understanding of how these come about. Findings of these empirical studies reported several factors (e.g., attitude, norm, locus of control, green communication, trust, information, perceived values, environmental awareness, social responsibility, environmental responsibility and the quest for knowledge, self-interest and willingness to pay for green products) affecting consumer green buying behaviour for particular green products. A meta-analysis study by Wiernik et al. (2013) discovered that environmental concerns constitute one of the important sustainability variables in green marketing literature.

To explain consumers' green buying behaviour, previous studies focused on the impact of several personal and contextual factors. Both personal and contextual factors might influence people's intention and behaviour towards adoption or non-adoption of green products. A few years ago, an important study on green purchase behaviour by Joshi and Rahman (2015) comprehensively reviewed empirical studies published between 2000 and 2014. According to Joshi and Rahman (2015), the complexity of the consumer decision-making process regarding green products is motivated by several factors include both personal and contextual. Further, with reference to the factors affecting green buying, many researchers (e.g., Tanner & Wölfing, 2003; Vermeir & Verbeke, 2006; Yadev et al., 2019; Ridhosari & Rahman, 2020; Sultan et al., 2020; He et al., 2020) recommended that personal factors (e.g., attitudes, values, personality, trust, satisfaction, emotion, habits, personal norms, moral norms, knowledge, trust, etc.) and contextual factors (e.g., price, product availability, brand image, service offered, communication, etc.) remain the most important criteria in the consumer decision-making process.

Although numerous factors (see Table 2.5) affecting consumer green buying behaviour were identified in the extant literature, understanding determinants/factors affecting green buying behaviours is still critical and important theoretically (Paul et al., 2017; Joshi & Rahman, 2015, 2019; Kumar & Muruganandam, 2020). Despite the multiple behavioural factors affecting the green buying behaviour examined in past research, further research on similar factors might also be important as the outcome of these factors are likely to differ due to a country's cultural characteristics, socio-cultural differences, the samples gathered and how they are used (Hassan, 2014; Van der Linden, 2015), leaving substantial room for rigorous research.

In review, numerous factors were identified that either encourage or discourage purchase of buying green products. However, the intricate nature of the consumer decision-making process to buy green products is associated with different types of green products. Research (e.g., Yadev & Pathak, 2017; Chaudhary, 2018; Jaiswal & Kant, 2018; Jaiswal & Singh, 2018) suggests that each green product has its own features, benefits, and quality attributes or problems. The determinants of consumers' buying behaviour are determined by different categories and distinct factors (Liobikien et al., 2016; Liobikienė & Bernatonienė, 2017). Therefore, it is important to investigate the circumstances under which a consumer is willing to purchase a particular green product or good/service. This research attempts to investigate this issue in order to understand the key factors behind sustainable consumption of 'Green Energy' – as currently an imbalance between understanding the intention and behaviour regarding green energy purchase is evident (see Section 2.4.1).

In terms of the determinants of green energy purchase intention and behaviour (GPIB), this research pays great attention to the key factors shaping sustainable consumption of green energy, focusing on the personal and contextual factors (see Chapter 3, Section 3.3). To date they have been largely unexplored in a green energy context.

Table 2.5: Factors affecting green product buying behaviour

Determinants	Studies (Example)
Knowledge	Tan (2011), Suki (2016),
Environmental attitude	Jaiswal & Singh (2018), Taufique & Vaithianathan (2018)
Environmental concern	Jaiswal & Singh (2018)
Environmental/Individual consequences	Follows & Jobber, 2000
Moral norm	Saleki et al (2019)
Perceived consumer effectiveness	Tan (2011), Kabadayı et al. (2015); Taufique & Vaithianathan (2018)
Subjective norm	Chaudhary (2018), Taufique & Vaithianathan (2018)
Green brand	Suki (2016), Chen et al. (2020)
Promotion/diffusion	Zhu et al (2013),
Locus of control	Patel et al (2020)
Perceived behavioral control	Taufique & Vaithianathan (2018); Sultan et al. (2020)
Information	Adrita (2020)
Price	Palandino & Pandit (2019), Adrita (2020)
Green perceived risk	Chen (2012), Juliana et al (2020)
Green perceived value	Lam et al (2016),
Personal norm	Moser (2015).
Environmental responsibility	Sinnappan & Rahman (2011), Zheng (2021)
Government's role	Sinnappan & Rahman (2011)
Lack of trust in green product	Nuttavuthisit & Thøgersen (2017)

2.3.2. Review of intention-behaviour gap

This research examines the factors influencing consumers' purchase intentions and actual behaviours concerning green energy. Although consumers are indicating much more interest in green energy, not enough research has been done on this topic. This thesis employed the Theory of Planned Behaviour (TPB, Ajzen, 1991) to understand and examine the factors influencing green energy purchase intention and behaviour. Most of the studies that used TPB as the theoretical framework concluded that there is always a gap between purchase intention and actual behaviour. However, research explaining the intention-behaviour gap using the full TPB model is lacking to date. This thesis addresses this gap.

The intention-behaviour gap reflecting the disagreement to translate consumers' positive intention into actual green consumption behaviour, also includes the consumption of green energy (e.g., Claudy et al., 2013; Hobman & Fredrick, 2014; Halder et al., 2016; Palanadino & Pandit, 2019). This is despite displaying a positive intention to purchase it. Although several studies (e.g., Sheeran & Webb, 2016;

Echegaray & Hansstein, 2017; Sultan et al., 2020; ElHaffar et al., 2020; Ismael & Ploeger, 2020) have explored the intention-behaviour relationship, these studies exploring ways to minimise or explain these gaps are scarce. In this section the intention-behaviour gap in green consumption literature is examined, to develop an understanding of the causal processes that predict actual buying behaviour. To meet one of the challenging aims of the research (i.e., research question two), it is important to review the extant literature which documents empirical evidence quantifying the intention-behaviour gap.

Green consumption behaviour has received greater attention in the literature in recent times (Liu et al., 2017, Nguyen et al., 2019; Sultan et al., 2020). The focus is on socially responsible green consumption behaviours, notably peoples' decision-making process in buying green products. Despite much research being done, marketers have still not been successful in getting green goods and services to the market or making them economically viable.

Green products are preferred by individuals who are concerned about the environment, yet they may fluctuate in their preferences (Ha & Janda, 2012; Kilbourne and Pickett, 2008, Sultan et al., 2020). They may change or not change in terms of their intention formation to buy such products. Consumers in general express a positive attitude or have an intention to behave in an environmentally friendly way but in reality, many do not engage in the actual buying (Peattie, 2010; Nguyen et al., 2019; Palandino & Pandit, 2012, 2019; Sultan et al., 2020). This discrepancy has been labelled the "intention-behaviour gap". Empirical evidence does demonstrate such a gap. For instance, a survey in the UK reported that 30% of consumers were concerned about organic food consumption, and approximately 46-67% of UK consumers expressed their positive intention to buy organic food. However, the variance in actual buying recorded only 4-10% (Hughner et al., 2007).

Elsewhere, Rokka and Uusitalo (2008) revealed that although consumers demonstrate environmental responsibility, they do not always purchase green products. A Canadian study reported a gap of about 40% between consumers' intended action and the actual buying of different green products including energy, food, recycling, reuse, fuel performance and green product preference (Joshi & Raman, 2015). In a recent study by Sultan et al. (2020), they also reported the intention-behaviour gap for organic food consumption in Australia. Again, in Australia, Palandino and Pandit (2019) used regression analysis to examine the influence of consumer attitudes towards green energy purchase intentions and actual behaviour; a negative effect was indicated. The findings concluded that although consumers have positive attitudes and intentions towards green energy, their intentions did not transform into actual purchasing. In exploring green buying behaviour, many other researchers have also reported the "intention-behaviour gap" between peoples' expressed positive intention and their actual buying (e.g., Godin et al., 2005; Vermeir & Verbeke, 2006; Vermeir & Verbeke, 2008, Echegaray & Hansstein, 2017; Nguyen et al., 2019; Agag et al., 2020; Qi, X et al., 2020).

The findings of our review (also see Table 2.6) show that in green consumption, there is indeed always a gap between purchase intention and actual buying behaviour. It is also reported that intentions are sometimes poor predictors of actual behaviour and that gaining potential insights into this gap is of critical importance to understanding, explaining, predicting and influencing consumer behaviour (Bagozzi, 1993; Auger & Devinney 2007; Carrigan & Attalla, 2001; Carrington et al. 2010). The gap, however, remains poorly interpreted, especially within the green consumption context. To understand the gaps in our knowledge, few studies have attempted to explore why this is the case. For example, In the context of ethical consumption, researchers (e.g., Carrington et al., 2010; Grimmer & Miles, 2017) examined the intention-behaviour gap utilising the mediation effect of implementation intention. Interestingly, the use of action planning has been found to explain variance in the intention-behaviour relationship by Scholz et al. (2008); and Wiedemann et al. (2009). In the context of green consumption, Godin et al. (2005) examined the role of the moral norm in bridging the intention-behaviour gap. A recent study by Nguyen et al. (2019) examined two factors, namely green product availability and perceived consumer effectiveness as these might reduce the intention-behaviour gap. Campbell and Fairhurst (2016) examined the role of price consciousness and trust as a moderator in reducing the intention-behaviour gap. Price consciousness as a mediator was also used by Saleki (2019) about organic food. Another popular recent study from Australia in the organic food context, Sultan et al. (2020) examined the moderating effect of perceived communication, satisfaction and trust to reduce the intention-behaviour gap.

Considering the above discussion, researchers have proposed several factors whereby a set of personal and contextual factors was used as a mediator or moderator with an aim to reduce the intention-behaviour gap. With high levels of the mediation and moderation effect in all prior empirical studies, this helped explain the gap between green purchase intention and behaviour. All the studies indicated that the correlation between intention and behaviour in green consumption is higher. Although researchers have previously explored several factors that help to explain the intention-behaviour gap, these studies are still scarce (Hassan et al., 2016; Nguyen et al., 2019; Agag et al., 2020; Qi, X et al., 2020; Sultan et al., 2020).

To find answers for the intention-behaviour gap particularly with green energy, this research focuses on how to reduce such gaps. Previous research (e.g., Halder et al., 2016; Palandino & Pandit, 2019) in the green energy context has not been able to provide adequate support for why a favourable intention fails to convert into actual buying. Particularly, the role of an external stimulus or motivator which is essential in the context of green energy consumption has not previously been investigated to bridge the intention-behaviour gap. There is a consistent need to explore the role of a mediator to help to reduce intention-behavioural gap. This limitation dissuaded researchers from looking for external stimuli transforming consumers' intention into actual buying of a green energy product and thus led us to identify the stimulus-green promotion. The role of green promotion as a mediator emerged as the key factor explaining the intention-behaviour gap underpinning our conceptual model (see Fig 3.4). In fact, focal attention has been paid to the key theme raised in the review – "intention-behaviour gap" – by incorporating a mediator who can reduce the gap between intention and the subsequent behaviour involved in the green energy context. This can contribute to the broader the literature of green energy consumer behaviour (see Sections 3.4, 5.6, 6.4, 7.2.3).

Table 2.6: Factors bridging the intention-behaviour gap (empirical studies)

Author	Variable bridging the Intention-behaviour gap	Variable role	Research context
Godin et al (2005) Journal name: British journal of social psychology (Q1)	Moral norm	Moderator	Health domain
Carrington et al (2010) Journal name: Journal of business ethics (Q1)	Implementation intention	Mediator	Ethical consumerism
Grimmer & Miles (2017) Journal name: International Journal of Consumer Studies (Q1)	Implementation intention	Mediator	Green consumer behaviour
Echegaray & Hansstein (2017) Journal name: Journal of Cleaner Production (Q1)	Behavioural intention	Mediator	Recycling
Nguyen et al. (2019) Journal name: Sustainable Development (Q1)	Green product, availability and perceived consumer effectiveness	Moderator	Green product
Saleki (2019) Journal name: Journal of Agribusiness in Developing and Emerging Economies (Q2)	Price consciousness	Moderator	Food
Cambell & Fairhurst (2016) Journal name: International Journal of Retail & Distribution Management (Q1).	Trust	Moderator	Food
Palandino & Pandit (2019) Journal name: Australasian Journal of Environmental Management (Q2)	Attitude	Mediator	Green energy
Sultan et al. (2020) Journal name: Food Quality and Preference (Q1)	Perceived communication, satisfaction, trust	Moderator	Organic food

2.3.3. Review of green energy buying behaviour

An issue with relevance for marketing addressed in this thesis is the determinants of green energy purchase intention and how consumer behaviour should be framed, so as to understand how green energy is purchased. The objective here is to review prior research done on consumer behaviour related to green energy so that it may advance our understanding of the determinants affecting consumers' green energy purchase intention and buying behaviour (GPIB).

The following section reviews the current literature on green energy consumer behaviour. In particular, this section discusses the relevant literature on green energy consumer behaviour in both cross-cultural and Australian contexts. A review of past research approaches and relevant findings serves to establish this study's research questions and objectives. The review can also to identify an opportunity to develop a new research framework of GPIB, identifying variables and plotting those variables in order to understand how the GPIB works. Also covered here are the scope and theoretical approaches that make it possible to identify the research gaps.

2.3.3.1. Review in cross-country evidence

The empirical research relating to consumers' purchase behaviour concerning green energy (GE) has mostly been conducted in the world's advanced economies such as the USA (Bang et al., 2000), UK (Rainey & Ashton, 2010; Ozaki, 2011; Salmela & Varho 2006), Canada (Rowlands et al., 2003) and Ireland (Claudy et al., 2013). The factors that influence consumers' green energy purchase intentions and behaviour (GPIB) will vary from country to country due to differences in cultural values, norms, beliefs, trajectory of history, and socio-economic circumstances. An important aspect of the empirical analysis of GE is understanding the purchase intention of green energy, beginning with Bang et al. (2000), who investigated the socio-psychological cognitive factors influencing consumers' green energy purchase intentions. They employed the framework of Ajzen's (1980) theory of reasoned action (TRA). Using the TRA concept, the research added two additional constructs, knowledge, and environmental concern, as components of attitude and investigated the relationship between the knowledge, environmental concern and attitude shown by residential consumers in the USA. A mail survey was conducted among a sample of 2600 residential consumers and resulted in a response rate of 13.4%, with 347 usable questionnaires included in the research. Using a T-test analysis, the study indicated a positive relationship between beliefs about salient consequences and attitudes to paying more for green energy. Interestingly, it was reported that consumers' environmental concerns failed to translate into heightened knowledge about green energy.

A different approach by Roe et al. (2001) investigated US consumers' willingness to pay (WTP) for green energy. The survey was designed and administered by mail among a sample of 1,292 residential consumers and resulted in a response rate of 74%, with 835 good responses. The research evaluated consumer acceptance and willingness to pay for green energy in several deregulated US markets. The survey results suggest that consumers are willing to pay only a small amount for green energy. Another topic relevant to WTP by Rowland et al. (2003) whose Canadian research aimed to profile consumers' willingness to pay high premiums for green energy. The survey questionnaires were distributed by post to 1390 households throughout the Waterloo region and found 466 completed questionnaires with a response rate of 33.5%. The study profiled potential adapters of green energy by demographic, attitudinal and socialisation characteristics. Attitudinal characteristics – specifically ecological concern, liberalism and altruism – best identified the potential purchasers of green energy. Another study by Bamberg (2003) looked at the influence of related environmental behaviours in the green energy purchase decision among university students in Germany. A total of 380 university students participated in the study. The situation-specific cognition theory, conceptualised via Ajzen's TPB, was used to determine the behaviour shown for green energy products. The study employed a structural equation modelling approach for data analysis, and the findings suggested that environmental concern has a substantive direct effect on the perception and evaluation of the purchase of green energy products. More specifically, the study reported that highly environmentally concerned students show great intention to purchase green energy.

Arkestaijn and Oerlemans (2005) empirically explored the factors influencing the likelihood of adoption and non-adoption of green energy focusing on residential household consumers in the Netherlands. The study developed a theoretical framework rooted in cognitive science complemented with variables derived from economic theory. It distinguished three sets of independent variables: factors related to (a) the technical system, (b) individuals, and (c) economic issues. Data were collected from consumers who were adopters and non-adopters of green energy using a stratified disproportional random sample method. A total of 250 residential homes were chosen from the customer database of a regional electricity distribution company, which supplied green electricity throughout the Netherlands. The findings suggest that knowledge and actual environmental behaviour are strong predictors in the adoption of green energy.

Several research studies in relation to green energy consumer behaviour were done in Sweden. For example, Kristina and Patrik (2008) looked at 655 household consumers to assess the important determinants of the choice to pay a premium price for green energy. The authors tested the binary probit model and drew on recent developments in the literature on integrating norm-motivated behavioural theory. The study indicated that the choice of green energy is strongly determined by self-image characteristics, including perceived consumer effectiveness, personal responsibility and found limited support for the notion that perceptions about others' behaviours, in general, affect individual moral norms and ultimately expressed behaviour. Willingness to pay for green energy research is followed by some examinations on determinants or influencing factors of social acceptance. Hansla et al. (2008) had a different approach focusing on the topic consumers' WTP. The study hypothesised that WTP was influenced by an attitude to green energy, income levels, and electricity costs. The study reported an increase in positive attitudes associated with green energy that related to awareness of consequences of environmental problems, but decreased when linked to energy costs, as noted similarly by Bang et al. (2000). Hansla (2011) examined how egoistic, altruistic, and biospheric framing of consequences influence a stated willingness to pay (SWTP) for eco-labelled energy. The survey questionnaire was mailed with a free-post return envelope to a random sample of 1,800 residents between 25 and 65 years of age. The response rate was low with a total of 476 (26.5%).

In terms of determinants of green energy purchase intention, one of the most important studies is that by Gerpott and Mahmudova (2010a) who explored green energy adoption among residential consumers in Germany. The research employed a standardised telephone survey of 267 household energy consumers of a German regional energy supplier. A total of 380 fixed-line phone numbers was used. Structural equation modelling (SEM) served to determine the willingness of people to adopt green energy. The study suggested that the propensity to adopt green energy is most strongly influenced by general attitudes to environmental protection issues and social endorsement. However, price emerged as an important barrier. In line with this, Gerpott and Mahmudova (2010b) built on this previous study by collecting their data from 238 respondents. Binary logistic (ordinal) regression analysis was employed to explore determinants of the willingness to pay a mark-up for green energy. The analysis indicated that price tolerance for green energy is mainly affected by attitudes, power supplier, social reference groups, household size and size of electricity bill.

Extensive investigation of green energy consumer behaviour employing psychological theory is found in the literature. For example, Litvine and Wüstenhagen (2011) developed a psychological model based on Ajzen's theory of planned behaviour (TPB) and conducted a large-scale behavioural intervention survey with Swiss consumers. The study aimed to shed more light on the nuanced relationship between price and demand for green energy. An online survey was conducted, and the final sample consisted of 1007 (86.5%) respondents who were not currently buying green energy and 156 (13.5%) who were already such customers. It was found that the key factors influencing the intention to purchase green energy were attitudes, social norms and perceived behavioural control. Furthermore, price is not the only barrier to purchasing green energy and that quality information can increase the perceived benefits of buying green energy.

In the UK, Rainey and Ashton (2011) conducted extensive research using a sample size of 1800 via a telephone survey. The study tested a broad range of variables, which are grouped into three categories (demographic, attitudinal and behavioural) to profile potential adopters of green energy. The study used a probit model to explain the factors affecting WTP and the premium for green energy. They reported that perceived consumer effectiveness, ecological concern and knowledge of energy issues exerted a considerable influence on the propensity to adopt green energy. In the empirical analysis of factors affecting acceptance of green energy, Ozaki (2011) asked a somewhat different question in analysing determinants of UK consumers' green energy purchase decisions and consumers' preference to adopt or not adopt green energy tariffs. According to Ozaki, the reasons why consumers do not switch to green energy include switching costs, uncertainty about the quality of energy and the lack of healthy social norms.

Oliver (2011) examined a developing country in terms of the level of willingness of residential households in South Africa's Cape Peninsula to pay a price premium for green energy. The author identified individual and structural factors that affected the willingness to pay (WTP). The individual factors were identified as attitude, environmental concern, and previous environmental behaviour, perceived consumer effectiveness, income and resistance to change. On the other hand, structural factors included supply deficits, social and cultural context, sources of green energy, mandatory green energy quota, free-rider problem, price and feedback from consumers.

Zoric and Hrovatin (2012) analysed the willingness to pay (WTP) for green energy in Slovenia. Data was collected through both internet and field survey using a sample size of 450 respondents by a random sampling technique. A tobit or censored regression model was employed to estimate the WTP for green energy. The study found that gender, household size, type of residence and location and age did not significantly explain differences in the average WTP for green energy, while income, education and environmental awareness positively affected the WTP. Particularly, the willingness to pay for green energy predominantly depends on the household incomes of residential consumers. The authors recommended that green marketing should be promoted via awareness-raising campaigns and target the younger generation, well-educated and high-income households.

One of the most crucial topics in literature – "green energy attitude-behaviour gap" – was investigated by Claudy et al. (2013) in Ireland who researched among 254 homeowners. The study applied Westby's behavioural reasoning theory (BET, 2005). The research examined both for and against adopting a specific type of green energy – solar panels. Their study sought to empirically investigate the attitude-behaviour gap regarding green energy adoption (i.e. solar panels). To do that, the study collected data in two stages. First, an exploratory qualitative with a convenience sample of n = 20 adult homeowners was done. Second, a telephone survey (n = 254) was conducted among the homeowners. This research presents evidence for two mediated paths in the cognitive processing of intention to adopt solar energy panels: reasons for and reasons against. These findings offer a plausible explanation for the attitude-behaviour gap concerning green technologies. Another study presented key insights into the determinants of consumers' willingness to adopt green energies in the residential sector of Greece (Sardianou & Genoudi, 2013). The research employed a cross-sectional dataset comprising 200 consumers using a random stratified sampling method. The empirical analysis indicated that middle-aged and highly educated people are probably more willing to adopt renewable energy sources in their home. In terms of adoption factor, the study reported that income positively affects residential consumers' acceptance of green energy projects in Greece.

Larsen (2013) undertook a different approach to understanding consumers' attitudes about green energy using a cross-country perspective. The primary purpose of the study was to assess if there was any improved awareness of consumers about green energy in different countries. The study draws on findings from qualitative research where data was collected from Iceland, Norway, Poland, the Czech Republic and Estonia. A grounded theory approach was employed to analyse the responses from 83 energy consumers via focus groups. Several factors were identified that were country-specific and may be considered in the adoption of green energy such as price, scepticism, sustainability, and social responsibility. They found only a limited commitment to green energy and the respondents were sceptical about green energy., mainly because many were confused about the marketing or politics involved in green energy.

Yang (2014) identified a set of variables to examine consumers' willingness to pay (WTP) for various types of green energy (e.g., wind, hydro, etc.) in Denmark. The study investigated the question of different consumer preferences for energy products and how consumers decide to purchase green energy. The study found that green energy consumers, which make up 25%, are practicing sustainable behaviours and feel a moral norm to accept green energy. Their decision is influenced by multiple factors such as perceived relative advantage, perceived complexity, and socio-demographic (age, income, education) factors, which all indicated a positive relationship with the adoption of green energy.

Turning now to studies done in the Asian context, Liu et al. (2013) looked at the rural acceptance of green energy in Shandong, China with a total of 212 valid responses. The study followed the psychological theory and Ajzen's (1991) theory of planned behaviour (TPB) and used a logit regression method to examine possible determinants of local acceptance. Results revealed that most of the rural residents showed a real willingness to embrace green energy. Consumers' education level, knowledge about green energy and belief about costs are significantly associated with consumers' WTP. Consumers' attitudes to green energy and their willingness to buy green energy were researched by Hast et al. (2015) with a total 232 respondents consisting mostly of young and educated people living in Shanghai, China. The study investigated which factors influence the attitudes concerning green energy and what could motivate respondents but also function as a barrier to buy green energy. Income, assessment of green energy potential, and building type had a statistically significant influence on energy adaption. Environmentally friendly options, reliability (technology), saving energy and energy security were the motivational factors for purchasing green energy. However, energy savings and energy security were the most frequently chosen options. Thus, economic factors did wield a significant influence on consumers' green energy buying behaviour. Price was most often identified as a barrier to buying green energy.

Yazdanpanah (2015) examined factors influencing the intention of students to use green energy in Iran. The study used a different theoretical framework with the constructs of the Health Beliefs Model (HBM) model. Data collection was conducted face-to-face through a random sampling of 260 students in architecture and civil engineering university students. Structural equation modelling (SEM) was used for data analysis and findings indicated that perceived benefits and self-efficacy were the strongest predictor of willingness to purchase green energy.

To understand green energy buying behaviour, Halder et al. (2016) used the standard framework of Ajzen's (1991) theory of planned behaviour (TPB) to explain school students' intentions to use green energy by comparing Finland and India. The study set out to explain school students' intentions to use green energy in both cultures. Data were collected from 402 Finnish and 130 Indian students. For data collection, a schoolteacher in each school was responsible for conducting the survey in classrooms.

Structural equation modelling was applied to test the TPB model and indicated that the construct attitude had the strongest and statistically most significant positive effect on purchase intention. The other constructs such as subjective norm showed the second most positive effect whereas perceived behavioural control had a negligible effect on the students' intentions to purchase green energy. However, the study had some limitations including relatively small sample size, limitations with research constructs which only used the TPB elements and therefore, recommended other factors not captured in the study. In line with this, the author suggested extending the TPB model by including some new factors to better understand students' intentions to use green energy.

Other research done in India by Sangroya and Nayak (2017) examined the factors influencing the buying behaviour of green energy consumers, by developing a multidimensional green perceived value scale to measure their perceived values for embracing green energy. A nationwide survey was conducted in India, with a total of 713 questionnaire responses collected. The study used four dimensions, namely functional value, emotional value, conditional value, and social value to measure the green perceived value of green energy consumers. The study reported that consumers' green energy purchase decisions are not likely to be influenced by financial aspects; consumers are influenced by emotional and social considerations when purchasing green energy.

2.3.3.2. Review of empirical research in Australia

The integrated relationship among Australian household consumers' attitudes and preferences to green energy were examined by Tang and Madhokar (2011). This research is one of the key analyses that set out to identify the key factors associated with green energy purchase or non-purchase, thus, it differentiated between users and non-users of green energy. This study used a web-based questionnaire and binomial logit analysis, and it found a significant and positive association between a consumer's green energy purchase with environmental concerns and their ecologically conscious behaviour. The findings suggested that younger people are more likely to be green energy users and this is due to the probability of their increased level of awareness and concerns about environmental degradation and what it means for their future.

The next study by Paladino and Pandit (2012) investigated green energy preferences using a qualitative research method. The study aimed to provide insights into green energy market characteristics, motivational factors, the perceived barriers of green energy, and identify the options available to the green energy retailer to increase consumer appeal. This study seeks to explain the existing branding, services, marketing, and consumer behaviour literature to understand the motivators behind green energy purchasing in Australia.

A focused research group was conducted followed by in-depth interviews in Western Australia, recruiting 120 participants from urban and rural areas. The study revealed that consumers valued green brands and the strength of this relationship relied on trust. In terms of barriers, several factors were reported by customers preventing them from engaging in green energy purchases. These included: availability of green alternatives, choice, performance and reliability, cost (price), transparency of the benefits and trust in the brand (lack of information and reliable sources). The study recommended an empirical research strategy that would statistically assess the relationships among adoption factors of green energy.

A different research approach was employed in the study by Ivanova (2013). The study conducted an extensive analysis of Queensland consumers' willingness to pay for green energy. A mail survey method was used with a random sample of 820 households in Queensland by the University of Queensland Social Research Centre (UQSRC). The total response rate was only 26%. A latent class analysis (latent structure analysis) was employed, and the research found that 83% of the consumers in the sample indicated their willingness to pay for green energy as long as it was voluntary. There are significant differences in WTP among classes (statistically, three classes were identified: class 1 – "Concerned", class 2 – "Protest" and class 3 – "Willing to pay"). The mean WTP in class 1 was $29 (or 12.7% of their average energy bill), in class 2 it was $13 (or 4.5% of their average energy bill), and in class 3 it was $36 (or 14.4% of their average energy bill).

Comprehensive research on the factors affecting the non-adoption (i.e., barriers) of green energy in Australia was investigated in Hobman and Frederik's work (2014). The study is one of the first to identify the types of cognitive biases and psychological barriers that might potentially limit the uptake of green energy consumption practices among 900 households. The quantitative analysis indicated several significant barriers in the adoption of green energy – financial costs, limited knowledge, awareness and availability of green energy programs, and negative perceptions.

One recent study by Mydock (2017) explored the extent to which consumers' purchasing behaviour is influenced by advertisements of green energy products. The study conducted three experiments using two samples of university students enrolled in Australia. The first experiment tested the main effect of this research, the second tested the potential amplifying effect of locus of control, and the third tested the temporal orientation. The study revealed that consumers show a positive response in the promotion of green energy. However, the study acknowledged that consumers' values and opinions pertaining to environmental issues are subject to change over time, and accordingly, this study can produce results that cannot be replicated in future studies.

The most recent study relevant to our research, Palandino and Pandit (2019), explored the nature of the green energy market in Australia and the motivations behind the purchase of green energy. They looked at the effects of social reference, perceived behavioural control, price perception, environmental involvement and concern, attitudes to green energy, and the effect of attitude to green energy on the intention to purchase. Attribution theory was employed as the theoretical framework. A postal mail survey with the questionnaire was distributed to a random sample of consumers nationwide. The surveys questions were distributed across Australia and 1865 useable surveys were received. The response rate was 62 and the findings suggested that the attitude and intention to buy were affected by social reference, perceived behavioural control, price perception, environmental involvement, and environmental concern. However, the findings reported that attitudes do not wield an impact on actual purchase behaviour, which indicated that although consumers have positive attitudes and intentions about green energy, they may not be likely or willing to purchase a green energy product. Nevertheless, the direct impact and/or relationship of several important psychological factors on the green energy purchase intention and buying behaviour (GPIB) remains unexplored in their research (see chapter 3). Thus, the determinants motivating the GPIB have not been fully understood in the context of what drives green energy buying in Australia, this therefore remains a key research area (Ahmed, I et al., 2020).

2.3.4. Literature summary

The discussion above provided an overview of and description of the basic trends related to green energy consumption and helped us to understand the mechanism of green energy buying and its standing in the minds of consumers. A literature review was conducted to understand the current state of research on green energy buying behaviour, to help identify the current state of knowledge as well as gaps needing to be explored. Extensive psychological research on making decisions about the purchase of green energy is evident in the extant literature. The current review provided an overview of prior studies conducted both overseas and in Australia, where there is some agreement in terms of research constructs, research model, and methodology.

The foregoing review reveals that the extensive and well-developed empirical research on green energy consumer behaviour is predominantly based on residential energy customers in advanced economies countries such as the USA (Bang et al., 2000; Clark et al., 2003; Wiser, 2007), Great Britain (Rainey & Ashton, 2010; Ozaki, 2011), Canada (Rowlands et al., 2002, 2003) and Ireland (Claudy et al., 2013). Other studies were conducted in Sweden (Ek & Söderholm, 2008; Hansla et al., 2008), the Netherlands (Arkesteijin & Oerlemans, 2005), Germany (Gerpott & Mahmudova, 2010a, 2010b), Denmark (Yang, 2014), Finland (Halder et al., 2016), South Africa (Oliver, 2011), Switzerland (Litvine & Wüstenhagen, 2010), and Slovenia (Zori & Hrovatin 2012). In the Asian context research was conducted in China (Liu, Wang et al., 2013; Hast et al., 2015), Iran (Masoud 2015), and India (Halder et al., 2016). The following discussion synthesises the empirical findings (see Table 2.7) of the key research on this topic.

Table 2.7: Empirical research findings. Green energy consumer behaviour – 2000-2019

Author and year	Country	Key findings
1.Bang et al (2000) Journal name: Psychology & Marketing (Q1)	USA	The research found support for a central tenet of the theory of reasoned (TRA) action in that beliefs about green energy were positively related to attitude toward the act of paying more for green energy. Environmental concern and knowledge both were both found to be positively associated with willingness to pay in adoption of green energy.
2.Roe et al (2001) Journal name: Energy Policy (Q1)	US	The survey results suggest that consumers are willing to pay small amounts for green energy.
3.Rowlands et al (2003) Journal name: Business Strategy and the Environment (Q1)	Canada	Green energy consumers are likely to possess particular demographic characteristics, attitudinal characteristics and socialization characteristics.
4.Bamberg (2003) Journal name: Journal of Environmental Psychology (Q1)	German	The study reported that environmental concern has a substantive direct effect on the perception and evaluation of the purchase decision of green energy products.
5.Arkestaijn and Oerlemans (2005) Journal name: Energy Policy (Q1)	Denmark	Knowledge and environmental behaviour are strong predictors of the probability of adopting green energy
6.Samela & Varho (2006) Journal name: Energy Policy (Q1)	Finland	Lack of knowledge and trust, time, effort and cost identified as barriers by consumers to purchasing green energy
7.Kristina and Patrik (2008) Journal name: Ecological Economics (Q1)	Swedish household	The study indicated that the choice of green energy is strongly determined by the self-image characteristics, including perceived consumer effectiveness, personal responsibility

Author and year	Country	Key findings
8.Hansla et al.(2008) Journal name: Energy Policy (Q1)	Sweden	They reported that increased with a positive attitude towards green energy that related to awareness of consequences of environmental problems and decreased with energy costs
9.Rundle et al. (2008) Journal name: Business Horizons (Q1)	Australia/ case study	The case highlighted some factors that lead to non- adoption of green energy namely: Failure to segment the market, consumer awareness, educate to customers
10.Gerpott and Mahmudova (2010a) Journal name: International Journal of Consumer Studies (Q1)	German household	Propensity to adopt GE is most strongly influenced by consumer attitudes towards environmental protection issues and social endorsement
11.Gerpott and Mahmudova (2010b) Journal name: Business Strategy and the Environment (Q1)	German household	Psychological and socio-demographic characteristics influences residential customers willingness to pay a GE
12.Tang and Medhekar (2011) Journal name: Asian Journal of Business Research (Q3)	Australia	Environmental concern and ecologically conscious behaviour are key factors to purchase GE
13.Ozaki (2011) Journal name: Business Strategy and the Environment (Q1)	UK	Consumers’ sympathetic to environmental issues do not attract to adopt green energy. Social norms, personal preference and lack of information are the key barrier to adopt green energy
14.Oliover (2011) Journal name: Energy Policy (Q1)	South African	Significant positive link between household income and willingness to pay for green energy

Author and year	Country	Key findings
15.Diaz and Ashton (2011) Journal name: Business Strategy and the Environment (Q1)	UK	Attitudinal factors have a greater influence on propensity to adopt GE than do behavioural and demographic factors.
16.Hansla (2011) Journal name: Energy Efficiency (Q1)	Sweden	The study gives some support for the idea that altruism positively affects the probability of paying the premium for green energy.
17.Litvine and Rolf (2011) Journal name: Ecological Economics (Q1)	Swiss	Attitude, social norm and perceived behavioural control can affect GE purchase intention. Price is not only the barrier; targeted communication can overcome the barrier.
18. Zoric & Hrovatin (2012) Journal name: Energy policy (Q1)	Slovenia household	Education and environ- mental awareness are positively associated with participation in green energy programs.
19.Paladino and Pandit (2012) Journal name: Energy Policy (Q1)	Australia	Price, information and service quality of energy providers can create a value to purchase GE
20.Ivanova.G (2013) Journal name: International Journal of Renewable Energy Research (Q3)	Australia	The study indicated that consumers in Queensland, Australia are willing to pay for green energy by voluntary payment.
21.Sardianou & Genoudi (2013) Journal name: Renewable energy (Q1)	Greece	The study reported that income positively affects consumers' acceptance of green energy projects in the residential sector of Greece. The research also indicated that that marital status and gender are not statistically significant factors in the willingness to adopt green energies.
22.Liu et al (2013) Journal name: Applied Energy (Q1)	China	The probability of occurrence of positive intention is found to increase with household income, individual knowledge level and belief about costs of green energy use but decrease with individual age. In contrast household consumers with higher level of income are more likely to be willing to pay more for green energy.

Author and year	Country	Key findings
23. Claudy et.al (2013) Journal name: Journal of Macro marketing (Q2)	Ireland	The findings offer a plausible explanation for the attitude-behaviour gap for solar energy adoption including cost and risk.
24. Larsen (2013) Journal name: International Journal of Business and Social Science (Q3)	Iceland, Norway, Poland, Czech Republic and Estonia	Several factors were identified in country specific, which may be considered in adoption of green energy such as price, scepticism, sustainability and social responsibility. The findings from this research found limited commitment to green energy; the respondents were sceptical towards green energy. The research also reported that consumers are sceptical towards the concept of green energy, because many of them confused about the marketing or a political issue relevant to green energy.
25.Hobman and Frederiks (2014) Journal name: Energy Research & Social Science (Q1)	Australia	The quantitative analysis indicated several significant barriers in adoption of green energy – including financial costs, limited knowledge, awareness and availability of green energy programs, negative perceptions.
26.Yang (2014) Book name: Perspective on Marketing of Green Electricity	Denmark	Consumers' decision to adopt green energy influenced by multiple factors such as perceived relative advantage, perceived complexity, and socio-demographic (age, income, education) factors indicated positive relationship in adoption of green energy
27.Hast et al. (2015) Journal name: Sustainable Cities and Society (Q1)	China	Willingness to buy green energy system is affected by age, income and the building type
28.Yazdanpanah & Forouzani (2015) Journal name: Journal of Cleaner Production (Q1)	Students in Iran	Perceived benefits strongly influence the willingness to use GE.
29.Halder et al., (2016) Journal name: Renewable Energy (Q1)	Finland and India	Attitude has the strongest and statistically significant positive effect on the students' intentions to use green energy in a cross-cultural

Author and year	Country	Key findings
30.Sangroya & Nayak (2017) Journal name: Journal of Cleaner Production (Q1)	India	The study reported that consumer's green energy purchase decision is not only influenced by the financial aspects that lead consumers to decide on adoption of green energy; consumers are also influenced by emotional and social considerations in purchase decision of green energy.
31.Mydock et al (2018) Journal name: Marketing Intelligence & Planning (Q2)	Australia	Consumers respond favourably to products promoted as made with green energy.
32. Palandino & Pandit (2019) Journal name: Australasian Journal of Environmental Management (Q2)	Australia	The study reported that consumer's green energy purchase intention affected by attitude, subjective norm, PBC, environmental concern and price perception. Notably the study reported negative impact of attitude and intention on behaviour.

The review of the literature has identified a considerable amount of research that focused on green energy consumer behaviour. Research investigated and identified several of the determinants of green energy buying behaviour. The current literature reveals that both personal and contextual factors can influence consumers’ behaviour towards adoption or non-adoption of green energy. Although much research has been conducted, contrasting findings also have been reported in the literature due to the socio-cultural differences and the samples used. Empirical research in particular examining consumers’ green energy purchase intention (GPI) affecting consumers’ green energy buying behaviour (GEB) was found to be relatively scant in literature, limited to only a few studies (Halder et al., 2016, Palandino & Pandit, 2019). Research in the literature focused on willingness to pay, factors affecting green energy purchase decisions, economic issues, and technology but was relatively narrowly focused on the dependent variable GPI and GEB underpinning a behavioural model. Thus, the review of prior studies finds immense scope of further research to explore the determinants of green energy purchase intention and behaviour (GPIB). This research fills a gap in the current literature which investigate the relative importance of both personal and contextual factors (see chapter 3) on the GPI and GEB.

Further, there was research concerning the factors influencing consumers’ green energy buying behaviour in many countries. These comprehensive analyses have examined the influence of determinants on green energy purchase decisions which contribute to a better understanding of GEB and to formulating a policy framework for simulating the GEB in the residential household market. However, empirical research in the field of green energy regarding the buying behaviour (i.e., GPIB) is incredibly scant in the Australian context. Although previous studies on consumers’ purchase of green energy have identified a wide range of factors that influence their decisions, the contribution in this domain is limited to only one study (Palandino & Pandit, 2019) in the Australian marketing literature. Thus, this study aimed to investigate the determinants related to Australian consumers' GPIB to fill the void in our knowledge.

Due to significant omissions in the prior research, as discussed previously, it is the intention of this research to empirically investigate what determines consumers’ green energy purchase intention and behaviour to fill the gaps in our knowledge base, as follows:

(i) To investigate the underlying factors affecting purchase intentions (Australian context), and how those factors affect the behaviours according to psychological theories and/or models (see Chapter 3, 5, 6, 7)

(ii) Research in green consumerism has drawn attention to a better understanding of consumers green purchase intentions to provide an improved understanding of green buying behaviour. Persistently, researchers have also reported the existence of an intention-behaviour gap in green consumption, a common phenomenon. Yet, the systematic examination of factors that can reduce the intention-behaviour gap and its magnitude are scarce in the literature. This research, therefore, contributes to the debate on the intention-behaviour gap that has assessed both the intention and behaviour regarding green energy.

The research develops a theoretical framework that explains the critical factors determining the green energy purchase intention and behaviour (GPIB) with an aim to reduce the intention-behaviour gap (see Fig 5.5). We expect that the findings would allow marketers and policymakers to understand the essential considerations in adoption of green energy and may shape the behaviour of consumers. The findings of this research will also have several important policy implications that may boost the awareness of green energy products and stimulate the green energy market's share (see chapter 6).

2.4. Research gap and limitation in prior studies

An extensive literature review has been conducted to address the possible research gaps in the current literature. Based on the review of the literature, significant research gaps have motivated the current research. The literature review reveals the following shortcomings which have pointed to a research gap that this thesis seeks to fill.

2.4.1. Theoretical gap

2.4.1.1. Exploring determinants of green energy purchase intention and buying behaviour (GPIB)

Despite the rising interest in green energy products, studies regarding consumers' intention and behaviour with green energy have been especially scant in the marketing literature. Even though there have been some attempts to understand the issues underlying green energy purchasing behaviour in many developed and developing countries as shown earlier, there still remains considerable confusion in the demarcation between the antecedents of GPI and GEB. What evidence there is from the literature review above, is the vague nature of the determinants of green energy purchase intention and buying behaviour (GPIB). Although the review has uncovered relevant extant findings in a global context, there are only partial findings for green energy consumerism as indicated. For example, research in the past (e.g., Palandino & Pandit, 2019) has explored a limited theoretical examination of conditions under which behavioural intention may or may not directly influence the actual behaviour, in order to better understand the inconsistency in relationship between intention and behaviour. This research has attempted to provide a comprehensive look at the determinants of GPIB in the context of Australian consumers.

In addition, in the review of past studies, literature was found on the subject of GEB, it is observed that researchers obtained different results in terms of personal and contextual factors, and their influence on GEB. These differences can be clarified by the way that they encompassed various developing and developed countries with distinctive cultures, norms, values and levels of economic progress. The critical underlying factors of GEB have been examined in a limited theoretical perspective, mostly focused on common factors and are consistent across studies (depicted in Table 2.8). These have produced mixed results in terms of the associations between adoption factors and decisions to purchase green energy.

In particular, the review of the literature also reveals that examinations surrounding the issue of "willingness to pay" are many (e.g., Roe et al., 2001; Hansla et al., 2008; Oliver, 2011; Rainey & Ashton, 2011; Zoric & Hrovatin, 2012; Hansla, 2011; Ivanova, 2013). However, only limited research has been done on the motivations to purchase green energy (i.e., determinants of GPIB). In terms of variables, although scholars have scrutinised several factors affecting the green energy purchase decision via attitude, subjective norm, perceived behavioural control, and environmental concern to some extent, no similar research has evaluated the role of important factors such as green brand perception, moral norm, retail service quality and green promotion as the antecedents of GPI. Neither have their effects on GEB been assessed in the literature. Assessing the similar constructs are also likely to differ in terms of how they were measured, operationalised, sampled and any cultural differences (Van der Linden, 2015) leaving substantial room for further research to measure intention and observed behaviour. Considering the context of green energy consumer behaviour, this research found it important to retest the relationships between attitude, subjective norm, perceived behavioural control, environmental concern, and green energy purchase intentions (GPI).

To conclude, while several prior research studies have used the socio-psychological theory of planned behaviours (TPB) model to examine green buying behaviours, a lack of consideration of many important factors/determinants in those studies has been revealed. This research aimed to address this gap by modifying the TPB model, which comprises a wider group of influencing factors related to attitude, subjective norm, perception of behavioural control, environmental concern, moral norm, perceived green brand, retail service quality and green promotion together for the first time under one new framework. Thus, from the review, there are eight aforementioned important factors (i.e., attitude, subjective norm, perception of behavioural control, environmental concern, moral norm, perceived green brand, retail service quality and green promotion) associated with the GPIB (see Chapters 3 and 5). Knowledge of these factors is essential for devising an effective marketing strategy for the green energy market. Examining the factors affecting green energy purchase intention and behaviour is presented in Chapter 5, (5.7.1) and Chapter 6, (6.2.1).

2.4.1.2. Green energy consumption: the intention-behaviour gap

In exploring green buying behaviour, researchers have reported the “intention-behaviour gap” between peoples’ expressed positive intention and actual buying (e.g., Rokka & Uusitalo, 2008; Hughner et al., 2007; Sultan et al., 2020). A recurring theme noted in the current literature has been labelled as a “intention-behaviour” gap reflecting the disagreement to translate consumers’ positive intention into actual green consumption behaviour (Hassan et al., 2016; Nguyen et al., 2019; Sultan et al., 2020; Agag et al., 2020; Qi, X et al., 2020). This considers waste recycling (Echegaray & Hansstein, 2017), organic food (Sultan et al., 2020), and green food (Qi, X et al., 2020) etc.

The review shows not only a scarcity of quantitative findings regarding the intention-behaviour gap within green consumption contexts, but also the possible importance of demonstrating intervention efficacy. This also relates to sustainable consumption such as kerbside green energy buying. While many studies demonstrate that consumers' psychological factors regarding green energy significantly enhance their GPI and GEB, studies also find that consumers do not actually buy green energy despite displaying a positive intention to buy it. This discrepancy has been labelled the "intention-behaviour gap". For example, kerbside green energy consumption has been recorded based on evidence from different countries including the UK (Claudy et al., 2013) and Australia (Hobman & Fredrick, 2014; Palandino & Pandit, 2019). Our review identifies that only a few studies captured green energy buying behaviour at the primary data collection point. Only six articles in the context of green energy consumption measured intention to purchase and they were limited to the actual behaviour. Take kerbside green energy buying behaviour, six studies (see Chapter 3, Table 3.4) have been found for this review, with only one analysis (i.e., Palandino & Pandit, 2019) undertaken in Australia reporting there was an association between intention and behaviour, although it was not a statistically significant intention-behaviour gap. However, the current scholars reveal that there is no or little explanation for the discrepancy between intention and behaviour in green energy consumption settings. Studies exploring intention-behaviour relationships and ways to minimise or explain these gaps are not explored in a green energy context. Importantly, there is a need to explore the role of a mediator or external stimulus that would help to reduce the intention-behavioural gap. The role of mediator can focus on attaining a better comprehension of the underlying mechanisms by which an intention-behaviour gap might be diminished. In this aspect, the role of mediation practices may also help to abolish external barriers (e.g., price, see Palandino & Pandit, 2019) and ease the behavioural control factors for certain actions. Investigating the role of a motivational factor as a mediator (i.e., green promotion) may facilitate the intention-behaviour relationship and help marketers to promote green energy better.

Corroborating the arguments made about green energy buying behaviour, the research demonstrates how consumers' buying behaviour can increase and how the intention and behaviour gaps can be curtailed (i.e., Research question two). Here the current study examines the mediating role – see Chapter 3, (3.4.2.5) – that may facilitate closing the gap between the intention and actual behaviours. Examining the mediating factor bridging the intention-behaviour gap is presented in Chapter 5, (5.7.2) and Chapter 6, (6.2.2).

Table 2.8: Common factors affecting people's green energy buying behaviours

Factors of GEB	Literature (Example)	Number of studies	Number of positive relationships	Number of Negative relationships
Attitude towards the environment	E.g.: Arkesteijn and Oerlemans, 2005	19	19	0
Attitude towards the GE	E.g.: MacMillan et al,2006	10	10	0
Socials norms	E.g.: Rowlands et al, 2003 ; Gerpott and Mahmudova, 2010	4	4	0
Knowledge	Tang and Medhekar, 2011; Palandino, 2008;	12	12	0
Income	Rainey and Ashton 2008; Arkesteijin and Oerlemans 2005	18	17	1
Respondents' characteristics:				
Age:	E.g.: Ivanova, 2012	13	3	10
Level of education	E.g.: Rowlands et al, 2013	9	9	0
Gender	E.g.: Ivanova, 2012	5	4	1
Perceived consumer effectiveness	E.g.: Yang 2013; Rainey and Ashton, 2008; Tang and Medhekar, 2011; Oliver 2011	10	8	2
Perceived advantage	E.g.: Yang, 2013; Ozaki, 2011; Arkesteijin and Oerlemans, 2005	8	7	3
Attitude	E.g.: Palandino, 2008; Litvine 2011; Ozaki 2011	8	6	2
Social influence	E.g.: Gerpott and Mahmudova, 2010; Tang and Medhekar, 2011	12	8	4

2.4.1.3. Psychological model in predicting the GPIB

A number of studies have examined those factors affecting consumers' green energy purchase decision-making processes. However, these studies have been mainly descriptive and have still not provided a clear theoretical framework of how decisions are made for green energy purchases. Despite more literature focusing on green energy consumer behaviour, theory-based research that attempts to examine the links between green energy purchase intention (GPI) and green energy buying behaviour (GEB) is still underdeveloped. Hence, testing a theoretical framework (see Figure 4.4), furthers our understanding about GPI and its influence on GEB. A theoretical framework on energy and environmental issues is essential as it generates helpful information about psychological factors that can have crucial implications for consumers' intention to act in a pro-environmental way (Halder et al., 2016). However, a theoretical framework to explain a comprehensive view in predicting consumers green energy purchase intention and behaviour (GPIB) is lacking. To fill this gap, the present study employed a behavioural theory (discussed in chapter 4) to clearly explain consumers' decision formation for buying green energy.

Although researchers in a global context have initiated theoretical framework/models (Litvine & Wüstenhagen, 2011; Bang et al., 2000; Halder et al., 2016), there has been little work to advance the theory of buying behaviour of green energy in Australia. For example, out of six relevant articles published up to 2019, only one study (Palandino & Pandot, 2019) was based on a theory. It appears that no other studies were built on any sound theory and/or model to understand consumers' GPIB relevant to green energy. Yet the model offered by Palandino and Pandit (2019) has some weaknesses in its theoretical robustness and generalisability of results. Their study focused on attitudes that drive the purchase behaviours and revealed that GPI negates the GEB of Australian households. For this reason, the current research attempts to bridge the gap in the current literature by developing a parsimonious conceptual model integrating multiple factors in capturing consumers' green energy buying behaviours in Australia. Additional research is needed that looks specifically at Australian consumers and their motivations to accept green energy. Accordingly, this thesis investigates what factors most likely influence Australian households' intention and choice behaviour to purchase a green energy product (discussed in Chapter 3).

To meet the central aim of this research, a literature review was conducted to understand the explanatory power (R^2) of the social-psychological model on GPIB perception in a global context, and to find gaps to be explored. Given the green energy consumer behaviour, out of 32 relevant articles published up to 2019, only two studies were built on a robust theoretical model which explained the R^2 of the model. Studies are listed and selected based on the relative explanatory power (R^2) of the reported models and a brief overview of two “major” studies is provided in Table 2.9. Several conclusions can be drawn from Table 2.9.

a. While models developed in past studies have contributed to explaining green energy purchase behaviour, a more systematic and detailed exploratory study of key socio-psychological determinants is currently lacking to explain a substantial amount of the variance in the model of green energy consumption perceptions, making it difficult for both researchers and practitioners in the prediction of future intention and actual behaviour to purchase green energy.

b. To date only two studies conducted overseas (Yazdanpanah, 2015; Halder et al. 2016) provided robust evidence for the influence of socio-psychological factors and predicted a weak amount of variance (33% variance in behavioural intent, Yazdanpanah, 2015) to use green energy, leaving substantial room to further develop both the conceptual model as well as the empirical explanatory power of the model in Australian context.

c. The existing models explored green energy consumption perception (i.e., behavioural intent), but no coherent effort has been made to understand the explanatory power of the model which can show why a substantial amount of the variance predicted the observed behaviour, making it difficult for both marketers and policymakers stipulating suitable strategies to uptake the green energy market.

In Table 2.9, the studies offered strong correlational evidence of several factors (i.e., predictors) which are potentially associated with green energy purchase perceptions. However, it is worth noting that exploring these factors warrants caution, and the relative influence of these factors depends on the particular issue being researched and the sample type (Sánchez-Medina et al. 2014). Moreover, similar constructs are also likely to differ in terms of how they were measured and used (Van der Linden, 2015), leaving substantial room to further develop both a new conceptual model as well as the empirical explanatory power of a GPIB perception model integrating a set of new and similar constructs (see Chapter 3, 3.4, Chapter 7, 7.2.3) to predict both the purchase intention and observed behaviour towards green energy.

Table 2.9: Overview of studies in green energy consumer behaviour ordered by explanatory power (R^2)

Authors	Associated theories	Explanatory variables	Analysis method	Dependent variable	Explained variance
Yazdanpanah et al. 2015-Iran	Health Beliefs Model (HBM)	Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy	SEM	Purchase intention	0.33
Halder et al. (2016)-Cross country - India and Finland	Theory of Planned Behavior (TPB)	Attitude, subjective norm and PBC	SEM	Purchase intention	.63 in Finland and .71 in India

d. Knowledge about the Australian context

In our extensive literature review, several empirical studies have been reviewed to understand the determinants of buying behaviour concerning green energy, but these dynamic and complex determinants are yet to be researched in Australia. Although there have been some attempts (e.g., Palandino & Pandit, 2019) to investigate the factors affecting consumers' green energy buying behaviour (GEB), studies are still scarce. Several in-depth research studies in many countries have been done on the influence of consumers' green energy choices and behaviours, for example in the USA (Bang et al., 2000), Finland (Halder et al., 2016), Switzerland (Litvine & Wüstenhagen, 2011), China (Leu et al., 2013) and Iran (Yazdanpanah et al., 2015). These have examined the influence of both personal as well as contextual determinants of green energy purchase, and what it has meant for the wider society. An empirical study via large-scale self-administered research has not been done to any great extent in the literature and especially not from the Australian standpoint. Most studies done in Australia primarily dealt with issues like consumers' attitudes about green energy (Palandiono & Pandit, 2019), green energy brands (Palandiono & Pandit, 2012), willingness to pay for green energy (Ivanova, 2013), and barriers and challenges in green energy consumerism (Hobman & Fredrick, 2014). Yet the current literature holistically is void of research discussing the determinants of green energy purchase intention and behaviour (GPIB) elaborating the predictive relationship between different determinants of purchase intention, their effects on green energy purchase intention (GPI) and the behaviours which interplay when the green energy purchase decision is being made.

Although there have been some attempts to examine the factors affecting consumers' green energy buying behaviour (GEB) (e.g., Tang & Madhokar, 2011; Hobman & Fredrick, 2014; Palandino & Pandit, 2012, 2019), there remains a scarcity of studies on the aforementioned topics in the Australian setting. To the best of our knowledge, Paladino and Pandit (2019) is the only study to assess the factors affecting the GEB in Australia. Although their analysis sets out to describe the green energy marketplace and consumer attitudes to purchasing green energy, the direct impact and/or relationship of important personal and contextual factors to the green energy purchase intention (GPI) and their effects on the GEB remain unexplored (Ahmed, I et al., 2019; 2020; 2021). The determinants motivating the GPI have not been fully understood in terms of the underlying composition and drivers of GEB in Australia (Ahmed, I et al., 2020, 2021), making it difficult for both marketers and practitioners to get a better overview of understanding the impact of psychological factors in green energy buying. Furthermore, the work of Palandino and Pandit (2019) has some weaknesses regarding theoretical robustness and generalisability of results. Their study focused on attitudes that drive the purchase behaviours and revealed that GPI negates the GEB of Australian households. Therefore, it is unclear whether Australian consumers' intention to purchase green energy is consistent with their overall purchasing behaviour and the decisions that can create a demarcation between the antecedents of GPI and the GEB. To some extent, prior studies in Australia (e.g., Ivanova, 2013, 2015; Palandino & Pandit, 2019) have undoubtedly created a repository of knowledge about green energy consumerism and have helped marketing professionals and policymakers.

Corroborating the above gap in the current literature, the purpose of the current research is threefold:

- Examine the factors affecting green energy purchase intention and behaviour (see Chapter 5, 5.7 and Chapter 6, 6.2).

- Extend existing theory through the examination of the green energy intention-behaviour gap (see Chapter 5, 5.7.2.2 and Chapter 6, 6.2.2).

- Compare the predictive power of the original TPB with that of the proposed research model (see Chapter 5, 5.6.4, Chapter 6, 6.4).

2.4.2. Methodological gap

Referring to methodology, the review of the literature revealed that most analyses are built on the quantitative research method (see Table 2.10). However, regarding data analysis, most prior studies have used a variety of strategies including logit models, logistic regression methods to test their research constructs. While most of the research undertook regular critical reflections on a very important method – the partial least squares structural equation modelling (PLS-SEM) as used in a growing amount of marketing research (e.g., Sultan et al., 2020) – has not been employed to date for investigating the GPIB.

This scenario provides us with an immense opportunity to fill this significant methodological research discrepancy using the PLS-SEM technique. This methodological approach is the best one for this kind of study.

Table 2.10: Empirical research methodology: Green energy consumer behaviour – 2000-2019

Author	Country	Methodology	Data collection method	Sample size/method	Data analysis
1.Bang et al (2000) Journal name: Psychology & Marketing (Q1)	USA	Quantitative	Mail survey	125/random	T-tests
2.Roe et al (2001) Journal name: Energy Policy (Q1)	USA	Quantitative	Mail survey	835/random	Conjoint analysis and hedonic analysis
3.Rowlands et al (2003) Journal name: Business Strategy and the Environment (Q1)	Canada	Quantitative	Postal mail	466/random	Spearman's correlation calculation
4.Bamberg (2003) Journal name: Journal of Environmental Psychology (Q1)	German	Quantitative	Face to face with students	380/random	Structural equation approach
5.Arkestaijn and Oerlemans (2005) Journal name: Energy Policy (Q1)	Denmark	Quantitative	Online	250/stratified	Logistic regression analyses
6.Samela & Varho (2006) Journal name: Energy Policy (Q1)	Finland	Qualitative	In depth interview	25	Thematic analysis
7.Kristina and Patrik (2008) Journal name: Ecological Economics (Q1)	Sweden	Quantitative	Postal mail	655/	Binary probit analysis

Author	Country	Methodology	Data collection method	Sample size/method	Data analysis
8.Hansla et al. (2008) Journal name: Energy Policy (Q1)	Sweden	Quantitative	Postal mail	855/random	Regression analyses
9.Rundle et al. (2008) Journal name: Business Horizons (Q1)	Australia	Case study	NA	NA	Review
10.Gerpott and Mahmudova (2010a) Journal name: International Journal of Consumer Studies (Q1)	German	Quantitative	Telephone	267/random	Partial Least Squares analysis
11.Gerpott and Mahmudova (2010b) Journal name: Business Strategy and the Environment (Q1)	German	Quantitative	Telephone	238/random	Logistic regressions
12.Tang and Medhekar (2011) Journal name: Asian Journal of Business Research (Q3)	Australia	Quantitative	Online	220/random	Binomial logit Analysis
13.Ozaki (2011) Journal name: Business Strategy and the Environment (Q1)	UK	Mix	Interview/online	10/103	Thematic/correlation coefficients
14.Oliover (2011) Journal name: Energy Policy (Q1)	South Africa	Quantitative	Telephone survey	543/random sample	logistic regression

Author	Country	Methodology	Data collection method	Sample size/method	Data analysis
15.Diaz and Ashton (2011) Journal name: Business Strategy and the Environment (Q1)	UK	Quantitative	Telephone survey	1800/random sample	Discrete ordinal preference
16.Hansla (2011) Journal name: Energy Efficiency (Q1)	Sweden	Quantitative	Postal mail	476 random sample	Multiple linear OLS regression analyses
17.Litvine and Rolf (2011) Journal name: Ecological Economics (Q1)	Switzerland	Quantitative	Online survey	1163/ random sample	Logistic regression
18. Zoric & Hrovatin (2012) Journal name: Energy policy (Q1)	Slovenia	Quantitative	Online and field survey	450/random sampling	Tobit or censored regression analysis
19.Paladino and Pandit (2012) Journal name: Energy Policy (Q1)	Australia	Qualitative	Focus group/ In depth interview	120/Focus group	Thematic analysis
20.Ivanova.G (2013) Journal name: International Journal of Renewable Energy Research (Q3)	Australia	Quantitative	Postal mail	820/random sample	Latent structure analysis
21.Sardianou & Genoudi (2013) Journal name: Renewable Energy (Q1)	Greece	Quantitative	Online survey	200/ random stratified sampling method	Binary probit regression

Author	Country	Methodology	Data collection method	Sample size/method	Data analysis
22.Liu et al (2013) Journal name: Applied Energy (Q1)	China	Quantitative	Face to face	212/random	Binomial logit model
23. Claudy et.al (2013) Journal name: Journal of Macro Marketing (Q2)	Ireland	Quantitative	Telephone	254/ random	Structural equation modeling
24. Larsen (2013) Journal name: International Journal of Business and Social Science (Q3)	Iceland, Norway, Poland, Czech Republic and Estonia	Qualitative	Face to face	83	Thematic analysis
25.Hobman and Frederiks (2014) Journal name: Energy Research & Social Science (Q1)	Australia	Quantitative	Online	900	logistic regression
26.Yang (2014) Book name: Perspective on Marketing of Green Electricity	Denmark	Quantitative	Online	1022/random	Latent class analysis
27.Hast et al. (2015) Journal name: Sustainable Cities and Society (Q1)	China	Quantitative	Online	232/ random	Linear regression

Author	Country	Methodology	Data collection method	Sample size/method	Data analysis
28.Yazdanpanah & Forouzani (2015) Journal name: Journal of Cleaner Production (Q1)	Iran	Quantitative	Face to face	260/random	SEM
29.Halder et al., (2016) Journal name: Renewable Energy (Q1)	Indi and Finland	Quantitative		532 random	SEM
30.Sangroya & Nayak (2017) Journal name: Journal of Cleaner Production (Q1)	India	Quantitative	Mail	659/random	Structural equation modelling (SEM).
31.Mydock et al (2018) Journal name: Marketing Intelligence & Planning (Q2)	Australia	Quantitative	Face to face experimental/	159/random	Ordinary least squares regression
32. Palandino & Pandit (2019) Journal name: Australasian Journal of Environmental Management (Q2)	Australia	Quantitative	Postal mail	Specified as 62%	Regression analysis

2.4.3. Summarising the research gap

The literature survey reported two important critical research gaps (i.e., theoretical and methodological) that need to be addressed both in the literature and especially in Australia. Reference needs to be made to the research constructs, methodology and an all-encompassing research model which fills the current research gaps (see Figure 2.1). First, it explores new research constructs and examine these dimensions in terms of green energy purchase intentions. Second, the relationship between research constructs to measure the purchase intention and behaviour of green energy in the Australian market is explained. Third, it is necessary to develop a conceptual model to comprehend and predict consumers' behaviour and reduce the intention-behaviour gap when it comes to green energy. Fourth, the methodological gap in green energy purchase intention and behaviour (GPIB) is addressed. Fifth and finally, the proposed conceptual model is reported. Thus, the study aims to present important insights into the determinants of Australian consumers' GPIB.

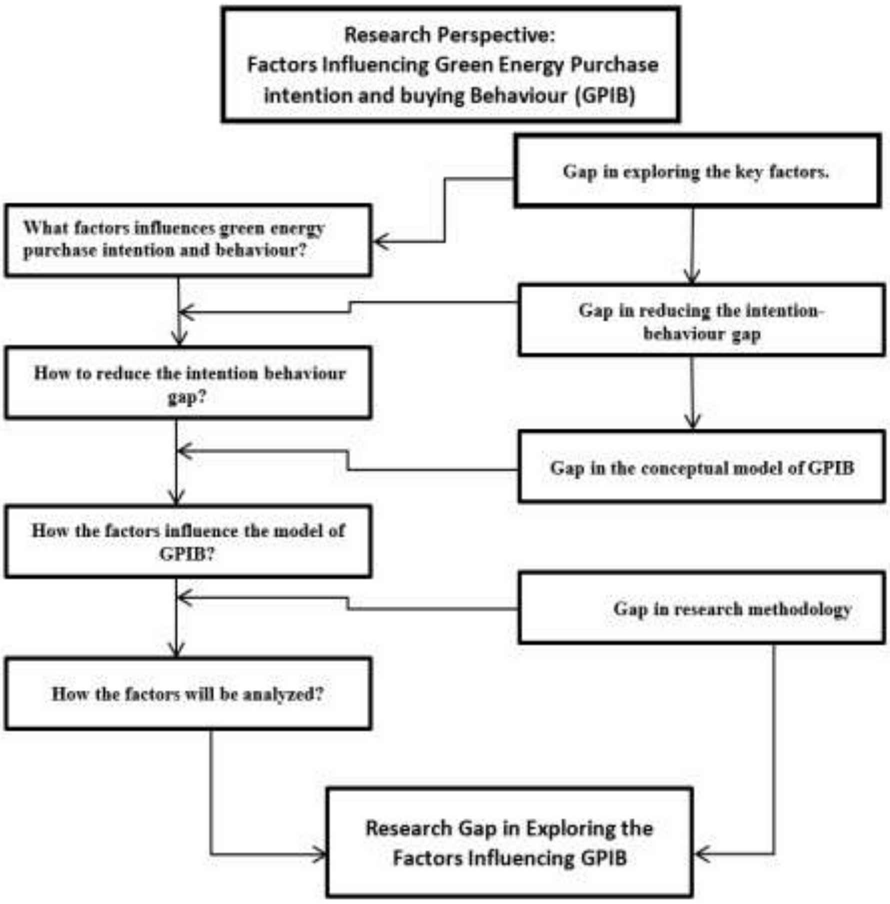


Figure 2.1: The research gap

2.5. Chapter summary

The chapter draws on the extant literature from various perspectives that have been refined in economics, social sciences, and marketing to understand the mechanism of green energy buying behaviour in developed and developing economies. The literature review was conducted to identify and understand what other research on consumer behaviour regarding green energy has been reported. An overview of empirical studies identified the research gaps in our knowledge and especially the paucity of data on Australia. The theory incorporates four new antecedents of GPIB and these are: retail service quality, perceived green brand, green promotion and moral norms which have not been investigated previously investigating green energy consumer behaviour (elaborated on in Chapter 3). Further, the literature addressed the intention-behaviour gap in the acceptance of the green energy consumption concept by assessing individual opinions. Yet, the factors that can reduce the intention-behaviour gap and its magnitude have not been systematically examined. This research, therefore, contributes to the debate on the intention-behaviour gap that has assessed both the intention and behaviour of green energy.

The chapter also identifies the methodological gap and to solve the methodological gap the PLS-SEM method was recommended (and discussed in more detail in Chapter 4). A discussion of behavioural theory concerning the current research gap is the basis for developing the research framework in the next chapter.

CHAPTER 3
RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

The chapter introduces the readers to the research model investigating consumers' green energy buying behaviours, followed by the core theory on which the proposed research model is framed. The chapter also discusses and justifies the key determinants plotted in the conceptual model and links them with theoretical foundations and hypotheses.

Chapter outline:

- Introduction
- Establishing the theoretical framework
- Determinants of the green energy buying behaviour
- Theoretical background and construct definitions
- The conceptual model
- Research hypotheses development
- Summary of the chapter

3.1. Introduction

The previous chapter evaluated the extant literature concerning the relevant factors affecting green energy buying behaviour and revealed an overarching research problem in trying to understand consumers' actions. This chapter presents a detailed discussion of the theoretical framework, with reference to a fundamental theory that offers a better understanding of how consumers form the intention to act in an ethical way when purchasing green energy products. The chapter emphasises the applicability of a theory in predicting the behaviours, justifies why and how this framework is to be employed by explaining the process of consumers' green energy purchase intention and behaviour (GPIB). The chapter also presents the research hypotheses.

The chapter is structured as follows: the discussion establishing the theoretical framework is reported in Section 3.2. Section 3.3 is about the key determinants of GPIB. The theoretical background and definitions of the research constructs are shown in Section 3.4. This is followed by Section 3.5 which portrays the research model (model phases and the model features) devised for the thesis. In next section, 3.6, research hypotheses (20 in number) are explained under two categories: the direct effect and the indirect effect. Finally, the chapter concludes with a summary in Section 3.7.

3.2. Theoretical framework (TPB) – review and justification

In marketing, academics and researchers are interested in investigating the underlying factors and mechanisms that drive the intention to buy green energy products. Given the importance of the issue, researchers have advanced theoretical frameworks/models that aim to identify the underlying mechanisms and improve the predictions of consumer's choices and behaviours. The following section proposes a profound theory (Theory of Planned Behaviour, TPB) (Ajzen, 1991) to explain the relative importance of certain factors in facilitating the consumers' intention to purchase green energy and the mechanism behind it.

The social psychological theories that explain the green buying behaviour are labelled as norm activation theory (Schwartz & Howard 1981), theory of self-regulation (Bagozzi, 1992), value belief norm theory (VBN) (Stern, 2000), ABC model theories (Stern et al., 1999; Guagnano et al., 1995), motivation-opportunity-abilities model (Ölander & Thøgersen, 1995), and theory of reasoned action (TRA, Ajzen & Fishbein, 1980).

Norm activation theory (NAT) ascribes the significance role of personal norms, such as strong moral obligation, as the only direct determinants of pro-social behaviours where awareness of consequences and ascription of responsibility create personal norms, which leads too pro-social behaviour (Schwartz, 1977; Ozaki, 2011). Theory of self-regulation or TSR (Bagozzi, 1992) posits that desire, a motivation-based variable which leads to intention. Ajzen (1991) introduced perceived behavioural control (PBC) concerning behaviours are partially under volitional control but Bagozzi (1992) claimed that the main forcible factor in TPB is desire not PBC.TSR argues that intention implies desire, but that desire does not necessarily imply intention (Leone et al., 1999). Empirical support from Bagozzi, & Kimmel (1995) confirmed the digital effects of attitude on intentions through desires.

Stern's value-belief-norm-theory (2000) is an attempt to link assumptions of the NAT to findings about the relation between general values, environmental beliefs and behaviour (Klöckner, 2013). The VBN theory combines value theory (Schwartz, 1992) and norm-activation theory (Schwartz, 1977) postulating that the relationship between values and actual behavior is affected by more factors than consumption specific attitudes including fundamental values, behavior specific beliefs, and personal moral norms that guide the individual's action (Jansson et al., 2010). Using this notion, the VBN theory has been validated in a wide variety of green consumer (curtailment) behavior contexts, such as household energy use (Poortinga et al., 2004), conservation behavior (Kaiser et al., 2005).

The Motivation-Opportunity-Abilities (MOA) is an integrative model pointed to the improvements in predictive power achievable by incorporating two factors - ability and opportunity, as indispensable pre-requisites to green consumer behavior. The MOA model is recognisable in Figure 7. The ability construct incorporates both habit and task knowledge, whereas the opportunity construct incorporates facilitating conditions or ‘opportunity’ to perform the behavior (Joshi & Rahman, 2015). According to this theory, consumers’ positive attitude will lead to desired behaviour only if consumers have the ability and the opportunity to carry out the expected behaviour. For example, green energy purchase will not happen without low premium.

One of the underlying theory falls under this category is the theory of reasoned action (TRA) posits that an individuals’ behaviour is determined by their behavioural intention, which in turn is defined as a function of attitudes toward the behaviour and subjective norm connected to the behaviour (Ajzen 1980; Hong & Swinder, 2012). All these theories have different emphases, and there are overlapping factors that influence green product adoption decisions (Table 3.1).

Notably, all the aforementioned theories take into account both personal and environmental variables (e.g., Kalafatis et al., 1999; Salmela & Varho, 2006; Ahmed, I. et al., 2017) but do not explain how consumers can translate their intention into green buying behaviour effectively (Kalafatis et al., 1999; Moser, 2015, Paul et al., 2015, Halder et al., 2015: Ahmed, I et al., 2017; Wang et al., 2019). To account for this process and in order to develop a comprehensive theory of consumer behaviour especially for green products, many researchers (Paul et al., 2015, Halder et al., 2016; Moser et al., 2015; Yadav & Pathak, 2015, 2016; Ahmed, I. et al., 2017) turned to the social psychological theory of planned behaviour (TPB, Ajzen, 1991). A meta-analysis review of 185 studies by Armitage and Conner (2001) reported that studies using the TPB model found that certain factors explained 39% of the variance of intentions, 21% of the variance in self-reported behaviour and 30% of the variance in observed behaviour (Armitage & Conner, 2001; Sultan et al., 2020). In addition, Kaiser et al.’s (2005) comparison between TPB and VBN reported that the TPB fully interprets the proportion of explained variance. More importantly, the revised statistics reveal that TPB alone represents the relationships between its concepts appropriately, while the VBN model does not.

In recent years, the TPB model (see Figure 3.1) which is widely used, has predicted consumers' pro-environmental intentions and behaviours (Khan & Sridhar, 2018), green purchase behaviour (Jaiswa & Kant, 2018), organic food (Wijayaratne et al., 2018; Sultan et al., 2020), household appliances (Tan et al., 2017), green product purchase intention (Yadav & Payhak, 2016, 2017) and green brand (Lin, 2018). In specific energy-related issues, the TPB framework can explain adults' energy conservation behaviours (Abrahamse & Steg, 2011), acceptance of green technologies (Alam & Rashid, 2012) and household energy appliances (Tan et al., 2017). Additionally, it explained the general public's intention to reduce carbon and engage in re-forestation (Lin et al., 2012; Karppinen, 2005). Tables 3.2 and 3.3 list the research articles that have published heterogeneous TPB-based research across a variety of disciplines.

It is worth noting that the literature advancing behavioural theory for TPB in the context of green energy is scant. Out of 74 relevant articles published up to 2019, only four studies were built on a robust theoretical foundation using TPB to understand consumers' green energy buying behaviour. For example, TPB was employed by Litvine and Wüstenhagen (2011) to predict the green energy purchase intention (GPI) of Swiss consumers. The study noted the relevance of the strong influence of social norms and attitudes in predicting consumers' intention to purchase green energy but the influence of behavioural control was not evident. Table 3.4 summarises the respective use of behavioural theories used to explain green energy buying behaviour in prior research.

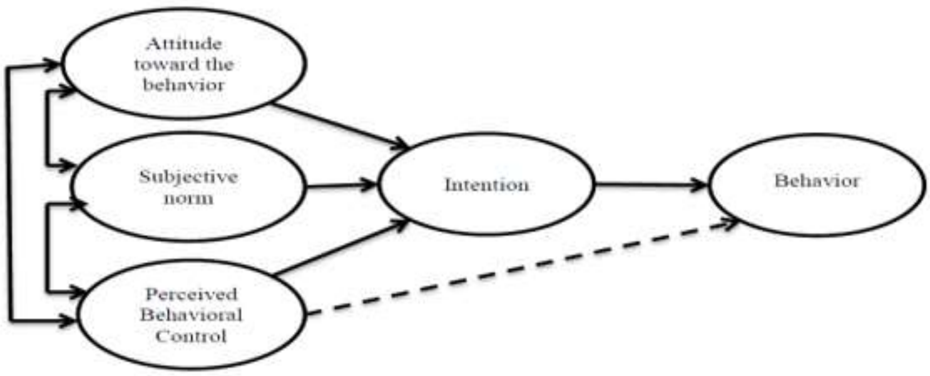


Figure 3.1: The theory of planned behaviour
Source: Ajzen, 1991

In line with the subject matter discussed above, from a consumer psychological perspective, the TPB model (Ajzen, 1991) is the most robust and useful theory (Wang et al., 2019; Sultan et al., 2020; Ahmed, I. et al., 2020) to investigate the factors predicting consumers' intention and behaviour to purchase green products, which has been supported by a substantial amount of research across multiple green behavioural domains (e.g., Khan & Sridhar, 2018; Jaiswa & Kant, 2018; Wijayaratne et al., 2018; Yadev & Pathak, 2919; Sultan et al., 2020). Thus, TPB has proven its application and usefulness, ability to test and generate certain truths and cognitive realities. In addition, the appropriateness of this theoretical framework has already been tested and validated to explain intention-behaviour to consume green products and other pro-environmental behaviours (e.g., Sultan et al., 2020).

Based on this notion, this research assumes the framework of the TPB model provides a reasonable likelihood of answering the research questions as posed.

(i) What factors determine green energy purchase intention and behaviour?

(ii) What can reduce the gap between purchase intention and actual behaviour?

Table 3.1: Critical internal and external factors from behavioural theories
Source: Ahmed, I et al., 2017, p. 21

Theory of self- regulation: In TSR three factors determine the behavioural intention: attitudes towards the behaviour, subjective norms, and desire.

Theory of reasoned action: In TRA two factors determine the behavioural intention: attitudes towards the behavior and subjective norms.

Theory of planned behavior: In TPB three factors determine the behavioural intention: attitudes towards the behaviour, subjective norms, and perceived control

Norm activation theory: In NAT theory awareness, aspiration, norm and behavioural control lead to the relevant behaviour

Value belief norm theory: The VBN theory combines perspective of personal value (biospheric, altruistic and egoistic), belief (awareness of consequences)and norm (pro environmental personal norm) that lead to relevant behavior.

Attitude, Behaviour, Context theory: IN ABC theory consumer behaviour affected by internal (attitude) and external factors (education, money, time)

The Motivation-Opportunity-Ability Model: Ability and opportunity are indispensable pre-requisites to consumer behavior

Table 3.2: Major research in different disciplines using the TPB framework
Source: Ahmed, I et al., 2017, p. 20

Discipline	Journal	Refereed Articles
Psychology	British Journal of Social Psychology	Ajzen et al. (2009)
	Journal of Applied Social Science	Giles and Cairns (1995); Hagger and Chatzisarantis (2005)
	Journal of Applied Social Psychology	Perugini and Bagozzi (2001)
	British Journal of Addiction	Arvola et al. (2008)
	MIS Quarterly	Godin et al. (1992); Pavlou and Fygenson (2006)
Consumer Behaviour	Leisure Science	Ajzen and Driver (1991)
	Clothing and Textile Research Journal	Kim and Karpova (2010)
	Journal of Consumer Marketing	Fin and Kang (2011)
	Social Science and Medicine	Conner et al. (2001)
	Journal of Retailing	Shim et al. (2001)
	Transportation Research Part F	Cestac et al. (2014); Waddell and Wiener (2014)
Logistics	Transportation Research Part F	Castanier et al. (2013)
	Environment and Behaviour	Cheung et al. (1999)
E-Commerce	Journal of Applied Social Psychology	Beale and Manstead (1991); Yousafzai et al. (2010)
Management	Forest Policy and Economics	Karppinen (2005)
	Academy of Management Journal	Cordano and Frieze (2000)
	Journal of Economic Psychology	East (1993)
	Journal of Environmental Management	Beedell and Rehman (1999)
Marketing	Journal of International Consumer Marketing	Ferdous (2010)
	Journal of Consumer Marketing	Kalafatis et al. (1999)
	Journal of Marketing	king et al. (2008)

Table 3.3: TPB framework in green research domain

Green research domain	Journal	Referred articles
Environmentally sustainable products	Journal of Retailing and Consumer Services	Kumar, B., Manrai, A. K., & Manrai, L. A. (2017).
Green consumption	Journal of Retailing and Consumer Services	Paul, J., Modi, A., & Patel, J. (2016).
Organic food	Appetite	Yadav, R., & Pathak, G. S. (2016).
Green products	Journal of Cleaner Production	Yadav, R., & Pathak, G. S. (2016).
Green products	Ecological Economics	Yadav, R., & Pathak, G. S. (2017
Green hotel	Journal of Cleaner Production	Verma, V. K., & Chandra, B. (2018).
Ecologically conscious consumption behavior (ECCB).	Journal of Cleaner Production	Taufique, K. M. R., & Vaithianathan, S. (2018).
Carbon reduction behaviors	Journal of Cleaner Production	Chen, M. F. (2016).
Green products	International journal of consumer studies	Arli, D., Tan, L. P., Tjiptono, F., & Yang, L. (2018).

Table 3.4: Summary of consumers' behaviour measured by theories relating to green energy

Author& Year/Country	Aim	Associated theories	Findings
Bang et al., (2000) – USA	To examine the relationships between consumer concern for the environment, consumer knowledge and beliefs about green energy	Theory of Reasoned Action (TRA)	Knowledge levels were relatively low. Interestingly, it was also found that consumer concern failed to translate into heightened knowledge about green energy.
Bamberg (2003) - German	Investigate the direct relationship between environmental concern and TPB elements	Theory of Planned Behavior (TPB)	The results of the study confirm that environmental concern have direct effect on intention or behavior.
Litvine & Wüstenhagen (2011) - Switzerland	Influence green energy purchase intention	Theory of Planned Behavior (TPB)	Attitude, social norms and perceived behavioral control affects green energy purchase intention.
Liu et al. (2013)	To examines what factors influence the rural social acceptance of green energy deployment in china	Theory of Planned Behavior (TPB)	Green energy purchase intention is found to increase with income, knowledge and belief about costs of renewable energy use but decrease with individual age
Claudy (et.al. 2013)- Ireland	Green energy attitude behavior gap	Behavioral Reasoning Theory (BRT)	BRT model is generally supported with both reasons for adoption and reasons against adoption of green energy
Halder et al. (2016)- Cross country - India and Finland	To explain high school students' intentions to use green energy in cross cultural context-Finland and India	Theory of Planned Behavior (TPB)	Attitude has the strongest and statistically significant positive effect on the students' intentions to use green energy in a cross-cultural

3.2.1. Core elements of TPB framing the research model

The Theory of Planned Behaviour (TPB) (Ajzen, 1991), which is a derivative of TRA (Ajzen, 1985), establishes a theoretical link between the concept of intention and behaviour. TPB proposes that a person's intention and motives are influenced by their individual attitude towards a product (i.e., about outcomes of behaviour), their subjective norms (i.e., how others view the behaviour), and consumers' perceived behavioural control (i.e., how difficult the behaviour is to perform). Taken together, all three salient constructs lead to the formation of a behavioural intention that ultimately conditions behaviour (Ajzen, 2002). As a rule of thumb, TPB posits that the stronger each of its elements is, the greater the intention or desire of the person to perform the actual behaviour. The corresponding framework of the TPB (see Figure 3.2) demonstrates the link between intentions to self-reported behaviour. Based on the assumptions of TPB (Ajzen, 1991), green energy buying behaviour can be explained by the behavioural intention, which is then determined by the attitudes, subjective norms, and perceived behavioural controls people employ. In the green energy context, the predictors of consumers' intentions to purchase green energy affect their buying behaviour through the lens of TPB as follows:

- Attitude (i.e., consumers' overall assessment of the provision of green energy purchase)
- Subjective norm (i.e., other people's influence on purchasing green energy)
- Perceived behavioural control (i.e., extent to which an individual believes purchasing green energy is easy or difficult).

Although TPB establishes a strong theoretical link to measure the relationship between intention and behaviour, this theory is not without limitations. It requires additional constructs to create a robust outcome when exploring GPIB, as discussed in the following section.

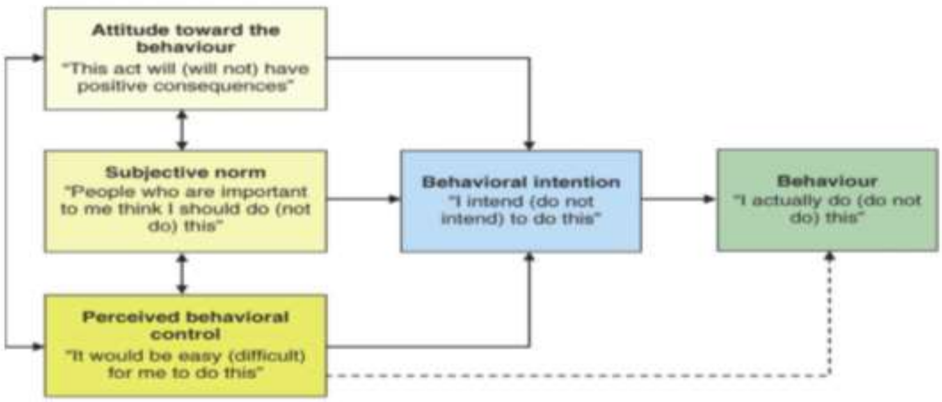


Figure 3.2: Theory of planned behaviour (elaborated)
Source: Sarkis, 2017, p. 531

3.2.2. Extension of the TPB model

Green consumption-related decisions and behaviours are most likely driven by a combination of several factors (personal, contextual) and motivations (Palandino & Pandit, 2019; Yadav et al., 2017, 2019; Ahmed, I. et al. 2017; 2020). In this context, this research finds the framework of TPB (Ajzen, 1991) is the most widely used and accepted theory in green behavioural research. It can include additional factors to explain consumption behaviour-related research. This section argues that the TPB model needs major theoretical additions. Although the TBP framework appears to contain the core elements of purchasing intent and behaviour in the context of green buying behaviour, other constructions need to be considered when undertaking an in-depth study. The following deliberation argues in favour of these constructs.

TPB has been employed to investigate the decision-making framework for green purchasing behaviour and has become one of the best known and most widely used models for explaining how people make rational decisions (Tan et al., 2017; Verma & Chandra, 2018; Yarimoglu & Gunay, 2019; Sultan et al., 2020). Although TPB's success in predicting behaviour has been demonstrated, it has also been criticised (Conner & Armitage, 1998; Armitage & Conner, 2001; Halder et al., 2016). For example, some researchers (Armitage & Conner, 2001; Donald et al., 2014, Yadev & Pathak, 2016; Sultan et al., 2020) have argued that although the three salient predictors of TPB (attitudes, subjective norms, behavioural control) can predict human behaviour, other factors may also affect behaviour. It is asserted that the level of prediction using the three components of TPB is insufficient (Wang & Wang, 2016; Sultan et al., 2020), so the original TPB model requires some relevant modifications as recommended by Ajzen (1985, 1991). It is important to note that it has been almost 35 years (1985-2020) since Ajzen's TPB model was introduced (see Figure 3.3). During this period, the TPB model underwent several refinements in terms of theory and methodological changes. Empirical evidence has been found in the recent psychological literature for including additional constructs to improve the predictive ability of the extended TPB model (e.g., Paul et al., 2015; Halder et al., 2015; Moser et al., 2015; Yadav & Pathak, 2015, 2016; Khan & Sridhar, 2018; Canova et al., 2020; Liu et al., 2020; Chan et al., 2020; Sultan et al., 2020). Accordingly, the study expands the TPB model to examine the impact of additional factors (discussed in Section 3.4.2) to explore consumers' behaviour.

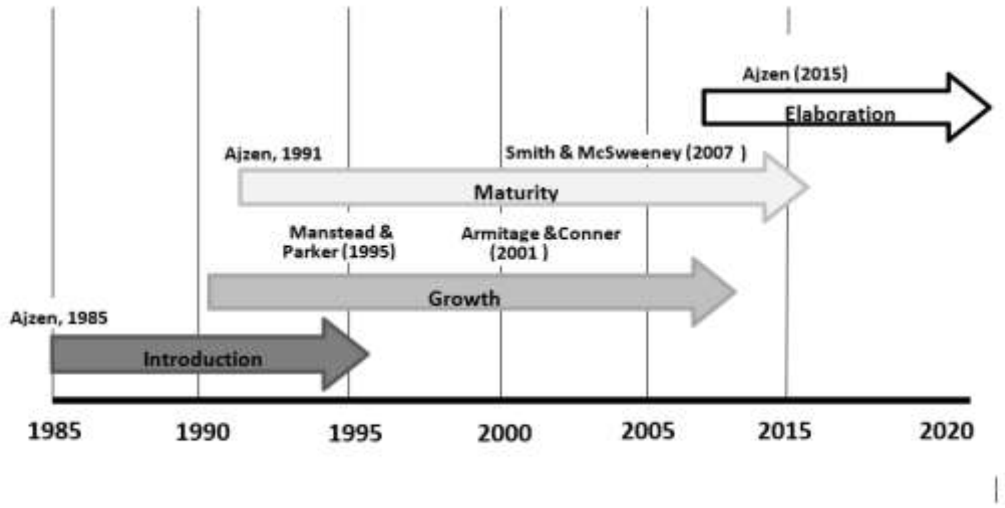


Figure 3.3: Evolution of TPB model
Source: Adopted and modified from Lee et al. (2004)

3.3. Determinants of green energy purchase intention and behaviour (GPIB)

The aim of the research was to examine the factors influencing consumers' intent to purchase green energy and its relative importance in predicting their behaviour (i.e., GPIB). The research also focused on covering the issue of how to reduce the gap between intention and actual behaviour. To make this possible, a conceptual model was synthesised so that the factors affecting the green energy purchase intention and buying behaviour (GPIB) could be explained. Different research constructs/factors were established and divided into two main categories, according to their area of influence: – a) personal and b) contextual factors. These are discussed in more detail below.

Personal factors are defined as those related to a consumers' personal values, feelings, etc., which explain an individual's behaviour (Lin & Huang, 2012; Nguyen et al., 2019). Many studies claim that personal factors are important and motivating to encourage behavioural change, although the correspondence between attitudinal variables and behaviour is often moderate (Tanner & Wölfing, 2003; Hasnain et al., 2020). Consumers' personal values are relevant to understanding which policies are supported or opposed by the public because these factors determine how consumers evaluate and weigh the various consequences that stem from implementing new energy policies and strategies. On the other hand, there is an amity in the green marketing literature about the contextual factors that influence the decision to buy green products. This is because buying a green product appears to be risky due to several contextual issues (Hosseini et al., 2018; Elsamen et al., 2019).

Contextual factors refer to situation/domain-specific factors which influence an individual's behavioural actions (Belk, 1975; Yadav et al., 2019). Contextual factors are linked to social, economic, and physical environments, and institutional realities within which individuals act and can have a bearing on pro-environmental attitudes (Guagnano et al., 1995; McKenzie-Mohr, 2000). These contextual factors can play the role of prime product attributes, and influence motivations which may affect the interpretation and evaluation of certain behaviours (Yadav et al., 2019).

Although personal and contextual factors make an important contribution, they have not received the attention they deserve with reference to energy behavioural research. For example, in the domain of energy use, research indicates that personal factors (e.g., consumer attitude, social structure, social reference) and contextual factors (e.g., monetary benefit, brand, promotion) have some bearing on household energy consumption (e.g., Hartmann & Apaolaza, 2012; Halder et al., 2016; Palandino & Pandit, 2012, 2019). However, only a few studies have explored the intricate associations and interactions among personal and contextual factors, in assessing the actual buying behaviour of green energy. This study aims to remedy this lack of data.

For sustainable consumption of green energy, attitude, subjective norm, environmental concern and moral norms are considered to be personal factors. For contextual factors, behavioural control, green perceived brand, retail service quality, and green promotion serve as indicators of external motivation to adopt green energy. Despite interest in what improves individuals' knowledge about the benefits of green energy consumption, recent literature indicates barely any research on green energy marketing which discusses the contextual relationships among different behavioural factors from the Australasian region. Considering TPB and both personal and contextual factors together, offers valuable insights into investigating green energy buying behaviour. Examination of these factors can improve our understanding of environment sustainability. It is reasonable to argue that the extended TPB model (see section 3.5) of personal and contextual factors integrated with the original TPB factors may help better understand consumers' green energy adoption practices.

Although some scholars (e.g., Tang & Medhaker, 2011; Halder et al., 2016; Palandini & Pandit, 2019) have scrutinised the factors affecting green energy purchase intention (GPI) via attitude, subjective norm, perceived behavioural control, and environmental concern, no research has evaluated the factors that govern moral norm, retail service quality, green perceived brand, as the antecedents of GPI directly and/or indirectly, of the behaviour. Neither has the mediating role along with the stimulus – green promotion on GEB been assessed. The exact relationships of these factors with intention and /or behaviour are still unexplored regarding green consumption, in particular green energy buying. Notwithstanding, the key determinants (i.e., attitude, social norms, perceived behavioural control, environmental concern, perceived green brand, retail service quality, moral norm and green promotion) that influence consumers' GPIB have not been combined into any known study. Although researchers like Tang and Medhaker (2011), Halder et al. (2016), Palandini and Pandit (2019) have conducted research using attitude, social norms, perceived behavioural control, and environmental concern, research is scant, and results are mixed due to the differences in methodology, demographic profile, context and samples used. To further ensure the reliability and replication of these constructs the relationships will be retested between attitude, social norms, perceived behavioural control, environmental concern, and green energy purchase intention as they apply to the Australian context.

Embracing the aforesaid argument, this research collated eight key determinants influencing consumers' green energy purchasing intentions and buying behaviour (GPIB). The initial three determinants are attitude, subjective norm and perceived behaviour control extracted from the TPB while the remaining five are moral norm, green perceived brand, green promotion, environmental concerns and retail service quality and green promotion. Including all these exogenous constructs (i.e., predictors) is further justified by the evidence provided by prior empirical research and the extant literature on green energy consumers.

3.4. Theoretical background and construct definitions

This section establishes the research constructs to develop the conceptual model that extends the existing Theory of Planned Behaviour (TPB) framework and explores the decision-making framework regarding the GPIB. All the research constructs – attitude, subjective norm, perceived behavioural control, moral norm, green energy brand perceptions, green promotion, environmental concern and retails service quality – are incorporated into the model with various kinds of supportive empirical evidence.

An overview of the definitions of all research constructs is shown in Table 3.5. A literature review of the proposed constructs under investigation and their possible relationships with green energy purchase intention and/or behaviour purchase behaviour is provided in the following discussion. This will form a strong basis for formulating the relevant conceptual model of GPIB to guide the subsequent survey. The constructs discussed in the following section are described in two aspects: core constructs of the TPB model and additional constructs in the extended TPB model.

3.4.1. Key constructs from the TPB model

The TPB model states that human behaviour is guided by three salient elements, namely, attitudes, subjective norms, and perceived behavioural control, all together leading to the formation of a behavioural intention (Ajzen, 1991) which in turn results in behaviours. Studies have tested, validated and established that these factors can significantly predict intentions and behaviours. From the empirical research it is evident that attitude, subjective norm and perceived behavioural controls together can shape individuals' behavioural intentions, so it is reasonable to claim that these same three components all influence their green energy purchase intentions and behaviours. The following section reviews the literature relevant to the three components of TPB.

TPB asserts that consumer attitude (ATT) is explained by the assessment of individuals' either positive or unfavourable evaluation of purchasing decisions (Tan et al., 2017; Sultan et al., 2020). Prior research literature has demonstrated that consumer attitudes are among the most relevant predictors of green purchasing decisions (e.g., Kumar et al., 2017) and also with respect to the motivations for green energy buying (Palandino & Pandit, 2019). Subjective norm (SN) which refers to social compatibility, is an important predictor in green consumer psychology. The views of peers, friends, and others are related to individuals' psychological properties, and affect their behavioural outcomes (Kumar et al., 2017; Richard et al., 2014). Therefore, social reference and the suggestions of significant others are found to strongly affect individual's behavioural intention, including green energy consumption (Ahmed, I. et al., 2020, 2021). Most importantly, perceived behavioural control (PBC) in many green-related studies is used to assess how external and irrational factors (such as time, money, cost, availability, awareness) affect behavioural outcomes (Ajzen, 1991; Yadev & Pathak, 2017), and is noted in green energy behaviour-related studies (e.g., Palandino & Pandit, 2019). These complementary findings point to the importance of considering attitude, subjective norm and PBC in relating to green energy consumer behaviour.

3.4.2. Derivation of additional constructs to the extended TPB

In this study, the additional five constructs which are moral norm, retail service quality, environmental concern, green brand perceptions and green promotion are included in the expanded model of the TPB to examine their contribution to behavioural intention and actual behaviour of people to purchase green energy. To the best of our knowledge no research has integrated the aforementioned constructs into the TPB model to predict consumers' intentions/behaviours (i.e., GPIB). Here the TPB model is refined by including such constructs, which are important in green energy consumption: moral norm, retail service quality, environmental concern, green brand perceptions and green promotion. They change the direction of the model by improving our ability to predict and understand consumers' decisions about green energy products.

All the additional determinants of an extended TPB (i.e., GPIB) will be discussed in the next section to show how they can buttress the proposed conceptual model. What follows is a discussion of the possible relationships between five additional constructs (i.e., environmental concern, green brand perceptions, retail service quality, moral norm and green promotion) and intention/behaviour in green energy consumption.

3.4.2.1. Theoretical and empirical support including environmental concern

Environmental considerations indicate the degree to which an individual is aware of environmental problems, and such people are motivated to resolve these issues or contribute a solution to the overall strategy (Dunlap & Jones, 2002; Yadev & Pathak, 2016). Findings from previous literature suggest that environmental concern plays a significant emotional role in green product purchase decisions. For instance, Bamberg (2003) noted that consumers' environmental concerns exert influence on attitudes and direct determinants of specific behaviours. Furthermore, as suggested by Yadev & Pathak (2015, 2016), environmental concerns have a profound effect on pro-environmental behaviours. They can determine consumers' green buying behaviours and help to better understand people's intentions to buy green energy, so environmental considerations should be seriously considered. Therefore, in addition to the three predictors in the TPB model, environmental concern is found to be an important aspect of this model.

Table 3.5: Construct definition and source of research constructs

Construct	Definition	Source
Attitude	‘‘The degree to which an individual possesses a positive or unfavourable evaluation of the behaviour in question”	Ajzen (1991)
Subjective norm	“The degree of social stress felt by a person's behaviour”.	Ajzen (1991)
Perceived behavioural control	“The perceived ease or difficulty of performing the behaviour”.	Ajzen (1991)
Environmental concern	“The degree to which people are aware of problems regarding the environment and support efforts to solve them or indicate the willingness to contribute personally to their solution”.	Dunlap & Jones, (2002); Yadev & Pathak (2016)
Green brand perceptions	“A whole range of impressions, conceptions and apprehensions towards a brand in the customers’ memory which is correlated to the sustainability and eco-friendly concerns”.	Chen (2010)
Retail service quality	“A retail service quality involves more than a non-retail service experience in terms of customer’s negotiation to buy, delivery services, payment facilities, interaction with personnel along the way all of which influence consumers' evaluations of service quality.”	Dabholkar et al. (1996)
Moral norm	“A sense of obligation to perform a specific behaviour, producing feelings of moral obligation to perform on specific circumstances.	Chen (2015)
Green promotion	“The concept of green promotion, considered by the approach of motivation used to move from an actual state to the desired end-state”	Higgins et al., 1994; Codini et al., 2018
Purchase intention	“Indicates an individual’s readiness/willingness to engage in a particular behaviour”.	Ajzen (1991)
Green buying behaviour	“Green behaviour is primarily an environmental-related topic that incorporates the topics of sustainability, pollution control, and environmental conservation”.	Jaiswala & Kant, (2017)

3.4.2.2. Theoretical and empirical support for including moral norms

Moral norms are one of the most widely observed proximal motivational factors of green behaviour that triggers individuals' concern and commitment to solving environmental problems (Verma & Chandra, 2018; Ahmed, I. et al., 2019). The concept of moral norms (i.e., ethical obligations) refers to a moral norm that involves a sense of obligation to perform a specific behaviour, producing feelings that lead to an ethical stance regarding specific circumstances (Chen & Tung, 2014).

As discussed earlier, Ajzen's TPB (1991) is one of the major models for predicting and understanding individuals' intentions and behaviours. However, one of the main criticisms of the TPB is that it does not consider an individual's moral norms which may affect subsequent behaviour (Dowd & Burke, 2013; Saleki et al., 2019). Furthermore, Ajzen (1991) stated that, besides the component subjective norm, individuals' moral feelings or responsibility towards a certain behaviour should be considered in some circumstances. More importantly, Fishbein and Ajzen (2011) argued that when dealing with behaviours where a clear ethical or moral dimension is evident, it is pertinent to include the perceived moral norm in the original framework of TPB to determine whether moral norms can help predict intention and behaviour. A growing body of research supports the role of moral norms as a strong predictor (e.g., Manstead, 1999; Godin, 2005; Conner & Armitage, 1998) even when attitude, subjective norm and perceived behavioural control have been taken into account.

Based on the review, there is ample evidence that moral norms should be included in the TPB model (Conner & Armitage, 1998; Arvola et al., 2008; Kaiser & Scheuthle, 2003; Oteng et al., 2020; Liu et al., 2020). Of further note, although researchers stressed the importance of moral norm determining consumers' green buying behaviours, the current literature on moral norm is inadequate, particularly in the context of green energy consumer behaviour. This distinct but complementary finding points to the importance of considering moral norm dimensions in the research model which considered moral norms as strong proximal determinants of both intention and behaviour.

3.4.2.3. Theoretical and empirical support for including green brand perceptions

Green brand has been defined (Cretu & Brodie, 2007) as a set of perceptions in the consumer's mind relating to brand performance associated with environmental commitments. More importantly, the extant literature has been moderately conclusive that the factor “green brand” is a crucial one in green purchase decisions, for example see Darnall (2008), Jalilvand et al. (2011), and Chen et al. (2020). Notably, green branding research has traditionally focused on examining consumers’ behavioural intentions concerning green tangible products. However, green branding and its effects are rarely reported in the green energy marketing context.

Regarding green energy, consumers are sceptical about the authenticity of what is claimed to be ‘green’. A green brand may play a significant role in influencing consumers’ attitudes or intention to reveal a certain behaviour in a green energy choice, particularly when they are concerned with the authenticity of a green energy product or source but have too much information about how they will benefit. This issue was echoed by Hartmann & Ibáñez (2007), Palandino & Pandit (2012) and Hanimann et al. (2015) who suggested that researchers should consider the role a perceived green brand plays is an important construct to understand consumers’ green energy choice behaviours. Therefore, the additional construct “green brand perception” is included in the TPB model because it is a distinct psychological predictor of green energy purchase intentions.

3.4.2.4. Theoretical and empirical support for including perceived retail service quality

Researchers defined perceived service quality as the comparative judgement of consumers’ expectations about the perceived performance of products or services (e.g., Anderson et al., 1994; Ibáñez, 2006; Siu & Cheung, 2001; Parasuraman et al., 2002; Shahzad et al., 2019; Akdere et al., 2020). In retail contexts, service quality refers to that being offered by many kinds of retailers (Dabholkar et al., 1996). Findings from previous literature suggest that retail service quality plays a significant role in green purchase decisions. Dabholkar et al. (1996) for example, found a strong statistical relationship between retail service quality and purchase behaviour. Nadiri and Tümer (2009) conducted a regression analysis to test hypotheses regarding retail service quality and behavioural intentions in Cyprus and found that retail service quality had a positive effect on consumers' future buying decisions. The study also found a positive correlation between retail service quality and intention.

Consistent with these findings, retail service quality is a very important factor in increasing consumers' purchase decisions in the intangible product energy market (Dukart, 1998; Wiser et al., 1999; Umbrell, 2003; Hoggard, 2004; Hasanuzzaman & Kumar, 2020). Since the attributes of green energy (i.e., the intangibility) are a critical barrier for marketers to overcome, researchers suggest that energy retailers and marketers should exploit strong interactions with their customers and provide additional facilities to convince consumers about the green energy product, thus increasing their level of confidence in a challenging ecological product – green energy (Lewis, 2001; Coyles & Gokey, 2002; Brown, 2003; Dinçer et al., 2019). Although the current literature (Palandino & Pandit, 2012) has identified the importance of the quality of retail service in the context of the green energy market, the empirical evidence does not establish a link between retail service quality and purchase intentions for green energy. Therefore, considering consumers' perceptions of green energy, the retail service quality measurement scale construct is conceptually flawed in the present study.

3.4.2.5. Theoretical and empirical support for including green promotion

Promotions that serve the purpose of encouraging people to purchase green products are an effective way to save the environment and achieve sustainability in economic development (Liobikienė, & Bernatonienė, 2017; Palandino & Pandit, 2012, 2019). The concept of green promotion motivates the transition from an actual state to the desired end-state (Higgins et al., 1994; Codini et al., 2018), and wields a large influence on people's buying behaviours (Keller, 2006).

The concept of green promotion is used especially for a green product to increase its sales because it is deemed to be worth the higher price compared to other products (Goh et al., 2019). In the case of green energy consumption practices, several factors have been reported as barriers, for example price, reliability, and awareness (Hanimann et al., 2015; Palandino & Pandit, 2012, 2019). Because it costs approximately 20% more than conventional energy (Salmela & Varho, 2006), this higher price is a key problem in the adoption of green energy. However, good green energy promotion strategies can encourage consumers' green purchase decisions (e.g., Aziz & Chok, 2013; Ku et al., 2012; Fam et al., 2013; Aziz & Chok, 2013). Several studies (e.g., Bang et al., 2000; Claudy et al., 2013; Halder et al., 2016; Hartmann et al., 2016; Palandino & Pandit, 2012, 2019) stressed the importance of marketing incentives and promotional activities to motivate consumers to buy green energy products. This research examines and tests how to promote green energy consumption intentions and introduces actual real green energy consumption behaviours.

3.4.2.5.1.The potential role of green promotion (mediator) in reducing the intention–behaviour gap

Green energy is an intangible product which is not generally accepted due to certain obstacles (e.g., price, awareness, information, trust). Studies in literature have revealed that consumers who generally indicated positive intentions towards green energy do not reflect their green energy purchase behaviours. This the intention-behaviour gap (Hobman & Fredrick, 2014; Palandino & Pandit, 2019; Ahmed, I et al.2019) needs explanation, i.e., additional stimulus factors should be explored to clarify the variations in actual buying. It is important to assess why favourable purchase intentions exert only a weak influence on actual purchases of green energy; there might be external factors including levels of government rebate, price benefits, etc., that influence the intention and behaviour to adopt green energy.

There is a strong perception that green energy is expensive and this is a dominating issue precluding consumers from buying behaviour (Keller, 2006). There is a need to explore the role of a motivating factor that would enable an increasing green energy consumption behaviour to contribute to a mediator that would help to reduce any intention-behavioural gap. However, a review of the current literature reveals that no prior researchers looked at any factors that could explain the gap between intention and behaviour in green energy consumption settings. This limitation dissuaded researchers from looking for external stimuli or contextual factors transforming consumers' intention into actual buying (Ajzen & Fishbein, 2005) of a green energy product and thus led us to identify the stimulus – green promotion was the key factor explaining the intention-behaviour gap underpinning the TPB model. This research discovers there is an opportunity to close the gap in the literature by examining the role of “green promotion” as a mediator to resolve the relationship between intention and behaviour.

According to researchers (MacKinnon, 2001; Cabuk et al., 2014), the main purpose of the mediation analysis is that the mediation examination can provide a detailed explanation of why and how there is an observed relationship between the two factors. Thus, examining a green promotion towards green energy as a mediator can provide a detailed explanation about why and how there is an observed relationship between the intention to buy green energy and the motivation to do so. Given the potential pitfalls, the current research endeavours to explore the role of green promotion as a strong mediator to explain firstly, the intention-behaviour gap in green energy consumption behaviour; and secondly, why individuals intend to behave in an environmentally friendly way but do not actually purchase the green energy product.

3.4.2.6. Summary of the rationale of adding constructs in TPB model

In brief, five additional constructs (environmental concern, moral norm, green brand perceptions, retail service quality and green promotion) were chosen for several reasons. First, as indicated several researchers agreed that certain environmental concerns, moral norms, and perceived green brand aligned with three TPB elements (attitude, subjective norm, perceived behaviour control) which considerably affected customers’ environmentally based decisions and behaviours. These determinants can guide the intention and/or actual behaviour to consume green energy. Second, these determinants are conceptually and theoretically distinct from the TPB constructs. That is, the additional constructs are different, but they improve the TPB model for the purposes of this thesis. Third, the unexplored new constructs (i.e., retail service quality, green promotion) are aligned with existing predictors of the TPB and will be suitable for a wide range of eco-friendly consumer behaviours in various research domains. Finally, prior studies have provided empirical evidence for supporting the impact of these constructs (i.e., environmental concern, moral norm, green brand perceptions, retail service quality and green promotion) on purchase intentions for environmentally friendly products (e.g., Hanimann et al. 2015; Chen, 2016; Paandino & Pandit, 2019; Akdere et al., 2020). However, the magnitude impact of these constructs using the TPB has been inconsistent and dependent on the specific research context. It is worth mentioning that the relative influence of psychological factors depends on both the particular issue under study and the sample (Sánchez-Medina e al. 2014). In this research, the relationships were tested between these important factors and behavioural intention toward green energy among consumers in Australia. The following section discusses a broad conceptual structure by outlining and delineating each of the dimensions in a theoretical framework.

3.5. The conceptual model

This section discusses the conceptual model to show causal effects among the proposed research constructs, followed by the chosen hypotheses. The core construction of the conceptual model is based on the widely accepted expectancy-value model of the intention-behaviour relationship in the TPB framework (Ajzen, 1991), which is well-established in predicting a variety of behaviours (Ajzen, 1991; Bilic, 2005; Canova et al., 2020). The model aims to measure the exploration of reciprocal determinism and viewing psychological factors as determinants of green energy purchase intention (i.e., GPI) to provide an improved understanding of green energy buying behaviour (i.e., GEB) in Australia. It is expected that the proposed model will help to measure the determinants of GPI and GEB and thus help marketers to identify specific factors that lead to effective green marketing approaches.

Inspired by the findings and recommendation of the literature (see section 3.4), the current study has added eight constructs viz. attitude, subjective norm, PBC, moral norm, retail service quality, environmental concern, green brand perceptions and green promotion to the original framework of TPB to create a new conceptual model. Previous studies have revealed that the aforementioned factors were crucial factors in predicting green purchasing behaviours (e.g., Bamberg, 2003; Parker et al., 1995; Conner & Armitage, 1998; Yadev & Pathak, 2015, 2016; Verma & Chandra, 2018; Wang et al., 2018; Codini et al., 2018; Pimonenko et al., 2019; Papista & Dimitriadis, 2019; Palandino & Pandit, 2019; Ahmed, I et al., 2019; Panda et al., 2020; Akdere et al., 2020; Hasanuzzaman & Kumar, 2020). However, a lack of comprehensive research has prevented the combination of these factors into one integrated model. In fact, to the best of our knowledge to date, no published literature has looked at or evaluated the effects of these factors under the aegis of one conceptual model (i.e., TPB). In other words, no studies assessed the eight cognitive factors as the antecedents of green energy purchase intention (GPI) and green energy buying behaviour (GEB) directly and/or indirectly based on the TPB model for green energy consumer behaviour in Austral

Although models have been developed in the past (see Table 3.4) a more systematic and detailed exploratory study of key socio-psychological determinants is currently lacking, making it difficult for both marketers and policymakers to predict how the observed behaviour can help to stipulate suitable strategies to uptake the green energy market. Further to that, despite some of the constructs examined in past research, which assess similar constructs, were also likely to differ in terms of how they were measured and used (Van der Linden, 2015). This left substantial room to further develop both a new conceptual model as well as the empirical explanatory power of the model, integrating a set of new and similar ways to predict both the purchase intention and observed behaviour.

Taking into account the premises stated, this study aims to develop a parsimonious model that helps organise and integrate different personal and contextual factors underpinning the theoretical framework of TPB. The conceptual model of this study comprises eight independent variables selected with reference to the foregoing literature review and these are: attitude, subjective norm, PBC, moral norm, retail service quality, environmental concern, green perceived brand, and green promotion. The measure of GPI is the fundamental predictor of GEB in the model. According to Ajzen (1991) intention is the cognitive representation of an individual's willingness to perform a specific behaviour, and it is the immediate determinant of behaviour.

In sum, the research model included the seven independent research constructs as the antecedents to GPI: attitude, subjective norm, PBC, moral norm, retail service quality, environmental concern and green perceived brand, three variables to the GEB: moral norm, perceived behavioural control and green promotion. In addition, to overcome the limitations in intentional models and close the gap between intention and behaviour, the model incorporated the mediating effect via green promotion of precipitating events in the relationship between intentions and buying behaviour. A representation of the modified version of the theory of planned behaviours is depicted in Figure 3.4.

The following section portrays the phases of the conceptual model and reveals how the proposed model developed appraisal about understanding the green energy buying behaviour, indicating how consumers believe purchasing green energy to be easy or difficult.

3.5.1. Model development phases

This section aims to discusses the phases of the structural model including the original TPB model, extended TPB model and the mediation model (proposed model). Section 5.6 (Chapter 5) examines all three models consecutively. Some important features of the proposed conceptual model are elaborated in 3.5.2.

Model Phase 1: Original TPB model

In the original TPB model, the salient constructs of the TPB model: attitude, subjective norm, and perceived behavioural control were tested to predict the intention and behaviour towards green energy (see Fig 5.1, 5.2). The model aimed verify the components of the TPB model can influence one's intention to consume and purchase green energy. However, the TPB model was extended and validated to understand a comprehensive picture of green energy buying behaviour.

Model Phase 2: Extended TPB model

The second model (see Figure 5.3) added the additional latent constructs in order to predict consumers' purchase intentions and buying behaviour of green energy. In second phase, the model for this study was conceptualised by considering environmental concern, moral norm, green brand perception, retail service quality in addition to the core variables of TPB, including attitude, subjective norm, perceived behavioural control, intention, and actual behaviour. The model (see Fig 5.3, 5.4) aims to examine of reciprocal determinism and viewing the factors as determinants of green energy purchase intention (i.e., GPI) to provide an improved understanding of green energy buying behaviour.

Model Phase 3: Proposed model with the mediation effect

One of the central aims of this research is to reduce the intention-behaviour gap evident in current literature. Using TPB (Ajzen, 1991) as a theoretical foundation, the research develops a unique model for understanding consumers' intention to use green energy and provide a better understanding of factors that can lever actual buying behaviour. The model aims to explore and examine reciprocal determinism and viewing both personal and contextual factors as determinants of green energy purchase intention (GPI) to provide an improved understanding of green energy buying behaviour (GEB). Therefore, much focus is put on what mediates the intention-behaviour relationship. This research discovers there is an opportunity to close the gap in the literature by examining the role of a stimulus, i.e., "green promotion". Examining the role of a mediator (i.e., green promotion) in the intention-behavioural relationship can provide a detailed explanation of why and how there is an observed relationship between the intention to buy green energy and the motivation to do so. The graphical representation of the modified version of the theory of planned behaviour is depicted in Figure 3.4 (also see the structural models in 5.5, 5.6).

3.5.2. The model's features

The present research builds a parsimonious and comprehensive research model of consumers' green energy purchase intention and buying behaviour (GPIB). It elaborates the direct and mediating relationships among the predictors (attitude, subjective norm, perceived behavioural control, moral norm, retail service quality, environmental concern, green perceived brand, green promotion) for sustainable green energy in Australia.

First, the model shows that intention depends on seven exogenous (predictor construct) factors: attitude, subjective perceived behavioural control, moral norm, retail service quality, environmental concern and green brand perceptions. This postulation reflects the cognitive effect of purchasing a green energy product on the consumers' mind. Second, the construct purchase intention and buying behaviour is endogenously determined. In the model, intention is hypothesised to be the immediate determinant of the behaviour. Consistent with the intention-behaviour hierarchy, the model postulates that all the constructs influence green energy buying behaviour

(GEB) via the mediating variable green energy purchase intention (GPI). In other words, the model investigates the indirect relationship between the seven above-noted independent constructs and the dependent variable – GEB via the GPI. Therefore, in the research model, GPI acted as an endogenous (dependent variable) and exogenous (predictor variable) investigating the green energy buying behaviour. Third, the model explores the role of three predictors - moral norm, green promotion, and perceived behavioural control as a direct variable on the GEB.

For the fourth aspect, the core attributions of the proposed conceptual model are that it scrutinised the intention-behaviour gap (Claudy et al., 2013; Hobman & Fredrick, 2014; Palandino & Pandit, 2019) and attempted to provide scientific evidence for a mediator translating a consumer's GPI into buying practice (i.e., GEB). The model assumes that the external stimulus (i.e., mediator) can better help to explain the gap between purchase intentions and actual behaviour.

It is argued (see Section 3.4.2.5) that many consumers do intend to consume green products but this does not translate literally into actual buying, due to various external constraints including price perception (e.g., Kuhn et al., 2015; Palandino & Pandit, 2019). In this context, promotion can motivate the transition from an actual state to the desired end-state (Higgins et al., 1994; Liobikienė, & Bernatonienė, 2017; Codini et al., 2018), and has a large impact on buying behaviour (Keller, 2006). Hence, the stimulus – 'green promotion' is integrated into the cognitive intention-behaviour model to develop a conceptual model of GPIB, focusing specifically on the transformation of purchase intentions into actual buying behaviour. Thus, the conceptual model in fact seeks to address the key shortcomings of the intention-behaviour gap identified earlier by exploring the mediating effect of green promotion. The model looks at the strength of the mediating effect of 'green promotion' under the influence of a dependent variable GPI (see Fig 3.4, 3.5).

In terms of model validation, the inclusion of 'green promotion' as a mediator between the intention and behaviour is expected to improve the explanatory power of the proposed model (see Chapter 5, 5.7.2.2). In the model, the mediating effect of green promotion is that green energy buying behaviour depends on purchase intentions, which are a precursor of the final green energy purchase level. It remains to be seen whether the aforementioned exogenous constructs exert any significant effect on endogenous constructs (i.e., intention and behaviour) when combined in the hypothesised model - Fig 3.5 (analysed in Chapter 5- Fig 5.7).

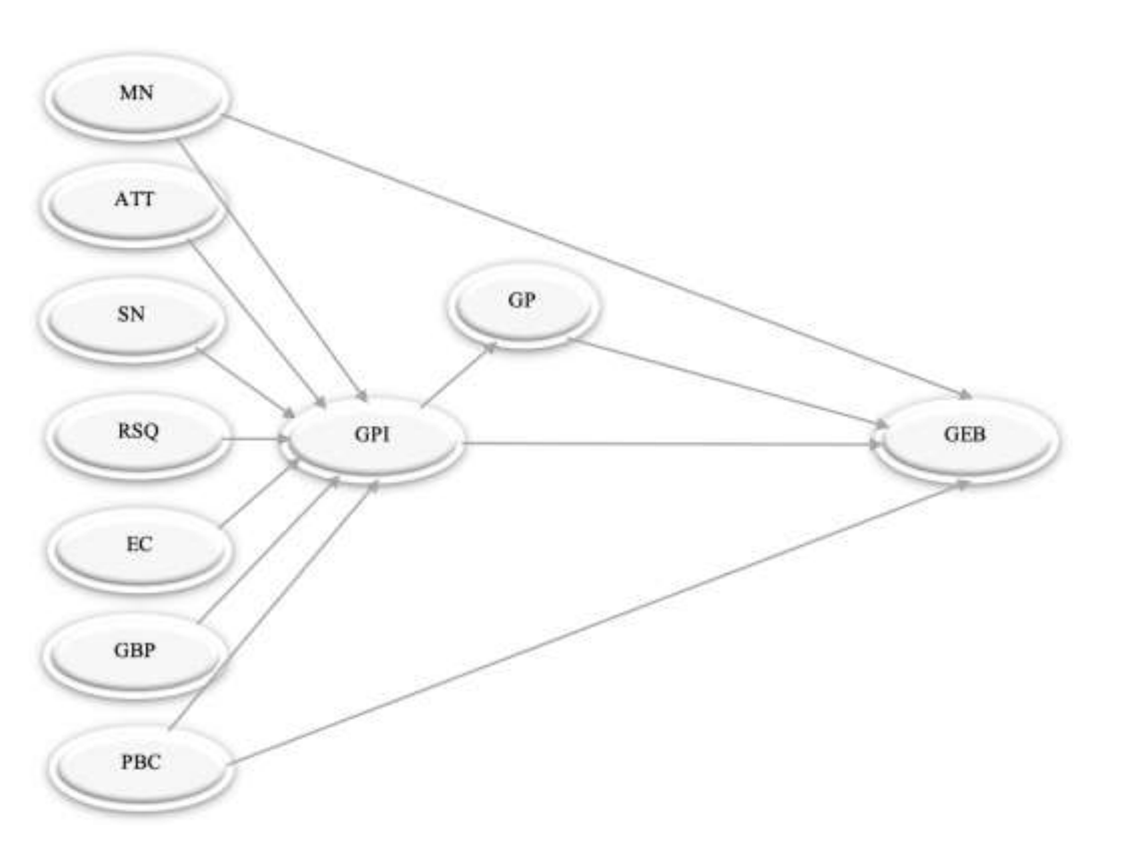


Figure 3.4: The conceptual model

LEGEND*: ATT-Attitude; MN-Moral norm; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GBP-Green brand perception; RSQ-Retail Service quality; GPI-Green energy purchase Intention; GEB- Green energy buying behaviour.*

In sum, the research claims the newness arises in the research model from the application of the aforementioned constructs and their causal relationships. It is hoped that incorporating these cognitive factors (i.e., attitude, subjective norm, behavioural control, moral norm, retail service quality, environmental concern, green perceived brand and green promotion) into the same model would provide in-depth insights into how they influence individuals' decisions about a specific kind of buying behaviour, including green energy purchase.

Reviewing the determinants of green buying behaviour, the determinants of the GPIB model have been classified. Consequently, the study proposed a classification system dividing the factors into: (a) personal factors, which encompass attitude, subjective norm, environmental concern and moral norm; and (b) contextual factors which incorporate perceived behavioural control, green brand perception, retail service quality, and green promotion. These serve as indicators of external motivation to accept green energy. It is conceivable that the comprehensive model can yield increased explanatory power of Australian consumers' green energy buying behaviour. Furthermore, the conceptual model can be a starting point for understanding consumer behaviour with reference to both intention and behaviour to buy a green energy product in Australia. The empirical findings of the proposed model will also contribute to the managerial practices becoming part of a developed strategic option for green energy, which in turn will contribute significantly to tapping into the potential target market (see Chapter 6, 6.7).

3.6. Research hypotheses development

A research hypothesis refers to a "logically conjectured relationship between two or more constructs developed in the form of a testable statement" (Sekaran & Bougie, 2016; Asadi et al., 2018). This section attempts to formulate a set of hypotheses to assess causal effects between the research constructs and to justify the proposed research model as depicted in Figure 3.5.

Based on theoretical perspectives of consumers' behaviour regarding green energy choices, hypotheses regarding green energy purchase intention and behaviour (GPIB) are postulated here and are based on the theory of planned behaviour (TPB, Ajzen, 1991) which integrates environmental concern, moral norm, green brand perceptions, retail service quality and green promotion in addition to the core variables of TPB, including attitude, subjective norm, perceived behavioural control, intention and actual behaviour. The extended TPB model was developed for further empirical examination.

The eight exogenous factors which framed the extended TPB model (i.e., the framework of GPIB) formulated 20 research hypotheses (12 direct and eight indirect) to be investigated. Tables 3.6 and 3.7 summarise the hypothesised relationship (direct and indirect) of the research constructs, respectively. The following section covers the twenty hypotheses (direct and indirect) constructed through the conceptual framework based on our literature review.

3.6.1. Research hypotheses – the direct effect

3.6.1.1. H1 – Attitude towards green energy purchase intention

Attitude is defined as a 'learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object' (Ajzen, 1991, p 211). Scholars have confirmed the applicability of this specific phenomenon – "attitude" with "purchase intention" for green products (e.g., Yadev & Pathak, 2017; Jaiswal & Singh, 2018; Joshi & Rahman, 2019; Wong et al., 2020). In the context of green products, a positive relationship between attitude and intention is well established across many cultures. According to research (Taylor & Todd, 1995; Sultan et al., 2020), when individuals have a more positive attitude, then the behavioural intention will be more positive and vice versa. Taufique and Vaithianathan (2018) observed that consumers' eco-friendly buying behaviour is evident if or when they hold a positive attitude about the environment. The recent study by Sultan et al. (2020) also verified this proposition in organic food purchasing. Similarly, in a green energy context, scholars revealed a positive relationship between consumer attitudes and behavioural intention (Halder et al., 2016), determining that an attitude-intention rationale prevails in green energy consumption scenarios. In recent studies in Australia, Ahmed, I et al. (2019) and Palandino and Pandit (2019) reported that consumer attitudes have a significantly positive influence on green energy purchase intention.

Based on the literature discussions and what TBP asserts, this research assumes a higher degree of positive attitude will lead to a higher positive behavioural intention. A shift in attitude to green energy purchase would increase the intention to buy green energy products. Thus, it is proposed that:

H1: Consumers' attitude to green energy positively influences their intention to purchase green energy.

3.6.1.2. H2 – Subjective norm towards green energy purchase intention

In the TPB model, a second determinant of behavioural intention is a subjective norm. Ajzen (1991) defined subjective norm as “the perceived social pressure to perform or not to perform the behaviour” (p. 188). In the green consumer behaviour context, several studies have documented subjective norms as an important predictor of intention. When examining the relationship between subjective norms and behavioural intention, researchers found that subjective norms positively affected behavioural intention (e.g., Han & Kim, 2010; Taylor & Todd, 1995; Tonglet et al., 2004; Chen & Tung, 2014). Most studies applying the TPB found subjective norms to be a significant predictor of green buying decisions, for instance Verma & Chandra (2018) on an intention to visit ‘green’ hotels, and Sultan et al. (2020) on organic food buying behaviour. Likewise, it emerges that social reference has a strong impact on consumers’ green energy purchase intention. The literature here indicates some important studies like Halder et al. (2016), Palandino & Pandit (2019) and Ahmed, I et al. (2019) who found that consumers’ intention to buy green energy was primarily determined by social factors. In line with the TPB theory and the literature review, consumers who believe that others’ opinions will support them are likely to participate in green energy consumerism. Based on this assumption the second hypothesis is conceptualised as follows:

H2: Subjective norm positively influences the consumers’ intention to purchase green energy

3.6.1.3. H3 – Perceived behavioural control towards green energy purchase intention

The final component of behavioural intention in the TPB framework is referred to as perceived behavioural control (PBC) which is defined as “the perceived ease or difficulty of performing the behaviour” (Ajzen, 1991). In the green marketing literature, PBC has been examined in great detail by several scholars as an important predictor of green purchase intentions. Many studies on green consumer behaviour have confirmed that an individual's behavioural intention is significantly and positively influenced by the PBC to act in a particular way, such as recycling (Mamun et al., 2018), buying organic foods (Wang et al., 2019) and green furniture (Xu et al., 2020). In a recent study on the intention to buy organic food, Sultan et al. (2020) confirmed that perceived behavioural control significantly influences Australian residents' intention. Similarly, in green energy purchase intentions, scholars detected a positive relationship between PBC and behavioural intentions as observed by Halder et al. (2016) in a cross-cultural study between India and Finland. Likewise, perceived behavioural control is likely to positively influence purchase intentions for green energy consumption. This discussion leads to the hypothesis that:

H3: Consumers' greater behavioural control significantly increases their intention to purchase green energy.

3.6.1.4. H4 – Environmental concerns leading to green energy purchase intention

Environmental concern (EC) is a key cognitive measure to predict individuals' green buying behaviour over time and an important sustainable variable in green marketing literature (Prakash & Pathak, 2017). There is mounting evidence that individuals who are concerned about the environment, are more likely to engage in pro-environmental behaviours. A strong influence of environmental concern has been observed by many researchers, for example, Pagiaslis and Krontalis (2014) on consumers' intention to buy biofuels. Yadev and Pathak (2016) developed the extended TPB model to predict consumers' intentions to buy green products, observing that the environmental concern-intention relationship is a positive one.

Following this paradigm, Tang & Medhaker (2011), Palandino & Pandit (2019) and Ahmed, I et al. (2019, 2020) all asserted that consumers who prefer green energy sources were more likely to be concerned about the environment. In fact, environmental concern is motivated by a policy because individuals' environmental concerns are able to reduce carbon emissions. Likewise, environmental concern plays a significant role in determining the intention to purchase green energy. The discussion above leads to the following hypothesis:

H4: Environmental concern positively influences consumers' intention to purchase green energy

3.6.1.5. H5 – Green brand perception towards green energy purchase intention

‘Green brand perception’ can be defined as linking the value of green products or services to public perception, bolstered by the environmentally friendly attributes of the brand (Hartmann & Ibanez, 2005; Rios et al., 2006; Pimonenko et al., 2019). Referring to Hartmann and Apaolaza (2012), this study defines “green energy branding” as “a specific set of green brand attributes such as reliability of green energy and benefits related to the lower environmental impact of the brand and its perception being environmentally sound”. Green branding of such products has been found to be very useful in predicting consumers’ intention to buy green goods and services. Ko and Kim (2013) noted that a perceived green brand image for relevant products reveals consumers’ intention to buy these products, which is generally a combination of product excellence and corporate social responsibility. Parallel to these findings, researchers like Suki (2016), Kerdpitak & Mekkham (2019), Gong et al (2020) noted that a green branding strategy increases consumers’ green purchase intentions. Panda et al. (2020), extended the framework of TPB to explore the decision-making framework regarding ethical behaviour in India and found that the green brand significantly informs the green purchase intention (see also Palandino & Pandit, 2012; Hanimann et al., 2015). In a different approach, Palandino and Pandit (2012) in their Australian qualitative study assert that green brand image has a direct relationship with the green energy purchase decision. Based on the above, a green brand would positively affect consumers’ green energy purchase intentions. The assumption results in the following hypothesis being posited:

H5: Green brand perception positively influences the consumers’ intention to purchase green energy

3.6.1.6. H6 – Retail service quality towards green energy purchase intention

Service quality is an important strategy in retail contexts, particularly in developing defensive marketing approaches (Fisk et al., 1993). Ertekin et al. (2019) illustrated that perceived retail service quality compares between the customers’ perceived expectations of service quality and their actual experience. This study proposes the notion of “retail service quality” and refers to Palandino & Pandit (2012) who defined it as a list of attributes that an energy provider must have in order for the customer to consider purchasing their green energy from them (in order of importance): customer service, exposing green information, energy reliability/performance, educating customers for their contribution and genuine environmental benefits, capacity to guarantee reliability, green energy tip, awarding customers for green participation etc. Findings from the previous literature suggest that service quality plays a significant role in predicting consumer intention. For instance, Cronin and Taylor (1992) examined the causal relationships between quality and intention and found that service quality is an essential indicator of customer satisfaction in the formation of behavioural intentions. Ting (2004) examined customer behaviour in a service environment and found that service quality is a significant predictor of behavioural intent.

In the context of green energy, retail service quality is a competitive advantage for energy retailers to differentiate their intangible green energy product from conventional energy, to enhance market share. Palandino and Pandit (2012) in a green energy consumption setting in Australia, reported that retail service quality plays a crucial role in determining the quality of green energy. Building on the literature review given above, the current study proposes the novel construct known as ‘retail service quality’ as determining the components of the extended TPB model and the following hypothesis:

H6: Service quality of an energy retailer influences consumers’ intention to purchase green energy

3.6.1.7. H7 – Moral norm towards green energy purchase intention

The perceived moral norm implies an individual’s ethical behaviour when faced with an ethical situation. Scholars defined a moral norm as an individual’s perception of the moral correctness of performing a specific behaviour (Sparks, 1994; Conner & Armitage, 1998) and take account of ‘personal feelings of … responsibility to perform, or refuse to perform, a certain behaviour” (Ajzen, 1991, p. 199). Considering the importance of moral norm, researchers recommended that individual’s moral feelings or norms needed to be considered while examining an individual’s intention in the paradigm of buying green products (Tang & Goh, 2018; Ahmed, I et al., 2019). For instance, in pragmatic studies, importance of moral norms found evidence understanding consumers' behaviour across a range of green research domains, such as visiting in a green hotel (Verma & Chandra, 2018), eating from an organic menu (Shin et al., 2018; Yazdanpanah and Forouzani, 2015), green building purchases (Tang & Goh, 2018), energy conservation (Schultz et al., 2007), and recycling (Poskus, 2015; Botetzagias et al., 2015). Moral norms can predict various types of human behaviour such as people's intentions to engage in energy savings and carbon reduction strategies in Taiwan (Chen, 2015). Recent studies (Wang et al., 2018; Liu et al., 2020) further upheld that moral norms have a direct effect on the intention to purchase green products. Thus, there is the following hypothesis suggested here:

H7: Moral norms significantly and positively influence consumers' intention to purchase green energy

3.6.1.8. H8 – Moral norm towards green energy buying behaviour

The inclusion of moral norms in the TPB model and its applicability is proved in behavioural studies and especially in green purchasing (Chen 2015; Tan et al., 2017). Heightened moral norms or feelings predisposes individuals to engage in a sustainable behaviour because it represents an opportunity to satisfy personal moral norms for sustaining society or economic systems (Saleki et al., 2019; Liu et al., 2020). The positive effect of moral norms on the purchase of environmentally friendly products has risen over the last few years, which leads to more favourable perceptions about environmentally friendly buying (Thøgersen & Ölander, 2006, Ha & Janda, 2012; Moser, 2015; Koklic et al., 2019). For instance, Van der et al. (2013) found perceived moral norms added a critical significance to pro-environmental behaviour. Similarly, other researchers (Arvola et al., 2008; Dowd & Burke, 2013; Yadev & Pathak, 2015; Verma Chandra, 2018; Liu et al., 2020) empirically confirmed the role of moral norm in aspects of behavioural research. Therefore, the study proposes the following hypothesis:

H8: Moral norms significantly and positively influence consumers' actual buying behaviour regarding green energy

3.6.1.9. H9 – Perceived behavioural control leading to green energy buying behaviour

The TPB model (Ajzen, 1991) states that, PBC, together with behavioural intention, can be used directly to predict behavioural achievement. The variable – perceived behavioural control (PBC) is an important component of the TPB model which directly influences behaviour. The inclusion of this construct in the TPB model leads to more fully explained behaviour, especially one that is difficult to engage in (e.g., Ajzen & Madden, 1986; Madden et al., 1992; Chen, 2016). PBC is defined by Klockner (2013) as a person having the opportunity and ability to perform a behaviour. Zhou et al. (2013) stated that the PBC (i.e., ability) and motive determines behaviour (Paul et al., 2016). In green consumer behaviour, the PBC is confirmed as a significant determinant of actual buying behaviour. Recent researchers like Emekci (2019), Sultan et al. (2020) and Xu et al. (2020) have acknowledged the direct effect of PBC on environmentally friendly green products, and therefore they suggest that a higher level of PBC would lead to more purchases of green products. Based on the above discourse about the subjective degree of effectiveness, the following hypothesis is proposed:

H9: Consumers' greater behavioural control significantly influences consumers' actual buying behaviour regarding green energy

3.6.1.10. H10 – Green energy purchase intention leading to green promotion

Promotion can be defined as a special offer used in marketing communication activities to increase sales (Fam et al., 2013). In marketing, promotion is a series of actions that enable marketers to motivate consumers to buy goods and services (Kim et al., 2019). According to Ajzen (1991) purchase intention is a conscious plan to perform a specific behaviour in the future. Likewise, green purchase intention can be defined as a willingness to acquire a green product in the future. In the literature in psychology, it is generally agreed that individuals' behavioural intention can be generated by combining the three pillars of TPB (attitude, subjective norm, behavioural control). A strong link between these three pillars and many other contextual factors (e.g., environmental concern, moral norm,) was found to be green purchase intention. Several factors have been reported as barriers (e.g., environmental concern, retail service quality and green perceived brand) that undermine the purchase intention (Hanimann et al., 2014; Palandino & Pandit, 2012, 2019). Prior research reports that consumers' purchase intention is influenced by several factors but may not translate into action to purchase green energy (e.g., Palandino & Pandit, 2019) which is labelled the intention-behaviour gap.

An external stimulus such as a green promotional act is an important missing link in such intention-behaviour gap phenomena. Consumers who have a positive intention to purchase a green energy product will generally intend to look for further motivational factors (i.e. green promotion) in order to negate other external barriers (price, reliability, awareness). This observation also can be explained as thus – purchase intention is formed by contextual factors (i.e. green promotion). Although an individual is willing to purchase a green product, individuals' purchase intention may look for additional motivational support which can help an individual to translate their intention into action (i.e., behaviour). For example, consumers may have the intention of engaging in green energy buying; however, they may not follow through with their intentions leading to incongruence between their stated intention and their actual behaviour. Therefore, consumers' green energy purchase intention wields a positive influence on the stimulus-green promotion that may ultimately impact on consumers' decision-making, hence the following hypothesis:

H10: Green energy purchase intention influences green promotion positively

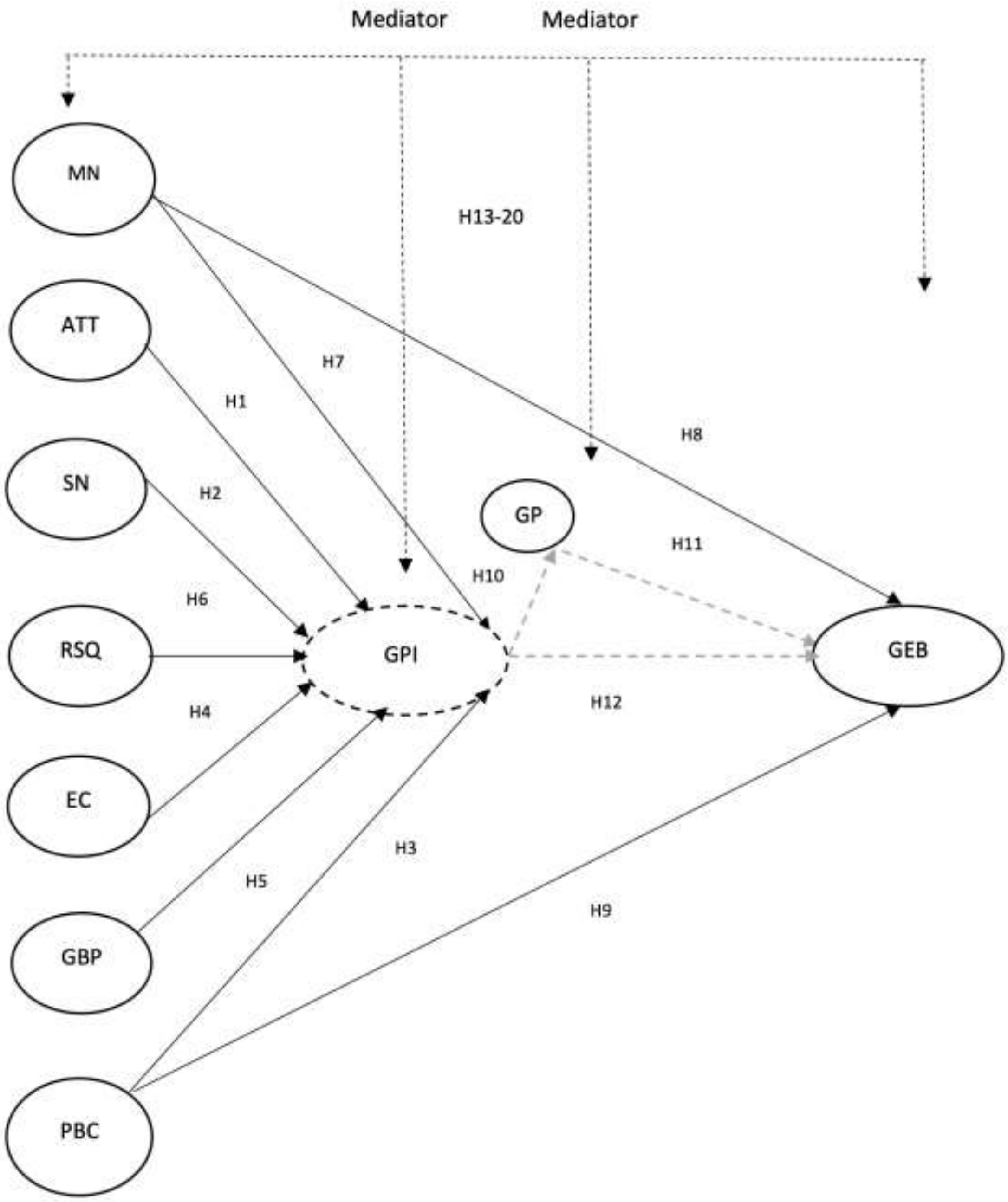


Figure 3.5: The hypothesised model

—— *Direct variable*

--------*Mediating variable*

LEGEND: *ATT-Attitude; MN-Moral norm; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GBP-Green brand perception; RSQ-Retail service quality; GPI-Green energy purchase Intention; GEB- Green energy buying behaviour*

3.6.1.11. H11 – Green promotion leading to green energy buying behaviour

Promotion is used as a marketing strategy (Kotler & Armstrong, 2010; Aziz & Chok, 2013), which influences consumers in their buying decisions, as discussed in H10 above. Green promotion refers to the specific type of advertisement, activities that focus on promoting green products, environmentally friendly production methods, and environmental measures used by manufacturers (Adhikari et al., 2019). For this thesis, green promotion is defined as marketing activities used in green energy consumption to entice consumers to buy goods and services offered by energy retailers and/or governments. Promotion of green energy is an important aspect as household consumers have a pragmatic approach about buying green energy but will prefer conventional sources of energy due to their sceptical attitude and lack of information about the authenticity of green energy supplied by retailers (Palandino & Pandit, 2012; Hartmann & Ibáñez, 2012; Krishnamurthy & Kriström, 2016).

Green promotion in the green energy consumption setting may help to mitigate external barriers (e.g., price) and ease behavioural control factors. Therefore, serious efforts should be made to promote green energy, so the consumers feel better motivated to purchase green energy goods and services. The extant marketing literature suggests that green promotion affects the buying process (Agrawal & Maheswaran, 2005; Roy & Ng, 2012; Codini et al., 2018; Adhikari et al., 2019). Bravo et al. (2013) found that the purchase of organic foods is influenced by green promotion. In the same vein, green promotion is assumed to arouse a person’s interest, enhance his or her level of involvement, and trigger a personal intention to buy green energy. Hence, the following hypothesis is suggested:

H11: Green promotion influences green energy buying behaviour positively

3.6.1.12. H12 – Green purchase intention and buying behaviour for sustainable product green energy

Ajzen (1991) defined intention as the cognitive representation of an individual’s readiness to perform a specific act and is the best predictor of behaviour. Purchase intention can be defined as the willingness to acquire a product in the future (Sarabia-Andreu et al., 2019). Green purchase intention (GPI) refers to consumers’ willingness to purchase green products for the benefit of the environment (Jaiswala & Kant, 2017;

Kashi, 2019). Green buying behaviour is an ecologically conscious behaviour, unlike others which can deliver emotional gain and satisfaction (Liu et al., 2020; Sharma & Lal, 2020). In the green energy behavioural (GEB) context, it is referred to as the level of importance a consumer attaches to his/her decision to buy green energy. According to Ajzen (1991), intentions or readiness are significant predictors of actual buying behaviour. In the same way, intention to purchase green energy is a prerequisite for an actual purchase to occur.

The underlying relationship between intention and behaviour has been examined in several different types of research. Jaiswal & Singh (2018), Kumar et al. (2017), Taufique & Vaithianathan (2018), Canova et al. (2020), and Sultan et al. (2020) all reported a higher level of correlation between intention and behaviour. For example, research on consumers and organic food have shown a significantly positive relationship between intention and behaviour (e.g., Sing & Verma, 2012; Sultan et al., 2020). In addition, Kumar et al. (2017) found that consumers' expressed readiness is more effective than other behavioural factors for capturing their purchase of sustainable products. Thus, the intention-behaviour relationship is well established, so it is hypothesised that:

H12: Green energy purchase intention generates a positive relationship with consumers' actual buying behaviour

Table 3.6: Research constructs and the hypotheses relationship (direct relationship)

Variables	Hypotheses statement	Anticipated effect hypothesised
Consumer's attitude	Consumer's attitude influences their intention to purchase green energy.	H1: Positive influence on purchase intention
Subjective norm	Subjective norm positively influences the consumer's intention to purchase green energy.	H2: Positive influence on purchase intention
Perceived behavioural control	Consumers' greater behavioural influences consumer intentions to purchase green energy	H3: Positive influence on purchase intention
Environmental concern	Environmental concern influences consumer's intention to purchase green energy	H4: Positive influence on purchase intention
Perception of green brand	Green brand positively influences the consumer's intention to purchase green energy	H5: Positive influence on purchase intention
Retail service quality	Retail service quality of energy retailer influences consumer's intention to purchase green energy.	H6: Positive influence on purchase intention
Moral norm	Moral norm significantly and positively influences consumer's intention toward green energy	H7: Positive influence on purchase intention
Moral norm	Moral norm influences consumer's actual buying behaviour toward green energy	H8: Positive influence on actual buying
Perceived behavioural control	Behavioural control influences consumer's actual buying behaviour toward green energy	H9: Positive influence on actual buying
Green energy purchase intention	Green energy purchase intention influences green promotion	H10: Positive influence on green promotion
Green promotion	Green promotion influences green energy buying behaviour	H11: Positive influence on actual buying
Green energy purchase intention	Green energy purchase intention influences consumer's actual buying behaviour	H12: Positive influence on actual buying

3.6.2. Research hypotheses – the indirect/mediation effect

The previous section formulated twelve research hypotheses highlighting the direct effects of the factors influencing the GPI and GEB. This section discusses the indirect effect of our exogenous constructs on buying behaviour via the mediator purchase intention and green promotion. It has been suggested that mediation constructs play a crucial role in social and behavioural sciences, and the main reason for mediation is a need to explain the causal relationship between variables (Caubuk et al., 2014; MacKinnon, 2015). Mediation analysis sets out to explain why and how there is an observed relationship between the two variables (MacKinnon, 2012).

In understanding consumers' green energy buying behaviour, it will be helpful to examine the role of a mediator to observe the relationship between the two variables – intention and behaviour. The rationale to include a mediator in such relationship is justified here. In green marketing literature, researchers have traditionally analysed the direct effect of attitude, subjective norm, PBC, moral norm, retail service quality, environmental concern, green perceived brand on purchase intentions and behaviours (e.g., Bamberg 2003; Albayrak et al., 2013; Yadev & Pathak 2017; Chowdhury, 2018; Verma & Chandra, 2018; Wang et al., 2018; Codini et al., 2018; Pimonenko et al., 2019; Papista & Dimitriadis, 2019; Palandino & Pandit, 2019; Panda et al., 2020; Akdere et al., 2020). While there is research examining the direct effect of these factors on intention/behaviour concerning green tangible products, the current literature on green buying behaviour does not demonstrate the mediating/indirect effects of these factors on behaviour via the mediator's behavioural intentions. This research works towards understanding this and theorises that attitude, subjective norm, PBC, environmental concern, moral norm, perceived green brand, and retail service quality all affect green energy buying behaviour through the mediational effects of green energy purchase intentions in a relational context.

The mediation test establishes whether or not consumers' green energy buying behaviour can be deliberated through the processes of the aforementioned cognitive factors in green energy buying. Several studies reported an intention-behaviour gap phenomenon in buying green products including organic food (Sultan et al., 2020) and in particular, green energy (Palandino & Pandit, 2019). This research explored whether the additional construct green promotion for green energy has a mediating effect on the relationship between the intention and buying behaviour to shed more light on a gap between purchase intention and behaviour in green energy consumption as reported in prior literature.

The following section develops the hypotheses that assess the causal effects between the research constructs through the two research mediators (see Fig 3.5) – Intention and Green promotion. In the first phase, the indirect effect of the TPB constructs (i.e., attitude, subjective norm, behavioural control) on buying behaviour via intention is discussed and leads to three hypotheses (H13-H15). In the second phase were hypothesised four indirect relationships of the additional constructs (i.e., environmental concern, green brand, retail service quality, moral norms) of the extended TPB model with buying behaviour through mediator purchase intention (H16-H19). Finally, the mediation effect of green promotion was formulated between intention and behaviour on one hand, and green energy purchasing on the other (H20).

3.6.2.1. H13-15 – The indirect effect of TPB elements on behaviour via purchase intention

The TPB model (Ajzen, 1991) argues that intention is the most direct and motivating predictor of behaviour, and it mediates the effect of other factors. This theory assumes that attitude, subjective norm and perceived behavioural control affect individuals' intention to become involved. This view deals with an individual's attitude towards the behaviour, how an individual perceives others' opinions (subjective norm), and their ability to perform the behaviour successfully (perceived behavioural control). Some studies (e.g., Taufique & Vaithianathan, 2018; Sultan et al., 2020) provided the basis for assuming that the inclusion of intention as a mediator between attitude, subjective norm and behavioural control can lead to a significant increase in varied green buying behaviour. Based on this discussion, the following hypotheses are developed:

H13: Consumer attitude has a positive effect on green energy buying behaviour through the mediator green energy purchase intention

H14: Subjective norm has a positive effect on green energy buying behaviour through the mediator green energy purchase intention

H15: Perceived behaviour has a positive effect on green energy buying behaviour through the mediator green energy purchase intention

3.6.2.2. H16-19 – The indirect effect of additional constructs in the extended TPB framework on behaviour via intention

According to Ajzen (1991), the three pillars of TPB (i.e., attitude, social norm, behavioural control) affect individuals' intention, which ultimately affects their actual behaviour. Aligned with the TPB framework, the current study assumes that constructs in the extended TPB framework (i.e., GPIB) viz moral norm, retail service quality, environmental concern, green perceived brand, all affect individuals' behavioural intention to purchase a green energy product. Further, this view provides an understanding of how individuals' green brand perception of green energy, retail service quality, individual's feelings towards environmental and moral norms influence behaviour in purchasing green energy where intention is a mediator. Based on the above arguments, the current study seeks to scrutinise the underlying indirect relationship of environmental concern, perceived green brand, retail service quality, moral norms with green buying behaviour via the mediating role of purchase intention. Hence this study postulates the following hypotheses:

H16: Environmental concern has a positive effect on green energy buying behaviour through the mediator green energy purchase intention

H17: Green brand perception has a positive effect on green energy buying behaviour through the mediator green energy purchase intention

H18: Retail service quality has a positive effect on green energy buying behaviour through the mediator green energy purchase intention

H19: Moral norm has a positive effect on green energy buying behaviour through the mediator green energy purchase intention

3.6.2.3. H20 – The mediating effect of green promotion on the intention-behaviour relationship

The TPB model states that the performance of specific behaviours is the representation of intention (Ajzen & Fishbein, 1980). The intention has been assumed to be a strong predictor of behaviour but in some cases (i.e., green buying), the relationship between intention and behaviour may not act in a consistent manner. Support for this gap can be found in the green marketing literature. Regarding green buying behaviour, studies have reported a discrepancy or "gap" between consumers' expressed intention and action behaviour taken (James et al., 2019; Sultan et al., 2020).

This discrepancy between consumers' intention and behaviour is also evident in green energy purchasing (Hobman & Fredrick, 2014; Palandino & Pandit, 2019). The intention-behaviour gap indicates that consumer positive intention does not always translate into action. It is essential to examine why favourable purchase intention has a weaker influence on actual purchase; which may include other factors such as government rebate, price and others that lead to the disparity between intention and behaviour. Hence, the impact of a stimulus (i.e., green promotion) on purchase intention and actual buying behaviour is considered.

The use of green promotion in such a context is more important in purchasing green products, in particular green energy because of the related external barriers, especially the price premium (Paladino & Pandit, 2012, 2019). Studies (e.g., Claudy et al., 2013; Halder et al., 2016; Hartmann et al., 2016; Palandino & Pandit, 2012, 2019) stressed the importance of marketing incentives and promotional activities to motivate consumers to buy green energy. However, no evidence has yet been found in academic research for the effect of green promotion on purchase intention and actual buying behaviour of a green energy product. There is a need to explore the role of an external stimulus that would help to enhance green energy consumption and thus to contribute to reduce the intention-behavioural gap.

Based on the above argument and information discussed about the intention-behaviour gap, there is a need to develop an intervention plan to help understand such a gap by investigating a mediator between the intention-behaviour relationship, which can help to reduce such a gap or at least may help to mitigate its potential effect. Accordingly, this research argues that green promotion plays a full mediator role in the research framework and suggests the following hypothesis to guide the realisation of the study aim:

H20: Green promotion mediates the positive relationship between consumers' purchase intention and buying behaviour towards a green energy product.

Table 3.7: Research constructs and the hypotheses relationship (indirect relationship)

Variables	Hypotheses statement	Anticipated effect hypothesised
Consumer's attitude	Consumer's attitude influences consumers' green energy buying behaviour	H13: Positive influence on behaviour through Intention
Subjective norm	Subjective norm influences consumers' green energy buying behaviour	H14: Positive influence on behaviour through Intention
Perceived behavioural control	Perceived behavioural control influences consumers' green energy buying behaviour	H15: Positive influence on behaviour through Intention
Environmental concern	Environmental concern influences consumers' green energy buying behaviour	H16: Positive influence on behaviour through Intention
Perception of green brand	Perception of green brand influences consumers' green energy buying behaviour	H17: Positive influence on behaviour through Intention
Retail service quality	Retail service quality influences consumers' green energy buying behaviour	H18: Positive influence on behaviour through Intention
Moral norm	Moral norm influences consumers' green energy buying behaviour	H19: Positive influence on behaviour through Intention
Green promotion	Green promotion mediates the relationship between intention and buying behaviour	H20: Positive and full mediation

3.6.3. Summary of the hypothesised relationship

The discussion about the hypotheses clearly states that the hypothetical framework of the present research comprises eight exogenous constructs (i.e., attitude, subjective norm, perceived behavioural control, moral norm, retail service quality, environmental concern and green perceived brand, and green promotion) integrated into the extended TPB model. They are all relevant to the green energy buying behaviour context which formulated 20 research hypotheses. These hypotheses are formally presented using a conceptual model in Figure 3.5. Based on the constructs of the measurement model, a quantitative survey using those measures has been conducted using PLS-SEM analysis carried out in Chapter 5, to assess causal effects between the research constructs. The aim is to find the specific beliefs that best explain the behaviour involved in buying green energy.

3.7. Chapter summary

In this chapter, the basic theory that provides a better understanding of how consumers develop an intention to act in an ethical way in purchasing green energy, using the existing green consumer theory where appropriate, has been discussed. First a detailed discussion of the theoretical framework (TPB) for predicting consumers' green energy purchase intention and buying behaviour (GPIB) and its applicability is proposed and legitimated. Finally, a research model of GPIB is proposed that expands the TPB by incorporating five added constructs, i.e. environmental concern, moral norm, retail service quality, green perceived brand and green promotion. Thus, the conceptual model comprises eight independent variables selected with reference to the foregoing literature review: attitude, subjective norm, perceived behavioural control, moral norm, retail service quality, environmental concern, green brand perception and the mediator green promotion.

The chapter also addressed the aforementioned factors framed in the extended TPB model which developed a series of hypotheses (H1~H20) to assess intention and behaviour when purchasing green energy. The research model is a comprehensive one that can predict consumers' intention and buying behaviour regarding the green energy product. The findings revealed the applicability of the modified TPB model in measuring the consumers' green energy buying behaviour and more details about this are supplied in Chapter 5 and discussed in Chapter 6. Next, Chapter 4 discusses the proposed research methodology and all relevant data collection and analysis procedures.

CHAPTER 4
RESEARCH METHODOLOGY

This chapter discusses the research's methodological procedures, including the sampling method, data collection methods, construction of the questionnaire, construct measurements with validity and reliability testing and data analysis methods employed in this research.

Chapter outline:

- Introduction
- The paradigmatic approach to research design
- Research instrument
- Sampling approach
- Data collection procedure
- Data preparation
- Data analysis method
- Chapter summary

4.1. Introduction

A research methodology is a systematic decision-making process to know how the methodological approach, including research design, research method, research instrument, sample design, data acquisition and method of data analysis reach certain conclusions. This chapter will describe the methodology employed and its justification for testing the theory-driven framework developed in Chapter 3.

The paradigmatic approach to research design is discussed in Section 4.2. The study adopts a quantitative research method as detailed in this section. Section 4.3 highlights the research instruments including research constructs, measurement scale items, scale selection method and questionnaire design. The sampling approach is followed by the sampling frame, sampling location, sampling method and sample size in Section 4.4. Data collection procedures and data preparation are noted in Sections 4.5 and 4.6, respectively. Finally, the data analysis procedure is described in Section 4.7. The last section, 4.8, summarises the main points.

4.2. The paradigmatic approach to research design

Research design is the plan a researcher adopts and includes the details of what needs to be done to complete a research project. According to Anderson (2010, p. 343), a research design/plan provides “the underlying structure to integrate all elements of quantitative (or qualitative or both) study so that the results are credible, free from bias, and maximally generalizable”. The following section discusses the research paradigm categories to select the most appropriate research paradigm for this study.

4.2.1. Research paradigm

Research paradigms guide scientific innovation and discoveries through assumptions and certain principles (Park et al., 2019). A research paradigm wields great effects on the actual design, data collection method and how findings are presented. According to Saunders et al. (2016) there are two traditional research paradigms in scientific research: the positivist paradigm and interpretivism. These approaches are presented in Table 4.1.

4.2.1.1. Positivist paradigm

A positivist paradigm or positivism is described as knowledge that is based directly on experience or empirical observations, and is scientifically meaningful (Easton, 2002; Peter & Olson, 1983). Positivist researchers focus on the scientific evidence and believe that anything can be objectively measured and observed (Hessler 1992). In terms of research design, the quantitative research method is conventionally based on the positivist approach and explores scientific evidence attached to certain phenomena (Saleh, 2006).

4.2.1.2. Interpretivist paradigm

An interpretivist paradigm or interpretivism emphasises the main objective by observing social phenomena in order to find the facts related to social reality (Burnett, 2012). Interpretivist researchers are concerned with individuals' perceptions, subjective interpretations, reasoning and how they shape the world around them (Lincoln & Guba, 1985; Leitch et al., 2010). Generally, in this form of research design, qualitative research is the course taken (Mustamil, 2010).

Table 4.1: Positivist and interpretivist approach to research.
Source: Ikeda (2009, p. 56)

Points of distinction	Description of positivist paradigm	Description of interpretivist paradigm
Field of study/Research domain	Natural sciences	Human sciences
Key concepts focused on	Structure, social and natural facts	Meanings and social developments, learned human phenomena
Methodologocal approach	Quantitative, statistical Inference (hypothesis testing), cause and effect relationships, measurement	Qualitative, generation of hypotheses, interactions, processes
Scope of research paradism	Seeks explanations for things, generalisations, laws, considers reality as being objective, tangible, and unique	Seeks to understand people, contextdependent
Researcher's role	Uninvolved observer	Actively involved
Analytical approach	Objective, abstract, fixed, value-free	Subjective, grounded, flexible, political

Source: Adapted from Ikeda (2009, p.56)

4.2.2. Nature of the current research paradigm

In selecting the most appropriate research paradigm, it is essential to reflect on the research aim and objectives of the study. The literature, research issues and preferences of the researcher exert great influence. As discussed in Chapter 1, investigated here are the determinants of people's buying behaviour relating to green energy in Australia. To make this possible, a theory-driven framework is developed (discussed in Chapter 3) and it requires a rigorous scientific approach to prove the validity of such theoretical foundations. In terms of research design, the study is based on the positivist approach (quantitative research) to evaluate scientific evidence based on numerical, statistical and/tabulated data. Figure 4.1 illustrates the research process referred as the deductive approach as employed in this thesis.

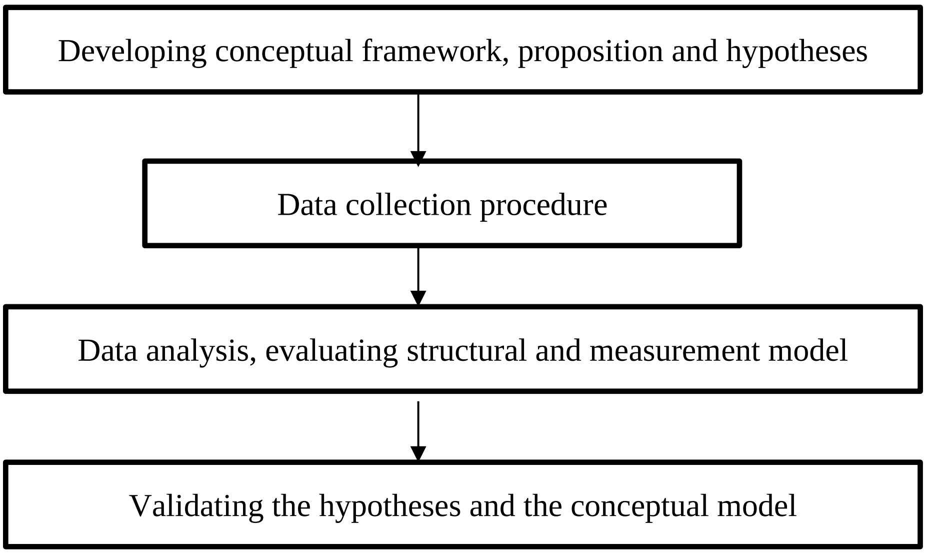


Figure 4.1: The research process

4.2.3. Research strategy

A research strategy is the methodological link between the research philosophy and the chosen data collection and analysis methods (Saunders et al., 2016). Survey design is the most commonly used research strategy in the social sciences (Griffiths & Christensen, 2000; Babbie, 2010) and particularly in marketing science (Roberts et al., 2019), including consumer behavioural research (Savelli, 2019; Savelli et al., 2019). Research through survey design is referred to as a deductive approach (i.e., positivist paradigm) in exploratory and descriptive research (Saunders et al., 2016). A survey functions to obtain answers from a sample of respondents where they tell the researcher more about the targeted sample and explain what the research questions are seeking (Saunders et al., 2016). The present research is an empirical study utilising the questionnaire survey method. Questionnaires are the most appropriate research strategy for a quantitative research or deductive approach because the outcomes can be generalised.

4.2.4. Methodological approach

Discussed here is the selection of the quantitative approach as the preferred method. Quantitative research comprises a systematic exploration of a particular problem by measuring carefully selected variables in quantifiable terms (Mertler, 2019). Table 4.2 provides some key contrasts between the qualitative and quantitative research methods.

Table 4.2: Difference between the quantitative and qualitative method.
Source: Hair, Celsi et al. (2011, p. 145)

Description	Quantitative approach	Qualitative approach
Purpose	• Collect quantitative data • More useful for testing • Provides summary information on many characteristics • Useful in tracking trends	• Collect qualitative data • More useful for discovering • Provides in-depth (deeper understanding) information on a few characteristics • Discovers hidden motivations and values
Properties	• More structured data collection techniques and objective ratings • Higher concern for representativeness • Emphasis on achieving reliability and validity of measures used • Large samples (over fifty) • Results relatively objective	• More unstructured data collection techniques requiring subjective interpretation • Less concern for representativeness • Emphasis on the trustworthiness of respondents • Small sample size • Results relatively subjective

As discussed earlier, this research employs the positivist research paradigm to explore scientific evidence for a particular kind of phenomenon. Research aligned with the positivist approach focuses on an explanatory association or causal relationship through quantitative methods (Park et al., 2019). The quantitative research method is conventionally based on the positivist approach (Saleh, 2006; Cox, 2019). This quantitative approach is chosen for several reasons:

a. The aim of this research could be better achieved by adopting a quantitative method which involves collecting primary data and testing the conceptual model (Henn, Weinstein & Foard, 2009)

b. The quantitative method can test the hypothesised relationships between sets of research constructs (Hair, 2015; Pantazides et al., 2019)

c. The quantitative research method is able both to answer the question of the study such as: what the factors are influencing green energy buying behaviour; and assess the extent to which the factors influence people's green energy purchase decisions.

d. The method can also generalise the outcomes of the research to a wider context (Cox, 2019; Ghauri et al., 2020).

4.3. Research instrument

The discussion on the research instrument design includes the domain of research constructs, measurement of constructs, construct scaling method and questionnaire design. These are explained in more in sections 4.3.1 to 4.3.4 below.

4.3.1. Research constructs category

4.3.1.1. Types of constructs

The aim of this subsection is to identify the nature of the constructs or latent variables (LVs) included in the proposed research model. In the literature, constructs or LVs are categorised under the two types modelled, these being formative or reflective constructs (Freeze & Raschke, 2007; Roberts & Thatcher, 2009). Figure 4.2 shows the visual presentation of reflective vs. formative constructs.

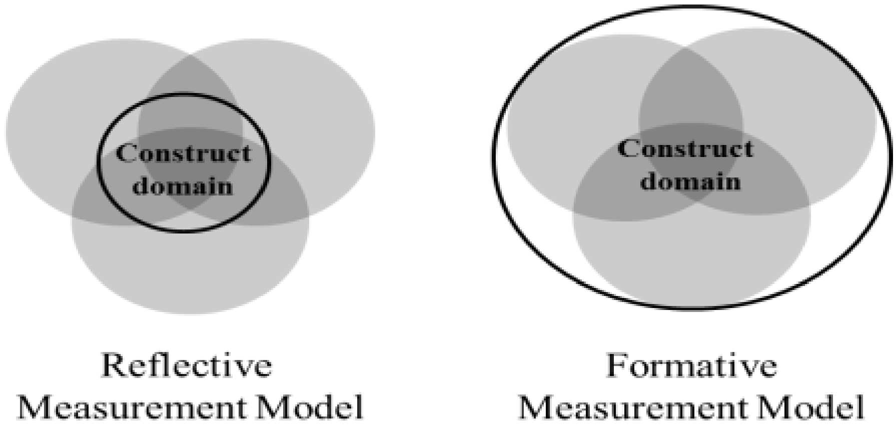


Figure 4.2: The diagram of reflective vs. formative constructs
Source: Compiled from Hair et al. (2016)

The term formative construct means that the construct is formed or induced by its measures (Treiblmaier, Bentler & Mair, 2011). Conversely, in reflective constructs, different indicators of a construct represent reflections or manifestations of a construct (Fornell & Bookstein, 1982; Freeze & Raschke, 2007; Olaru & Hofacker, 2009). The following subsection presents a brief description of the difference between formative and reflective constructs as presented in Table 4.3.

Table 4.3: The differences between formative and reflective constructs
Source: Roberts, N & Bennett Thatcher, J (2009, p. 12)

Concept	Formative Indicators	Reflective Indicators
Causality	Formative indicators are viewed as causes of constructs. The construct is formed or induced by its measures (Fornell & Bookstein, 1982).	Constructs are viewed as causes of reflective indicators (Bollen 1989). Reflective indicators represent manifestations of a construct (Fornell & Bookstein, 1982).
Interchangeable	Not interchangeable "omitting an indicator is omitting a part of the construct" (Bollen & Lennox, 1991 p. 308).	Interchangeable – the removal of an item does not change the essential nature of the construct. Although every item need not be the same, researchers need to capture
Validity	Indicators are exogenously determined; hence, correlations are not explained by the measurement model (Bollen, 1989).	Validity of indicators can be assessed through the measurement model (Bagozzi et al., 1991).

4.3.1.2. Nature of the constructs in the current study

It is important to identify the suitability of both a formative and a reflective construct in order to remove any model misspecifications (Edwards & Bagozzi, 2000; Olaru & Hofacker, 2009). Regarding the differences that exist between a formative and a reflective construct (see Table 4.3), the measurement items used in the questionnaire construction (see Table 4.4) demonstrate they can denote reflective constructs.

4.3.1.3. Domain of constructs in the current study

In this research, eight exogenous constructs or independent variables (attitude, subjective norm, perceived behavioural control (PBC), environmental concern, perception of green energy brand, retail service quality, moral norm, green promotional effect) are imposed on two endogenous construct or dependent constructs (intention and behaviour). Notably, intention acts as both an endogenous (dependent variable) and exogenous (predictor variable) factor in the research model. The sources of construct measurement are adapted from the literature (see Table 4.4).

4.3.2. Measurement scale items

Measures refer to indicators or scale items and they can be defined as “an observed score gathered through self-report, interview, observation, or some other means” (Edwards et al., 2000). This research employs measurement scales derived from the relevant literature to assess the hypothesised constructs devised for this topic. Subsequently, the scale-items were slightly modified with respect to the level of knowledge required to make them more understandable in the context of green energy. Each construct contains multi-items to better reflect the results and their predictabilities (Ajzen, 1985). Added to this study were ten constructs which are to be direct measures of the extended TPB model (see Chapter 3). In this research, all the studied constructs with the sources of measurement items of the research model are cited in Table 4.4. Based on the factor analyses and reliability tests (see Chapter 5), 31 items are used for the research.

Table 4.4: Specification of the domain of the constructs and measurement items

Construct	Sources	Measurement items	Source
1.Attitude	Ajzen (1991); Ajzen (2015)	1. I have a favorable attitude to purchase green energy. 2. If I can choose between eco-friendly and conventional products, I prefer eco-friendly ones such as green energy. 3. I am NOT the kind of person who makes efforts to conserve natural resources. 4. Science and engineering will solve the environmental problems; therefore, we do not need to change our way of live consuming green energy	Weisstein, Asgari & Siew, 2014 Mancha & Yoder, 2015 Gerpott & Mahmudova 2010a
2.Subjective norm	Ajzen (1991); Ajzen (2015)	1. Most people who are important to me think I should protect the environment. 2. My friends often recommend environment friendly products to me	Mancha & Yoder, 2015 Khare, 2015
3.Perceived behavioural control	Ajzen (1991); Ajzen (2015)	1. It's easy for me to practice green energy consumption. 2. I feel that purchasing green energy is not totally within my control 3. I have resources, time and willingness to purchase green energy	Wu & Chen, 2014 Paul, 2015
4.Environmental concern	Tang & Medhekar (2011); Paul, Modi & Patel, 2015; Suki(2016); Yadev & Pathak (2016)	1. I would describe myself as an environmentally responsible person 2. When I purchase products, I try to make an effort to buy products that are low in pollutants. 3. Environmental protection is important to me when making purchases 4. I am very concerned about the environment	Weisstein, Asgari & Siew, 2014; Khare, 2015; Paul, 2015

Construct	Sources	Measurement items	Source
5.Green brand perception	Hartmann & Ibáñez (2007); Chen (2010); Palandino & Pandit, 2012; Hartmann & Vanessa, 2012; Huang, Yang, & Wang (2014)	1. With green brand I have the feeling of contributing to the well-being of humanity and nature 2. With Green Brand, I can demonstrate that I care about environment. 3. With Green Brand, I can express my environmental concern. 4. The Green brand represents environmental friendliness	Hartmann & Apaolaza-Ibáñez,2012 Bigliardi, Bertolini, Mourad & Ahmed, (2012) Huang, Yang, & Wang (2014).
6.Retail service quality	Dabholkar et al. (1996); Siu & Cheung (2001), Palandino & Pandit, 2012; Ibáñez, Hartmann, & Calvo, (2006)	1. My energy provider offers adequate information about anticipated supply interruptions. 2. My energy provider offers adequate consultation about how to save energy, safety of home installations, etc 3. My energy provider offers flexible contracts, adapted to client's specific needs.	Ibáñez, Hartmann, & Calvo (2006)
7.Moral norm	Manstead. (2000); Chen (2015)	1. I feel a personal obligation to use green energy to prevent climate change 2. My motivation is low, and this would prevent me from adopting green energy 3. I feel a strong personal obligation to use green energy	Chen, 2015

Construct	Sources	Measurement items	Source
8.Green promotion	Higgins et al. (1994); Boztepe (2012). Hosseinzadeh & Azizpour, (2013); Sangroya & Nayak, (2017); Codini et al. (2018)	1. I would use green energy over conventional energy if offered at a discount or with other promotional incentives 2. I would use green energy over conventional energy if offered at subsidized rate	Sangroya, & Nayak, 2017
9.Intention	Ajzen (1991); Ajzen (2015)	1.I would like to practice green energy consumption. 2.I would consider purchasing environmentally friendly green energy over conventional energy. 3.I intend to engage myself more intensively in green energy issues	Wu & Chen, 2014 Bamberg, 2003, Gerpot 2010b:
10.Actual Behaviour	Ajzen (1991); Ajzen (2015)	1.I have been buying green energy 2.I would always choose green energy when buying it 3. In the last three months, my household consumed green energy	Ozaki, 2011; Yazdanpanah, Komendantova,Shirazi & Linnerooth. (2015). Wu & Chen, 2014; Ajzen (1991);

As shown in Table 4.4, there are ten constructs to be measured in this research, adapted from validated scales used in previous studies, following the TPB approach. Chapter 6 validated factors relating to consumers' green energy buying behaviour.

4.3.3. Construct measurement scale selection method

This research measures the questionnaire elements using a seven-point Likert scale ranging from one to seven respectively, from strong disagreement to strong agreement. Many studies have employed the seven-point Likert scale to measure answers to questionnaires (e.g., Tan et al., 2017; Sultan et al., 2020). Having the seven points Likert scale tends to be a good balance between having enough points of discrimination without having to maintain too many response options (Joshi et al. 2015). Considering reliability of the responses from participants in a survey, chances are that the seven-point scale may perform better compared to five-point scale owing to the choice of items on scale defined by the construct of survey (Joshi et al. 2015; Chyung et al. 2017). The seven-point scale provides more varieties of options which in turn increase the probability of meeting the objective reality of people (Jebb et al. 2021).

A seven-point Likert scale was used in Section 3 of the survey instrument and respondents were instructed to provide their level of agreement for each measurement item. They did this by indicating answers ranging from one representing "strongly disagree" to seven representing "strongly agree". Section 4.3.2 describes the development and/or adaptation of the scales for all constructs.

4.3.4. Questionnaire design

The questionnaire was designed to evaluate the buying behaviour of users and non-users of green energy in Australian households. Here the questionnaire covered the constructs emphasised in the research model, including attitude, subjective norm, perceived behavioural control, environmental concern, moral norm, green brand perception, retail service quality, green promotion, behavioural intention and actual buying behaviour. Existing questionnaires relevant to green energy consumer behaviour were reviewed, especially those previously employed to assess the TPB framework because the questionnaire had to consider additional components (i.e., environmental concern, moral norm, green brand perception, retail service quality, green promotion). The research questionnaire consisted of close-ended questions adopted from the relevant literature (see Table 4.4).

The survey questionnaire is shown in Appendix 2. The questionnaire consisted of three main parts, as documented below:

Section 1: The first section consists of queries (e.g., Ornstein, 2014; Sultan et al., 2020), that gather demographic information such as age, income gender, educational achievement, etc.

Section 2: This section identifies the users and non-users of green energy in Australian households. It also aims to obtain residential consumers' patterns of electricity use.

Section 3: This section looks at those factors that affect consumers' buying behaviour regarding green energy. Ten constructs related to green energy purchase intention and behaviour were measured. This study measures the questionnaire items that concern attitude, subjective norm, perceived behavioural control, environmental concern, green brand perception, retail service quality, moral norm, intention and actual behaviour. To ensure respondents understood what this study was about, the definition of each construct was given at the very beginning of each section. The questionnaire was designed to be a self-administered survey (Williams, Brick, Edwards & Giambo, 2020).

4.4. Sampling approach

Sampling is the selection procedure using a subgroup or a part of a larger population to collect data to answer the research question (Saunders et al., 2016). The present study follows the sampling procedure with three stages suggested by Saunders et al. (2016): (1) identifying sampling frame (2) sampling method, and (3) sample size.

4.4.1. Sampling frame

According to Gregoire and Valentine (2008), before a sample can be drawn from a population, it is important to design the 'sampling frame', that is, a mechanism that identifies the source (e.g., population) which is able to meet the expectations of the survey. The sample compiled for this research contains residential household consumers in Sydney, NSW, Australia. Respondents were aged between 18 and 75 years and have either purchased green energy or intend to do so. The sample had specific selection criteria of age, education, income, location, user and non-user of green energy.

4.4.1.1. The sampling location and the rationale

The research question was asked of residential consumers in Sydney, NSW because of their high propensity to become involved in environmental programs and causes (Truffer, 1998). A postal survey was conducted to quantify and explicate various determinants influencing consumers' purchase of green energy. The survey respondents were randomly selected through the White Pages telephone directory from multiple suburbs of NSW – north, east and west regions were targeted to select by the researcher (Australian Bureau of Statistics, 2017 Census). The postal survey generated 386 completed questionnaires from households located in the East, West, North and Southern suburbs of Sydney, New South Wales (NSW), including the CBD, Redfern, Sutherland, Minto, Glenfield, Bondi Junction, Manly, Blacktown, Rockdale, Kogarah, and North Sydney. These suburbs were chosen based on a convenient sampling technique, and for this purpose, households' socio-economic and demographic profiles available on the Australian Bureau of Statistics were studied. The purpose of this area selection is to have a sample reflecting high, medium and low-income earners.

The sampling location of Sydney was chosen due to some interesting findings that are highlighted below:

Rationale one, since conducting the research throughout Australia was beyond the scope of this research, the study chose to focus on the consumption behaviour of Sydney-based residents.

Rationale two, according to the green energy master plan (2012-2020) it is anticipated by the year 2030, green energy will provide 30% of electricity in Sydney (Clean Energy Australia Report, 2019).

Rationale three, a diversified social environment, economics and other relevant factors make Sydney an ideal setting for the current research; it allows the researcher to tap into a plethora of respondents from different backgrounds (i.e., social, economic, values and norms).

Rationale four, NSW is one of the largest states of Australia, but the market penetration of green energy in NSW is relatively low (17%) compared to the other states (Tang & Medhekar, 2011; Climate Council Report, 2018; Clean Energy Australia report, 2020). The empirical findings of this research will offer a detailed view of those factors affecting consumers' intention to purchase green energy, and inform all stakeholders involved in marketing and promotion of green energy products.

4.4.2. Sampling method

The sampling method can be categorised as probability sampling (representative) or non-probability sampling (Sandelowski, 2000; Zikmund et al., 2013). In a probability sampling method all the target population has an equal chance of being selected, and this probability can be accurately determined through the simple random sampling procedure (Mellenbergh, 2019). In contrast, in non-probabilistic sampling, the target population does not have the same choice and the probability of selection cannot be determined precisely. This has been criticised for its inability to draw conclusions about the entire population (Schreuder, Gregoire & Weyer, 2001).

Probability sampling is chosen because it increases the target population's chances of being selected (Mellenbergh, 2019). In a quantitative study, researchers seek to generate their samples through probability sampling (Etikan & Bala, 2017). This method relates to experiments or other studies where the research objectives are addressed statistically while the non-probability of sampling refers to case studies where statistical inferences are not supported (Saunders et al., 2016). With probability sampling, simple random sampling was preferred because it is the most basic method of sampling used in social sciences (West, 2016; Sultan et al., 2020).

4.4.3. Sample size

In general, there are no hard rules for any correct sample size (Uemura et al., 2017). However, a larger sample is always preferable to minimise any sampling errors (Sultan et al., 2020). Researchers suggest that the standard sample size should be between 200 to 500 respondents (Sudiyanti, 2009; Saiful, 2011). With a larger sample, even small effects can provide robust statistical findings (Hair et al., 2014) so the researcher should collect data from a larger sample (Sudiyanti 2009; Uemura et al., 2017). A set of 1200 questionnaires were distributed to targeted respondents to realistically obtain a target sample of at least 200 respondents. For this study, 400 completed questionnaires were received (i.e., the original sample size N=400) and this met the requirements for an effective sample size. A guideline for a sample size is presented in Table 4.5.

Table 4.5: A standard sample size
Source: Sudiyanti (2009, p. 46)

Sample Size	Level of Adequacy
50	Very poor
100	Poor
200	Fair
300	Good
500	Very Good
1000 or more	Excellent

4.4.3.1. Sample size determination

Determining the sample size depends on the statistical technique employed for the data analysis. This study employed a partial least square (PLS)-based structural equation modelling (SEM) approach to test the research model and hypotheses. The sample size needed for the research was calculated based on the requirements of PLS-SEM. Several proposed guidelines have been published for structural equation modelling (SEM). Bentler and Chou (1987) suggested that SEM analysis requires at least five examples per parameter estimate. Barclay et al. (1995) recommended that the basic rules for sampling should be ten times the number of indicators on the scale with the highest number of formative indicators. Other studies recommended specific sample sizes for SEM estimations. For example, Weston and Gore (2006) and Byrne (2010) recommend 200 to 400 or more would be sensitive to the SEM estimation.

Based on the above rule and the statistical analysis plan selected for the sample size, a total of 1200 questionnaires were administered using the simple random sampling technique, A total of 400 survey responses were received out of which only 386 were found to be appropriate (see 5.6.1). The final sample size of 386 was selected as it fits the guidelines suggested by other scholars (e.g., Hair et al., 2015; Jaiswal & Kant, 2018) for SEM purposes. Moreover, the sample size of 386 with ten constructs of 30 items was also considered to be fit and above (386>30*10 = 300), the desired level of 10-15 cases per parameter/item recommended (Hair et al., 2015; Kline, 2015; Jaiswal & Kant, 2018) for SEM. Therefore, the sample size was deemed sufficient for PLS-SEM data analysis.

4.5. Data collection procedure

The data collection procedure is one of the key features of a research design. Accordingly, the procedure gathering the data includes ethical considerations. A brief description of the data collection method is presented below.

4.5.1. Ethics and confidentiality

Prior to undertaking the research, research of ethical issues constitutes an important part of the design and conduct of research on human subjects (Bell, Bryman & Harley, 2018; Veal, 2005). Ethical approval was given for this study to proceed by the Human Research Ethics Committee of Central Queensland University on 4th December 2017. The reference number is H16/11-291 (see Appendix 3).

4.5.2. Pilot study

Before data collection, it is important that the questionnaires should be pre-tested through a pilot study to ensure the suitability of the survey questionnaires and verify the understandability of all respondents' statements (Woods et al., 2018; Solans-Domènech, Pons, Grau & Aymerich, 2019). The pilot study can help in rewording and reframing the questions to eliminate potential problems (Saunders et al., 2016). Before the pilot study some necessary alterations were made to the survey questionnaire to make it understandable to respondents. The validity of the survey instruments was then approved by the supervisors. Finally, the pilot study was conducted in June 2018 and employed a random sampling procedure for households (sample size n=30) on the issue of electricity use in the eastern suburbs of Sydney. A self-addressed pre-paid envelope was posted to a random sample of 100 for about 30 valid responses from people aged between 18-75. It contained 3 things – the survey, the information sheet for the pilot study and a self-addressed envelope to return the survey in.

To check the validity and suitability of the questionnaire, participants were requested to estimate the total duration of time they spent on completing the pilot study. They were also asked whether they could easily understand the instructions and they sent feedback on the question layout. A total of 25 completed questionnaire responses were received. The outcome of the pilot study found that participants selected ‘almost agree’ or ‘agree’ with the clarity of instructions; more than 90% accepted the layout of the questionnaire as adequate. However, based on the feedback, minor modifications were made to the instructions and construct clarification. The results of reliability and validity test for each of the scales amounted to at least 0.70. As a result of factor analyses and reliability tests for all the corresponding items used in the pilot study, 30 items were part of the final survey. The questionnaire was further reviewed and validated by the expert panel of two academic researchers (i.e., research supervisors) and one practitioner and deemed appropriate for final survey.

4.5.3. Administration of the survey

A questionnaire-based survey was employed (Woods et al., 2018; Ting et al., 2018; Thapar & Sharma, 2020) because it was the preferred choice for data collection. A self-administered survey can be done in several ways, such as via post or online (Saunders et al., 2016; Williams et al., 2020). A postal survey was employed in this study to examine the hypothesised associations for cost reasons (Bang et al., 2000; Ivanova, 2013; Ahmed, I et al., 2019b; Williams et al., 2020). In November 2018 (for six months) using a covering letter describing the survey, the questionnaire, and a self-addressed prepaid envelope were mailed randomly 1200 residential consumers across Sydney, NSW for at least 200 valid responses. The survey respondents were randomly selected through the White Pages telephone directory from multiple suburbs of NSW – north, east and west regions were targeted to select by the researcher (Australian Bureau of Statistics, 2017 Census).

4.6. Data preparation

There are four steps in data preparation include data exporting and cleaning, checking for outliers, assessment of normality and common method bias, prior to statistical analysis. First, the collected data from postal surveys was exported into a standardised format for assessment in SPSS (Section 4.6.1). Second, item outliers were checked (Section 4.6.2), followed by normality testing through a skewness and kurtosis index check (Section 4.6.3). Then a test of common method biases was conducted to ensure that data were free from bias before statistical analysis was employed (Section 4.6.4).

4.6.1. Data exporting and cleaning

A total of 400 survey responses were collected using the postal survey. Due to the 'required completion answer' constraint, no missing data was found. As stated earlier, 400 responses were completed and of these, 14 were partially filled, which were not included in the research. This brought the actual number of valid responses to 386. First, the data collected from postal surveys were exported to a standard format for statistical analysis. SPSS 2.0 software was used for the initial analysis. Second, all the exported data was analysed to obtain a summary of the sample response (386) using descriptive analysis (i.e. frequency distribution, mean, standard deviation and maximum and minimum values) in order to identify the out-of-range values and missing values. The descriptive statistics analysis are presented in Chapter 5.

4.6.2. Assessment of outliers

The second step in data preparation was checking the outliers. According to Hair et al. (2015) assessing the existence of outliers is done before conducting the normality testing. It is important to check the outliers because it helps to avoid bias in the data (Osborne & Overbay, 2004; Hair et al., 2014). Testing for outliers in the study was undertaken by multivariate analysis (Hair et al., 2009). Multivariate outliers can be discovered by visual inspection based on the "Mahalanobis distance (D) statistic (M2/df), which indicates the distance in standard deviation units between a set of scores for an individual case and the same means for all variables" (Kline 2005, p. 51). The decisions made regarding the assessment of outliers are explained in Chapter 5.

4.6.3. Assessment of normality

The third step in data preparation is normality testing. Test of normality is where the data is well-modelled from a normal distributed population (Allen & Bennett, 2010; Mishra et al., 2019). To test for normality, skewness and kurtosis index were checked using the criteria of Hair et al. (2010) and Kline (2005). Generally, higher level of skewness and/or kurtosis is non-normal, which might generate a random effect for estimating the data (Hall & Wang 2005). In this research, the normality test showed that all skewness and kurtosis values were below 2.0 and 7.0, respectively (Hair et al., 2011; Kline, 2015). The results of the normality test are documented in Chapter 5, Section 5.4.4.

4.6.4. Common method bias

Assessment of common method bias is the final step while preparing the data. Common method bias is a frequent problem that can arise and is defined as “the variance that is attributable to the measurement method rather than the constructs the measures represent” (Podsakoff et al., 2003, p. 879). In this study the common method bias issue was managed using both procedural and statistical methods (Podsakoff et al., 2003). Participants were assured that there were no defined right or wrong answers and thus they were encouraged to respond honestly. In addition, as a statistical remedy Harman’s single-factor test was performed after data collection to test for data variance (Podsakoff et al., 2003; Fuller et al., 2016; Yadev et al., 2019). As a rule of thumb, no single factor should exceed the threshold of more than 50% of the total variance (Ting et al., 2017; Yadev et al., 2019). The results were found to be relatively robust against common method bias where no single factor exceeded the threshold of more than 50% of the total variance (Yadev et al., 2019) with the final dataset reported in Section 5.4.5, Chapter 5.

4.7. Data analysis method-SEM

This section looks at the appropriate methodology for assessing the collected data. In social sciences research, there are two types of statistical techniques – multivariate analysis and structural equation modelling (SEM). Multivariate analysis is a first-generation technique including cluster analysis, exploratory factor analysis and multidimensional scaling for exploratory research; and analysis of variance, multiple regression and confirmatory factor analysis are employed for confirmatory studies (Chin, 1998; Hair et al., 2016). SEM is a second-generation approach which has become a special technique of choice for many researchers to examine the complex relationships between latent constructs (Urbach & Ahlemann, 2010; Khan et al., 2019). This study uses SEM as developed by the Swedish statistician Karl Gustav Joreskog in the mid-1970s (Cudeck et al., 2001). In recent years it has become a robust statistical technique in several fields such as psychology, economics, sociology, marketing and others (Hair et al., 2019). Broadly speaking, SEM can be defined as a combination of two sets of linear equations that support different sub-models: the measurement model (outer model) and the structural model or the inner model (Henseler et al., 2016; Urbach & Ahlemann, 2010).

4.7.1. Rationale for using structural equation modelling (SEM)

The study uses the SEM approach rather than other conventional techniques (e.g., first-generation technique). SEM improves on the limitations of conventional methods in several ways (Hair et al., 2017).

First, SEM stems from the "greater flexibility that the researcher has for the interplay of theory and data" (Chin, 1998, p. 296). Second, it allows the researcher to investigate relationships between multiple independent and dependent constructs simultaneously (Chin, 1998; Steinmetz et al., 2009; Hair et al., 2016). Third, one of the most commonly agreed strengths is that "SEM also allows researchers to directly test the model of interest rather than a straw-man alternative" (Tomarken & Waller, 2005, p. 35). Fourth, SEM is very suitable for evaluating complex research models and structural routes that include different types and levels of constructs. It can predict complex consumer behaviour and intricate relationships among the constructs that previously could not be easily untangled and examined (Szakos et al., 2019; Hirschfelder & Chigada, 2020). This research predicted the buying behaviour of green energy and validated the theoretical model where the latent constructs are inferred indirectly from multiple (thirty) observed items. Fifth and finally, based on the literature, SEM is the best statistical technique in studies which have applied the theory of planned behaviour (Sultan et al., 2020).

4.7.2. Types of structural equation modelling

Scholars have identified two types of estimation techniques researchers have used in SEM and they include the co-variance-based approach (CB-SEM) and component-based approach, such as partial least squares (PLS-SEM) (Marcoulides et al., 2009; Sarstedt et al., 2019a). Below is a brief discussion of two techniques in the SEM method.

a. Covariance-based SEM (CB-SEM)

Covariance-based structural equation modelling (CB-SEM) is a robust technique employed to examine complex interrelationships between observed and latent variables (Ting et al., 2019; Khan et al., 2019). The main assumption of the CB-SEM method is that it uses a maximum likelihood (ML) estimation procedure and aims at "reproducing the covariance matrix [i.e. minimising the difference between the observed and estimated covariance matrix], without focusing on explained variance" (Hair et al., 2011, p. 139).

b. Component-based SEM (PLS-SEM)

Component-based SEM (PLS-SEM) is a structured path estimation method which is a multivariate analysis approach to estimate the relationships among latent variables (Esposito et al., 2010; Yen et al., 2017). The main assumption of the PL-SEM method is that it uses a regression-based ordinary least squares (OLS) estimation method to explain the latent constructs' variance by "minimizing the error terms [and maximizing] the R square values of the (target) endogenous constructs" (Hair et al., 2014, p. 14).

The covariance-based and component-based SEM are two different techniques which differ not only in terms of their basic assumptions and outcomes, but also their estimation procedures (Hair et al., 2014; Astrachan et al., 2014). However, to some extent due to CB-SEM and PLS-SEM being similar, the differences are important. The key differences are presented in Table 4.6.

Table 4.6: Conceptual differences between CB-SEM and PLS-SEM
Source: Urbach & Ahlemann (2010)

Items	Covariance-based SEM	Variance-based SEM (PLS)
Objective	Parameter-oriented	Prediction-oriented
Approach	Minimising the difference between the sample covariance	Minimising the variance of all endogenous variables
Assumption	Parametric (normal distribution and independent observations)	Nonparametric (non-normal distribution and predictor specification)
Parameter estimates	Consistent	Consistent as indicators and sample size increase (consistency at large)
Latent variable scores	Indeterminate	Explicitly estimated
Relationship modes between latent variables and its manifest variables	Typically, only with reflective indicators	Can be modelled in either formative or relative mode
Implications	Optimal for parameter accuracy	Optimal for prediction accuracy
Model complexity	Small to moderate complexity	Large complexity (a large number of constructs and indicators)
Sample size	Ideally based on power analysis of the specific model. Minimal recommendations range from 200 to 800 observations.	Power analysis based on the portion of the model with the largest number of predictors. Minimal recommendations range from 30 to 100 observations
Type of optimisation	Globally iterative	Locally iterative
Significance tests	Available	Only using simulations (e.g., bootstrapping)
Availability of global Goodness of Fit (GoF) metrics	Available	Currently being developed and discussed

Compared with the differences between CB-SEM and PLS-SEM, PLS-SEM has more advantages in terms of: small sample size; applicability to the development of the theory; suitability for prediction; and avoidance of inadmissible solutions and factor indeterminacy (Fornell & Bookstein, 1982; Sultan et al., 2020). Accordingly, PLS-SEM is now widely applied in several research fields including organisational management (Sosik et al., 2009), strategic management (Hair et al., 2012c), supply chain management (Kaufmann & Gaeckler, 2015), and green marketing (Sultan et al., 2020).

4.7.3. Rationale for using PLS-SEM

This study employs partial least squares structural equation modelling (PLS-SEM) in order to test the proposed conceptual model and predict relationships, both between latent constructs and the key indicators by using Smart PLS 3.0 software (Yen et al., 2017; Sultan et al., 2020). This section justifies the data analysis technique which has been employed to examine the conceptual model. The rationale for employing PLS-SEM or CB-SEM has been discussed by many researchers (Hair et al., 2016, 2019b). Researchers like Esfandiar et al (2020); Sarstedt et al. (2016, 2019) suggest that PLS-SEM may be applied "practically no bias when estimating data from a composite model population, regardless of whether the measurement models are reflective or formative" (p. 4008). Another recent proposition as presented by Hair et al. (2019a, p. 5) states that researchers should select the PLS-SEM for specific situations (see Table 4.7). The following list summarises the important and updated aspects for when PLS is an appropriate SEM method.

Table 4.7: Selection criteria in selection of PLS-SEM.
Source: Hair et al. (2019a, p. 5)

Situation	Statement
Objective	• When the analysis is concerned with testing a theoretical framework from a prediction perspective • When the research objective is to better understand increasing complexity by exploring theoretical extensions of established theories (exploratory research for theory development
Model constructs	• When the structural model is complex and includes many constructs, indicators and/or model relationships • When the path model includes one or more formatively measured constructs; • When research requires latent variable scores for follow-up analyses.
Model specification	• When the path model includes one or more formatively measured constructs; • When the research consists of financial ratios or similar types of data artifacts
Sample size	• When a small population restricts the sample size (e.g. business-to-business research); but PLS-SEM also works very well with large sample sizes;
Data	• When the research is based on secondary/archival data, which may lack a comprehensive substantiation on the grounds of measurement theory; • when distribution issues are a concern, such as lack of normality;

In statistical analysis it is important that researchers apply several rules of thumb to get the best statistical results. Researchers (Hair et al., 2016; 2017, 2019) have suggested that in selecting a suitable analytical method, researchers should consider several issues like research objectives, measurement model specification, research modelling, data characteristics and model evaluation. Table 4.8 breaks down the research components and section criteria of the analysis technique (CB-SEM and PLS-SEM).

Table 4.8: Rules of thumb in selecting between CB-SEM and PLS-SEM
Source: Compiled from Nguyen (2017)

	Criteria to evaluate	**CB-SEM**	**PLS-SEM**
1	***Research objective and research modelling***		
	• Prediction of constructs		√
	• Theory testing, theory confirmation or comparison of alternative theories	√	
	• Exploring the extension of an existing theory		√
	• Optimal for prediction accuracy		√
	• Optimal for parameter accuracy	√	
2	***Measurement model specification***		
	• When formative constructs are part of the structural model		√
	• When error terms demand additional specification such as co-variance	√	
3	***Structural model***		
	• When the structural model is complex		√
	• When structural model specifies non-recursive relationships	√	
4	***Data characteristics and algorithm***		
	• Data meet distribution assumptions	√	
	• Data do not meet distribution assumptions		√
	• Non-normal distribution		√
	• Normal distribution	√	√
	• Small sample size consideration		√
	• Large sample size consideration	√	√
5	***Model evaluation***		
	• Use latent variable scores in		√

Based on the above discussion, PLS-SEM emerges as being more suitable for the data analysis approach. This research adopted it as the statistical analysis method for several reasons as outlined below:

- The analysis is exploratory research that aims to evaluate the conceptual model from a prediction perspective. The study employs the PLS-SEM technique because this method is recommended by Hair et al. (2017, 2019) as a robust approach when the research is concerned with testing a conceptual model from a prediction perspective; the research focused on predicting consumers' green energy purchase intentions and behaviour (GPIB).

- The focus of this study was on prediction of factors associated with people's green energy purchase behaviour. Therefore, the use of LV scores is critical to examine the relationships between the LVs and PLS-SEM which might help to achieve this.

- The research investigates the relationships among the factors affecting people's green energy buying behaviour in Australia where PLS-SEM has not been used for this topic.

- PLS-SEM is suitable for this thesis because it estimates and analyses the relationships between the latent variables in the model, as well as having the flexibility to consider all path coefficients at the same time, leading to more robust estimates of the structural model (Sultan et al., 2020).

- PLS-SEM has the additional advantage of being able to conduct a multi-group analysis (MGA) to study group differences. The MGA approach can clarify whether there are differences in hypothetical relationships among different groups (Wang et al., 2019).

  A variety of analytical approaches have been applied in literature in green energy context include logistic regression analysis, T test, Binary probit analysis. Discrete choice model (DCM) include probit, logit analyses commonly considered to rely on the assumptions of economic rationality and utility maximization (Hall et al. 2004). DCM directly estimate the importance weight of the attribute as a whole. However, PLS-SEM is capable of estimating path models with latent variables, and can combine the information for each level of an attribute, which then represents the attribute as a whole in the path model (i.e., with the attribute levels as indicators of the parent latent variable) (Hair et al 2021a). Furthermore, the advances in PLS-SEM (e.g., analysis of observable and unobservable heterogeneity, mediator, moderator and nonlinear effects analyses) also enable identification and assessment of decision making to distinguish rational, optimizing decisions from heuristic, pragmatic ones, when parameter estimations for attributes as a whole are crucial (Hair et al. 2021b). Discrete choice model (DCM) approach is not effective in model validation and in analysis of mediator, moderator relationship in the model for validation (Hair et al. 2019c) Therefore, applying PLS-SEM, as suggested in this research, expands the analytical scope for analyzing the factors affecting green energy buying behaviours include the mediation analysis and model validation in predicting the actual behaviour.

4.7.4. Approach to partial least squares (PLS) analysis

This section presents details regarding PLS-SEM as the data analysis method preferred for this research. It combines two steps: first, the measurement model and second, the structural model (Sarstedt & Cheah, 2019b). In brief, the measurement model assesses the validity and reliability of the research variables, while the structural model confirms the causal relationships amongst those variables. Figure 4.3 illustrates the two-stage approach of the PLS-SEM.

The following section discusses the initial evaluations of the partial least squares structural equation modelling.

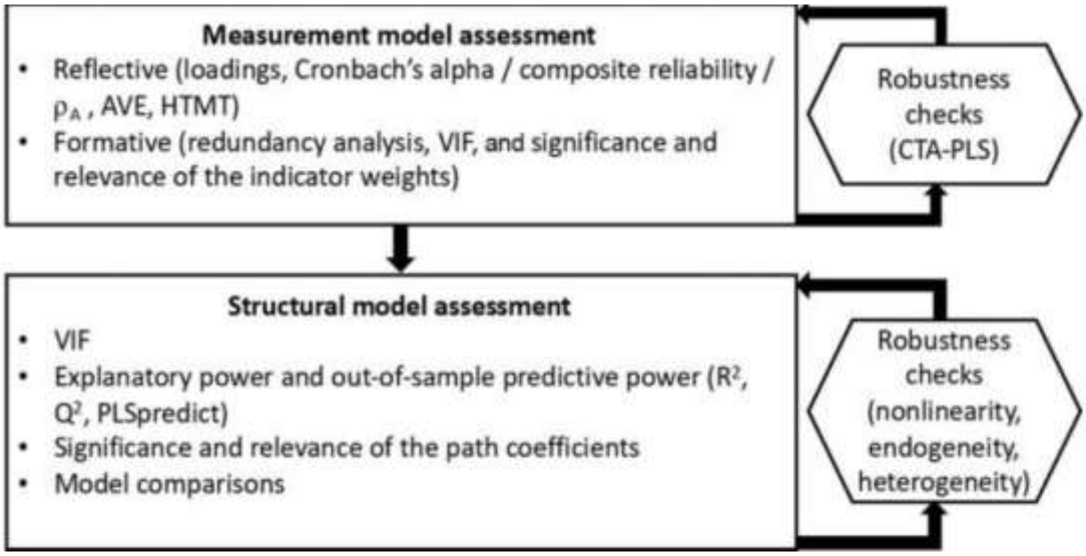


Figure 4.3: Aspects and statistics to consider in a PLS-SEM analysis
Source: Adapted from Hair et al. (2019, p. 4)

4.7.4.1. Measurement model assessment

This section focuses on the first step in an assessment of PLS-SEM which involves the measurement model (also known as the outer model). The measurement model defines how the latent variables are measured in terms of the observed constructs and their measurement items. The core objective of assessing the measurement model is to confirm the reliability, validity and empirical support for the inclusion of factors plotted in the path model. It helps to determine how well the research model items that is, the research constructs (the survey questions) are loaded on hypothetically defined model factors.

The measurement model is classified under two different categories to demonstrate causality between the construct and its indicators, known as the reflective and formative model (Jarvis et al., 2003; Hair et al., 2019a). In the reflective measurement model, the path of causality is directed from the construct to the underlying measures, which are expected to be correlated (Jarvis et al., 2003; Vinzi et al., 2010). Conversely, a formative model shows that the path of causality is directed from the indicator to the construct, where these measurements are not expected to be correlated (Jarvis et al., 2003).

It is essential to identify the distinction between formative and reflective models because it helps to properly specify a measurement model which is necessary to assign meaningful relationships to the structural model (Anderson & Gerbing, 1988; Freeze & Raschke, 2007). Jarvis et al. (2003) provided a set of criteria to identify whether the measurement model should be formative or reflective. According to Coltman et al. (2008), whether the measurement model is formative or reflective, theoretical and empirical aspects should be captured. Table 4.9 presents a guideline for designing and validating the formative and reflective model.

Table 4.9: A guideline for assessing the reflective and formative models (Adopted from Coltman, 2008, p 5)

Considerations	Reflective model	Formative model	Relevant literature
Theoretical considerations			
1. Nature of construct	Latent construct is existing Latent construct exists independent of the measures used	Latent construct is formed Latent constructs is determined as a combination of its indicators	Borsboom et al. (2003, 2004)
2. Direction of causality between items and latent construct	Causality from construct to items Variation in the construct causes variation in the item measures Variation in item measures does not cause variation in the construct	Causality from items to construct Variation in the construct does not cause variation in the item measures Variation in item measures causes variation in the construct	Bollen and Lennox (1991); Edwards and Bagozzi (2000); Rossiter (2002); Jarvis et al. (2003)
3. Characteristics of items used to measure the construct	Items are manifested by the construct Items share a common theme Items are interchangeable Adding or dropping an item does not change the conceptual domain of the construct	Items define the construct Items need not share a common theme Items are not interchangeable Adding or dropping an item may change the conceptual domain of the construct	Rossiter (2002); Jarvis et al. (2003)
Empirical considerations			
4. Item intercorrelation	Items should have high positive intercorrelations	Items can have any pattern of intercorrelation but should possess the same directional relationship	Cronbach (1951); Nunnally

Considerations	Reflective model	Formative model	Relevant literature
	Empirical test: internal consistency and reliability assessed via Cronbach's alpha, average variance extracted, and factor loadings (e.g., from common or confirmatory factor analysis)	Empirical test: indicator reliability cannot be assessed empirically; various preliminary analyses are useful to check directionality between items and construct	Bernstein (1994); Churchill (1979); Diamantopoulos and Siguaw (2006)
5. Item relationships with construct antecedents and consequences	Items have similar sign and significance of relationships with the antecedents/consequences as the construct Empirical test: content validity is established based on theoretical considerations, and assessed empirically via convergent and discriminant validity	Items may not have similar significance of relationships with the antecedents/consequences as the construct Empirical test: nomological validity can be assessed empirically using a MIMIC model, and/or structural linkage with another criterion variable	Bollen and Lennox (1991); Diamantopoulos and Winklhofer (2001); Diamantopoulos and Siguaw (2006)
6. Measurement error and collinearity	Error term in items can be identified Empirical test: common factor analysis can be used to identify and extract out measurement error	Error term cannot be identified if the formative measurement model is estimated in isolation Empirical test: vanishing tetrad test can be used to determine if the formative items behave as predicted Collinearity should be ruled out by standard diagnostics such as the condition index	Bollen and Ting (2000); Diamantopoulos (2006)

The reflective measurement model serves to examine the extended TPB-based research model (Mathieson et al., 2001; Coltman 2008; Razak et al., 2019). The reflective measurement model in this study examined the reliability and validity assessment of the constructs. According to Hair et al. (2019a) to validate the measurement model it is essential to test the reliability (include indicator loadings, Cronbach's alpha, and composite reliability) and test the validity of the measurement model (include convergent validity, Fornell-Larcker criterion (i.e. square root of AVEs, cross-loading and heterotrait-monotrait ratio – HTMT). The validity guidelines used to assess the measurement model are summarised in Table 4.10. The sections below present a discussion about testing for reliability and validity of the reflective constructs.

4.7.4.1.1.Reliability assessment

A test of reliability is one of the most important aspects of data analysis and it refers to the degree of consistency shown by the results. A reliability analysis was conducted using indicator reliability (iteam reliability) and internal consistency reliability (loading). The tests of reliability of the study are presented in section 5.5.1.1, Chapter 5.

1. Indicator reliability

Indicator reliability (iteam reliability) can be defined as the degree to which a construct is in line with what it is measuring (Shevlin et al., 2000; Urbach & Ahlemann, 2010). The indicator reliability is referred to as the proportion of item variance explained by the latent factors tested using item loadings. Examining the indicator reliability in the reflective measurement model is the first step of assessment which is measured through the indicator loadings of the items for reflective constructs (Hair et al., 2019a). The significance test for indicator loadings can be measured using the bootstrapping approach (Urbach & Ahlemann, 2010). The loadings score can be obtained from the bootstrapping result of PLS. As a rule of thumb, the acceptable indicator reliability is achieved when each measure's loading is has at least a value of 0.70 ((Chin 1998; Hair et al., 2019). However, in the literature was a loading minimum of 0.40 (Hair et al., 1998), and the 0.30 factor loading by Sirdeshmukh et al. (2002)

and Henseler et al. (2009). This research processes statistical analysis of indicator reliability in Chapter 5, Section 5.5.1.1.1.

2. Internal consistency reliability

The second step of reliability measure in PLS-SEM is internal consistency to ensure that there is a correlation among the items for a construct. The metric used for evaluating the internal consistency reliability in PLS-SEM is Cronbach's alpha (α) and composite reliability (CR). Cronbach's alpha (α) is the most popular measure of internal reliability. The higher value (the 0.70 or above reliability cut-off) of Cronbach's alpha indicates that the items used in the research construct have the same range and meaning, so reliability is demonstrated (Taherdoost, 2016; Nguyen, 2017). However, it should be noted that Cronbach's alpha can be sensitive to the measurement items and the scale used within the construct; using only Cronbach's alpha alone may not be enough (Fornell & Larcker 1981; McNeish, 2018).) Therefore, in PLS-SEM, internal consistency is also measured in conjunction with composite reliability (Fornell & Larcker 1981; Bacon et al., 1995).

Composite reliability (CR) can be defined as a test to which two or more measures are positively correlated in the same variance of its measurement items (Hair et al., 2019a). The reason for choosing composite reliability along with alpha is that, "in comparison to Cronbach's alpha, this measure does not assume tau equivalency among the measures with its assumption that all indicators are equally weighted. Therefore, while alpha tends to be a lower bound estimate of reliability, CR is a closer approximation under the assumption that the parameter estimates are accurate" (Chin, 2010, p. 671). Specifically, Cronbach's alpha may be too conservative, while in contrast the composite reliability may be too liberal, and thus the construct's true reliability is typically viewed as lying between these two extreme values (Hair et al., 2019a). In this research, the cut-off value of Cronbach's alpha and composite reliability were ensured at the value of 0.7 and above by Hair et al. (2019) to measure the internal consistency of the measurement items. The findings of internal consistency reliability of this research are provided in Chapter 5, Section 5.5.1.1.2.

4.7.4.1.2.Validity assessment

Validity measurement can be inferred through the assessment test of convergent validity and discriminant validity. The tests of validity are presented in Chapter 5, Section 5.5.1.2.

1. Test of convergent validity

The measure used to analyse convergent validity in PLE-SEM is referred as the average variance extracted (AVE), and was originally proposed by Fornell and Larcker (1981). In order to estimate the AVE, it is recommended to square the loading of each indicator on a construct and compute the mean value (Hair et al., 2019b). Construct validity analysis using convergent validity is presented in Chapter 5, Section 5.5.1.2.1.

2. Test of discriminant validity

The fourth stage of the measurement model assessment addresses discriminant validity. Discriminant validity can be defined as the extent to which a construct is empirically distinct from other constructs in the model. Discriminant validity is evaluated to examine the correlations between the measures of potentially overlapping constructs (Cable & DeRue, 2002). The metric used for evaluating a construct's discriminant validity in PLS-SEM comprises the cross-loading, Fornell-Larcker criterion (i.e., square root of AVEs) and heterotrait-monotrait ratio (HTMT) discussed below.

Cross-loading

In this research, the respective cross-loadings were tested for the construct validity. According to Hair et al. (2019a) the cross-loading method is considered to be a 'liberal' method to test for discriminant validity, which often presents more than one construct possessing discriminant validity. Hair et al. (2019a) recommended that the outer loading above 0.50 is significant. The discussion in Chapter 5, Section 5.5.1.2.2. 1 presents the values where the item loadings are above 0.50.

Fornell-Larcker criterion (average variance extracted – AVE)

The Fornell and Larcker (1981) criterion is the most widely used metric for determining discriminant validity. Here a comparative assessment is done between each construct's AVE scores and the square root of the correlations between the latent constructs. For adequate discriminant validity, the square root of the AVEs of all constructs should be higher than the highest correlation value for other constructs (Chin, 1998; Hair et al., 2019; Sultan et al., 2020). The results of the squared correlations for each construct referring to the Fornell-Larcker criterion are presented in Chapter 5, Section 5.5.1.2.2.2.

Heterotrait-monotrait ratio – HTMT

HTMT is the average value of the correlations of items between the relative constructs in relation to the average correlations for the items that measure the same construct (Hair et al., 2019a). This research adopted the partial least square heterotrait-monotrait ratio of correlations (HTMT) approach. Recent research indicates that the square root of the average variance extracted (AVE) is not the only suitable approach for confirming discriminant validity assessment. Hair et al. (2019a) indicated that the Fornell-Larcker criterion may not be sufficient in a particular context when the indicator loadings on a construct differ only slightly (e.g. all the indicator loadings are between 0.65 and 0.85). Henseler et al. (2016) employed the Monte Carlo simulation to compare HTMT with cross-loadings and the Fornell and Larcker (1981) discriminant validity assessment method; the findings of their study reported that the HTMT is more effective in estimating the discriminant validity. This study therefore accepted the heterotrait-monotrait (HTMT) ratio of the correlation's assessment in estimating discriminant validity. In this research the threshold value of HTMT is lower than 0.85 or 0.90 (Hair et al., 2019a) indicating a supportive discriminant validity of the research model. The findings of – HTMT in this research are provided in Chapter 5, Section 5.5.1.2.2.3. Furthermore, the structural model which is analysed (see Chapter 5) uses the following listed criteria (Table 4.10) to conduct a reliability and validity assessment of the measurement model.

Table 4.10: Reliability and validity measurement model criteria.
Source: Henseler, Ringle and Sinkovics (2009, pp. 300-303) and Hair et al. (2019, p. 15)

Measure	Criterion	Description	Score	Source
Internal consistency reliability	Cronbach's alpha (α)	Measures the coherence of the responses across a subgroup of the questions related to a particular concept that is measuring the correlations of the observed indicator variables.	α >0.7 Values must not be lower than 0.6	(Hair et al., 2019a. Saunders et al., 2016)
	Composite reliability (CR)	In contrast with α, CR considers the different outer loadings of the indicator variables for each concept. It measures the degree to which the indicator variables load simultaneously when the construct increases.	CR >0.7 Values must not be lower than 0.6	(Hair et al., 2019a. Urbach & Ahlemann, 2010)
Indicator reliability	Indicator loadings	Evaluates how much of the observed indicator variables variance is explained by the corresponding latent variable or construct.	Values significant at the 5% and >0.7	(Chin, 1998; Hair et al., 2019; Urbach & Ahlemann, 2010)
Convergent validity	Average variance extracted (AVE)	The extent to which the construct converges to explain the variance of its items	AVE>0.5	(Chin, 1998; Hair et al., 2019a)
Discriminant validity	Cross loading	The extent to which an item correlates with all other items	Item's loading of each indicator is highest for its designated construct	Hair et al (2019a)

Discriminant validity	Fornell-Larcker criterion (square root of AVEs):	Refers to whether a latent construct is truly distinct from other latent variables into in the same theoretical framework.	The square root of the AVE of a construct should be greater than the correlations between the construct and other constructs in the model	Hair et al., 2014; Sultan et al. 2020
Discriminant validity	Heterotrait-monotrait ratio – (HTMT)	Refers to the mean value of the item correlations across constructs relative to the (geometric) mean of the average correlations for the items measuring the same construct	For conceptually similar constructs: HTMT < 0.90 For conceptually different constructs: HTMT < 0.85	Henseler et al. (2015) and Hair et al. (2019a)

4.7.4.2. Structural model assessment

This section looks at the second stage in the assessment of PLS-SEM involving the inner, or structural model. A structural model is commonly described as the theoretical or causal model that "represents the theory with a set of structural equations and is usually depicted with a visual diagram" (Hair et al., 2019a, p. 845). Evaluating the structural model helps systematically examine whether research hypotheses proposed by the structural model are supported by the data (Urbach & Ahlemann, 2010). In PLS-SEM, two important evaluation criteria of a structural model are the amount of variance explained – the level of significance of the path coefficients (β) and the coefficient of determination (R^2) (Urbach and Ahlemann, 2010; Hair et al., 2019b).

The findings of the structural model are presented in Chapter 5, (see Figure 5.3-a, b). The subsequent two subsections of this chapter are concerned with explaining the path coefficients (β) and coefficient of determination (R^2), respectively.

4.7.4.2.1.Relevance of the significant path coefficients (β)

The path coefficient helps to specify how the percentage of each independent construct contributes to explaining the variance in the endogenous variable (Hair et al., 2011; Wong, 2013). The results of path coefficients (β) are documented in Chapter 5, Section 5.5.2.3.1.

4.7.4.2.2.Coefficient of determination (R^2)

The coefficient of determination demonstrates the nomological validity, explanatory power and predictive validity of the research model (Sultan et al., 2020). The values of R-square (i.e. coefficient of determination) refer to the overall effect size measure for the structural model proposed by Astrachan et al. (2014), Hair et al. (2012) and Sarstedt et al. (2017). The R-square value indicates "the amount of variance in dependent variables that is explained by independent variables" (Chin, 1998, p. 332). The coefficient of determination analysis of the study is shown in Chapter 5, Section 5.5.2.4. Table 4.11 summarises the rule of thumb for criteria used for the structural model assessment in this research.

Table 4.11:Summary of criteria used to examine the structural model. Source: Wong (2013); Hair et al. (2012, 2019a)

	Validity Type	Criterion	Guidelines
1	Model validity	Coefficient of determination (R^2)	0.75 – substantial 0.50 – moderate 0.25 – weak
2		Path coefficients	The t values larger than 2.58 for 1% level of significance or $P < 0.01$ and larger than 1.96 for 5% level of significance or $P < 0.05$ indicate significant path coefficient

4.7.5. Mediation analysis technique

This section briefly notes the mediation analysis approach relevant to the research model (discussed in Chapter 3) where the construct green promotion acts as a mediator that reduces the gap between intention and behaviour. Mediators in the research model provide helpful information on 'how' and 'why' the independent variable predicts or causes the outcome variable (Wu & Zumbo, 2008; Prayag et al., 2013).

A mediation effect is established (see Figure 4.4) in a research model when an exogenous construct (X) affects an endogenous construct (Y) indirectly via at least one mediating or intervening variable (M) (Baron & Kenny, 1986). There are several methods of assessing the mediation effect in a research model (e.g., Sobel, 1982). This study follows the classical approach of Baron & Kenny (1986) whose suggestions were endorsed by other researchers (Zhou et al., 2012; Zhu et al., 2013; Prayag et al., 2013; Singh & Verma, 2017; Chen et al., 2018; Shafique et al., 2018; Kumar & Kaushik, 2020) to measure the mediating effect in the model. According to Baron and Kenny (1986) four conditions should be fulfilled to complete the mediation, and these are (Kumar & Kaushik, 2020):

a. The independent construct likely to affect the dependent construct

b. The independent construct likely to affect the mediator

c. The mediator should likely affect the dependent construct

d. The mediation outcome (the inclusion of the mediator between independent and dependent constructs

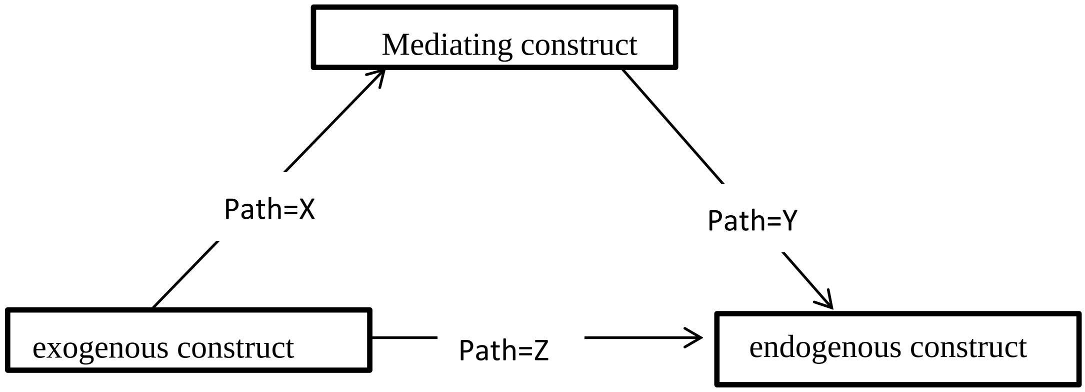


Figure 4.4: A standard mediation model
Source: Baron and Kenny (1986)

As presented in Figure 4.4, X, Y and Z are the direct effects. The indirect effect is analysed by multiplying X and Y. The aggregation of the direct and indirect effects is referred to as the total effect (Z). Full mediation holds when the relationship between an independent variable (X) and a dependent variable (Y) loses all significance/negative relationship when the mediating variable is included in the model (Baron & Kenny, 1986; Won & Ngai, 2009; Zhu et al., 2013; Shafique et al., 2018). Otherwise, it is assumed that all partial the mediation is supported in the model (Baron & Kenny, 1986).

In the same vein, the current research has attempted to examine the mediation effect of green promotion (mediator) on the relationship between intention (independent) and behaviour (dependent) for green energy consumption. Examining the role of green promotion in green energy purchase as a mediator can explain how and why there is an observed relationship between intention and behaviour. The magnitude effect of green promotion and results of mediation analysis are reported in Chapter 5, Section 5.7.2.2.

4.7.6. Partial least squares-multi-group analysis (PLS-MGA)

As discussed earlier (section 4.7.4) the proposed research model aimed employs partial least squares structure equation modelling (PLS-SEM) to analyse the structural model. Also, this thesis investigated different demographic aspects such as age, gender, education level and socio-economic group differences to measure Australian households' green energy buying behaviour. The present research seeks to bind the partial least squares structural equation model with the multi-group analysis (MGA) method.

PLS-SEM can employ multi group analysis (MGA) to analyse group differences (Wang et al., 2019). The PLS-MGA method can assert whether the predefined data groups have significant differences in their group-specific parameter estimates (Alzahrani et al., 2018). PLS-MGA can examine whether the predefined data groups have serious divergence in their group-specific parameter estimates. One of the most important advantages of the MGA method is that it can interpret whether there is disparity in the hypothesised relationships between different groups, and therefore it can, both theoretically and practically, be helpful in avoiding erroneous conclusions (Henseler, 2012; Wang et al., 2019). Therefore, from both theoretical and practical perspectives, this research examines the proposed model by using the multi-group analysis (PLS-MGA) approach.

In this research, the categorical variables investigated by the PLS-MGA were divided into different demographic data: age, gender, education level, energy usage, income and user group. The results of the PLS-MGA with path coefficient and p-value unearthed significant group differences that are presented in Chapter 5, Section 5.8.

4.8. Chapter summary

Presented here was the proposed research methodology. In particular, the chapter discussed the procedure for examining the proposed research framework. The research basically adopts the deductive approach, broadly involving testing the hypotheses developed in Chapter 4. The chapter also discussed the sampling procedure, and the questionnaire construction used in the survey. PLS-SEM emerged as the most appropriate analytical method for dealing with the complex modelling and nature of the research variables. The first stage of the PLS-SEM assessed internal consistency, indicator reliability, convergent validity, and discriminant validity. In the second phase of the PLS-SEM, a coefficient of determination (R^2) and path coefficient, were used to assess the structural model. The classical mediation analysis approach followed by Baron and Kenny (1986) and the multi-group analysis (PLS-MGA) approach were highlighted to analyse demographic factors.

The next chapter discusses the findings employing PLS-SEM which includes the assessment of the measurement model, the structural model, hypothesis testing (direct, indirect and mediation) and reports on the PLS-MGA findings.

CHAPTER 5
DATA ANALYSES AND RESULTS OF THE RESEARCH

This chapter reports the results of survey data, analytical processes and findings. The chapter starts with statistical findings of the respondents, informs the readers about descriptive statistics: frequency and descriptive analyses followed by the partial least squares-structural equation modelling (PLS-SEM) for each research construct. Also determined here are the causal relationships for theory confirmation. In addition, multiple group analysis (MGA) served to investigate and identify the differences in the effects of demographic factors on people's green energy buying behaviour.

Chapter outline:

- Introduction
- Survey responses
- Statistical analysis
- Assessment of the measurement model
- Assessment of the structural model
- Hypotheses and findings
- Multiple group analysis on demographic factors
- Chapter summary

5.1. Introduction

This chapter presents the findings of the data analysis. In the first phase, the survey response, statistical findings and demographic profile of respondents and data preparation process are described in Sections 5.2 to 5.4. The second phase focuses on assessment of the research model in Section 5.5 and reports the findings for the partial least squares (PLS)-based structural equation modelling (SEM): the assessment of the measurement model and assessment of the structural model. After the structural model is evaluated, Section 5.6 highlights the phases of the research model followed by the hypothesis results in Section 5.7. To better understand the demographic differences in NSW residents' green energy buying behaviour, this research combines the partial least squares structural equation with the multi-group analysis (MGA) method reported in Section 5.8. Finally, the chapter is summarised in Section 5.9.

5.2. Survey responses

The data for this research was collected by postal survey, as have other studies (e.g., Bang et al., 2000; Palandino & Pandit, 2019; Ahmed, I et al., 2019). A total of 1200 questionnaires were administered using a simple random sampling technique of which 400 responses were received, 14 were not usable and were discarded from the analysis, so 386 responses were deemed usable and this indicated a response rate of 33%, which is found to be appropriate (Ivanova, 2013; Palandino & Pandit, 2019). The postal response rate was comparatively low compared to online and face-to-face surveys, but this is consistent with those reported elsewhere (Ivanova, 2013; Palandino & Pandit, 2019).

5.3. Demographics of the respondents and statistical discussion

Regarding the total participants, Table 5.1 illustrates the demographic information and shows that most respondents belong to the 18-24 age group (10.1%), followed by the 25-31 age group (26.9%) and 31-40 age group (45.9%). The sample was split between 29.0% males and 52.8% females. Notably, about 18% of survey participants were not interested in disclosing their gender. Most participants (72.8% = 26.9 + 33.3) were between 25 and 40 years of age. Moreover, a small proportion (3.7%

= 3.4 + 3) were more than 46 years of age. In terms of education level, most participants (65.3% = 36.0 + 29.3) have either a bachelor's degree (36.0%) or postgraduate degree (29.3%); 33.9% have a diploma certificate and less than 1% have a High School Certificate or less. Regarding income, 29.3% of participants have a salary of less than $60K, and 36.5% earn between $60K and $80K. 34.2% of the respondents have income higher than $80k. In terms of electricity uses, 15.8% have used green electricity in their home, while 84.2% have not. A significant proportion of respondents (43.6% = 19.2 + 24.4) reported they consume less than 300 kWh annually, whereas around 56.4% consume more than 300 kWh.

Table 5.1: Demographic statistics of the respondents

Demographic factors		**Number (N)**	**Percentage**
Gender	Male	204	52.8
	Female	112	29.0
	Prefer not to disclose	70	18.1
Age	18-24 (Years)	39	10.1
	25-31	104	26.9
	31-40	177	45.9
	41-45	52	13.5
	46-52	13	3.4
	53-59	1	0.3
Education	High School Certificate or less	3	0.8
	Diploma	131	33.9
	Bachelor's degree	139	36.0
	Postgraduate qualification or more	113	29.3
Income (AUD)	$20,000-$30,000	13	3.4
	$30,000-$60,000	100	25.9
	$60,000-$80,000	141	36.5
	$80,000-$100,000	119	30.8
	More than $100,000	13	3.4
Electricity uses	Yes	61	15.8
	No	325	84.2
Amount of electricity uses (KWH)	200-250	74	19.2
	250-300	94	24.4
	300-400	150	38.9
	400-500	68	17.6

5.4. Preparation for statistical analysis

Five data preparation steps prior to statistical analysis were conducted in phase one of this research analysis: (1) descriptive statistics of variables, (2) data screening and cleaning, (3) assessment of outliers, (4) assessment of normality, and (5) testing for common method bias. These are all discussed in more detail in the sections that follow.

5.4.1. Assessment of descriptive statistics

Before performing the basic statistical analysis, one important task is to look at the primary data reported through the questionnaire survey transferred to a dataset. Descriptive statistics for this dataset are generated using IBM SPSS 24. Table 5.2 shows the descriptive statistics that include the number of items, as well as the mean and standard deviation values of all the research constructs (attitude, subjective norm, behavioural control, environmental concern, perceived green brand, retail service quality, green promotion, intention and behaviour).

The statistics shows that the mean and median values for most items are too close, which implies that the distribution of these constructs is close to symmetrical distribution. All the constructs concerning green energy consumption showed a relatively higher mean and high standard deviation value, thus signifying that all adoption factors (constructs) regarding green energy consumption, are very clear among Australian households. Based on Table 5.2, the mean values of attitude, subjective norm, perceived behavioural control, moral norm, green brand, environmental concern, retail service quality, green promotion, intention and behaviour are quite high and relatively favourable. These findings confirmed that the samples have positive evaluation or suitable appraisal about green energy purchasing, and that consumers believe purchasing green energy is affordable and something they are able to do. Notably, they have high moral norms and responsibility for purchasing green energy. Furthermore, subjective norm and environmental concern were also very high, indicating green energy is well understood in Australia (NSW).

In terms of standard deviation, the statistics show the higher standard deviation value for consumption of green energy indicated that the deviation was indeed high among residential consumers. Lastly, the distribution of responses is assessed, where the absolute skewness and/or kurtosis values of zero are indicative of normal distribution (Brown, 1997; Ting et al., 2019).

Based on Table 5.2, most of the skewness values are near to zero, and kurtosis values are higher than zero, which suggests that the distributions of the items follow the normal distribution. Normality assessment is noted in Section 5.4.4.

5.4.2. Data screening/cleaning missing data

Based on the descriptive statistics shown in Table 5.2, there is no non-response or missing values in any of the items. Note that the paper-based survey (postal mail) was carefully developed to make sure that respondents answered all required questions. All the respondents had to answer every question because each item is labelled as obligatory. However, respondents could withdraw from the survey at any time if they wanted to.

5.4.3. Assessment of outliers

The multivariate outliers (Hair et al., 2009) test (Mahalanobis distance or the (D) statistics) was performed to check for any outliers, with the threshold that if the values of the new probability variable based on a Chi-square distribution are less than .001, then values are treated as outliers. There were only eleven outliers. Cook's Distance was also done to determine whether these outliers have any significant effect on the results. Tabachnick and Fidell (2007) suggested that such outliers only pose a threat to results when the maximum Cook's Distance values are higher than one. In the results, the maximum value for the D statistic was 133.87 therefore it posed no threat to the rest of the data since the maximum Cook's Distance value is .027 and less than one. Hence, no further review would be needed for the eleven outlier cases, and the dataset of 386 responses was used for further testing.

Table 5.2: Descriptive statistics of variables included in the research

Variable	Item	Obs.	Mean	SD	Min.	Max.	Median	Skew.	Kurt.
Moral norm (MN)	MN1	386	5.552	0.977	2	7	5	-0.263	3.424
	MN2	386	5.681	0.843	3	7	6	0.109	2.319
	MN3	386	5.503	0.915	1	7	5	-0.282	4.327
Environmental concern (EC)	EC1	386	5.218	1.297	1	7	5	-0.759	3.658
	EC2	386	5.225	1.342	1	7	5	-0.900	3.676
	EC3	386	5.339	1.442	1	7	6	-1.205	3.932
	EC4	386	5.453	1.439	1	7	6	-1.301	4.413
Subjective norm (SN)	SN1	386	5.301	0.927	3	7	5	0.271	2.491
	SN2	386	5.339	0.994	3	7	5	-0.099	2.377
Attitude (AT)	AT1	386	5.464	1.014	2	7	5	-0.305	3.567
	AT2	386	5.567	0.965	1	7	5.5	-0.503	4.107
	AT3	386	5.516	0.994	2	7	5	-0.408	3.391
	AT4	386	5.495	1.025	2	7	5	-0.609	4.013
Perceived behaviour control (PBC)	PBC1	386	5.456	1.029	2	7	5	0.047	2.365
	PBC2	386	5.549	1.016	2	7	6	-0.245	2.581
	PBC3	386	5.604	1.050	2	7	6	-0.248	2.230
Green promotion (GP)	GP1	386	5.668	0.843	3	7	6	0.166	2.298
	GP2	386	5.653	0.942	1	7	6	-0.231	3.444
Green brand perception (GB)	GB1	386	5.585	1.016	2	7	5	-0.233	3.356
	GB2	386	5.653	1.019	2	7	6	-0.477	3.489
	GB3	386	5.689	1.018	2	7	6	-0.475	3.404
	GB4	386	5.749	1.035	2	7	6	-0.567	3.374
Retail Service quality (SQ)	SQ1	386	5.003	1.251	2	7	5	-0.331	2.974
	SQ2	386	5.000	1.232	2	7	5	-0.401	2.970
	SQ3	386	5.111	1.327	2	7	5	-0.499	2.652
Purchase Intention (PI)	PI1	386	5.557	0.930	2	7	5	0.270	2.981
	PI2	386	5.718	0.874	2	7	6	-0.168	3.055
	PI3	386	5.718	0.948	1	7	6	-0.436	4.017
Actual behaviour control (AB)	AB1	386	5.534	0.943	2	7	5	0.098	3.115
	AB2	386	5.570	0.965	1`	7	5.5	-0.505	1.137
	AB3	386	5.671	0.890	4	7	6	0.073	2.099

5.4.4. Assessment of normality

Regarding the test for normality, skewness and kurtosis tests were performed. This study used the criteria of normality derived from Hair et al. (2009) and Kline (2005). First, Hair et al. (2009) stated that if absolute values of skewness and kurtosis exceed 2.0 and 7.0, respectively, then the hypothesis will be rejected, and the sample will have a non-normal distribution. Kline (2005) suggested that absolute kurtosis values greater than 10.0 meant that problematic non-normality existed. The findings of the normality test in Table 5.3 showed that all skewness and kurtosis values are below 2.0 and 7.0, respectively. It also satisfies Kline's (2005) suggested thresholds. We can say that all individual variables satisfy the normality assumption

Table 5.3: Normality test using skewness and kurtosis

Variable	Item	Obs.	Skewness	Std. Error	Z-score skewness	Kurtosis	Std. Error	Z-score kurtosis
Moral norm (MN)	MN1	386	-0.264	0.124	2.129	0.445	0.248	1.794
	MN2	386	0.11	0.124	0.887	-0.674	0.248	2.718
	MN3	386	-0.284	0.124	2.290	1.36	0.248	5.484
Environmental concern (EC)	EC1	386	-0.762	0.124	6.145	0.682	0.248	2.750
	EC2	386	-0.903	0.124	7.282	0.7	0.248	2.823
	EC3	386	-1.21	0.124	9.758	0.96	0.248	3.871
	EC4	386	-1.306	0.124	10.532	1.447	0.248	5.835
Subjective norm (SN)	SN1	386	0.272	0.124	2.194	-0.5	0.248	2.016
	SN2	386	-0.1	0.124	0.806	-0.615	0.248	2.480
Attitude (AT)	AT1	386	-0.306	0.124	2.468	0.591	0.248	2.383
	AT2	386	-0.505	0.124	4.073	1.137	0.248	4.585
	AT3	386	-0.41	0.124	3.306	0.412	0.248	1.661
	AT4	386	-0.611	0.124	4.927	1.042	0.248	4.202
Perceived behaviour control (PBC)	PBC1	386	0.047	0.124	0.379	-0.627	0.248	2.528
	PBC2	386	-0.246	0.124	1.984	-0.409	0.248	1.649
	PBC3	386	-0.249	0.124	2.008	-0.764	0.248	3.081

Variable	Item	Obs.	Skewness	Std. Error	Z-score skewness	Kurtosis	Std. Error	Z-score kurtosis
Green promotion (GP)	GP1	386	0.167	0.124	1.347	-0.695	0.248	2.802
	GP2	386	-0.232	0.124	1.871	0.465	0.248	1.875
Green brand perception (GB)	GB1	386	-0.234	0.124	1.887	0.376	0.248	1.516
	GB2	386	-0.479	0.124	3.863	0.511	0.248	2.060
	GB3	386	-0.477	0.124	3.847	0.425	0.248	1.714
	GB4	386	-0.569	0.124	4.589	0.394	0.248	1.589
Retail service quality (SQ)	SQ1	386	-0.333	0.124	2.685	-0.011	0.248	0.044
	SQ2	386	-0.402	0.124	3.242	-0.015	0.248	0.060
	SQ3	386	-0.5	0.124	4.032	-0.337	0.248	1.359
Purchase intention (PI)	PI1	386	0.271	0.124	2.185	-0.004	0.248	0.016
	PI2	386	-0.168	0.124	1.355	0.072	0.248	0.290
	PI3	386	-0.438	0.124	3.532	1.046	0.248	4.218
Actual behaviour control (AB)	AB1	386	0.099	0.124	0.798	0.133	0.248	0.536
	AB2	386	-0.505	0.124	4.072	1.137	0.248	4.584
	AB3	386	0.074	0.124	0.597	-0.897	0.248	3.617

5.4.5. Common method bias

Since the self-reported questionnaire seeks to answer all the research variables, common method bias could potentially affect the relationship between constructs. To reduce the likelihood of this, participants were assured about the anonymity of their answers and they were requested to answer honestly. This study followed the statistical procedural remedies suggested by Podsakoff et al. (2003), who recommended the Hermann's single factor test can identify important biases in the final dataset due to the data measurement method. The proportion of data variance may differ depending on the topic (Podsakoff et al., 2003).

For example, in behaviour-related studies, variance accounting for a single factor may not exceed more than 40.7% (Podsakoff et al., 2003). Further, as a rule of thumb, no single factor should exceed the threshold of more than 50% of the total variance suggested by Yadev et al. (2019). In this study, Harman’s single factor test indicated that a one factor solution was estimated to be only 22.46% of the total variance, which was less than the recommended threshold (Podsakoff et al., 2003; Yadev et al., 2019). The following results validate the dataset in the current study relatively robustly against any common method bias (see Table 5.4).

Table 5.4: Harman's single factor test scores

Factor	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.427	23.959	23.959	6.41026	20.678	20.678
2	3.618	11.672	35.631			
3	3.140	10.130	45.761			
4	2.689	8.675	54.436			
5	1.954	6.304	60.740			
6	1.662	5.362	66.102			
7	1.466	4.730	70.832			
8	1.022	3.298	74.129			
9	0.907	2.927	77.056			
10	0.721	2.327	79.383			
11	0.676	2.181	81.564			
12	0.567	1.830	83.394			
13	0.538	1.736	85.130			
14	0.521	1.681	86.812			
15	0.497	1.604	88.416			
16	0.433	1.398	89.813			
17	0.406	1.311	91.124			
18	0.347	1.120	92.244			
19	0.333	1.075	93.319			
20	0.285	0.920	94.239			
21	0.281	0.907	95.147			
22	0.235	0.759	95.905			
23	0.222	0.717	96.622			
24	0.195	0.630	97.252			
25	0.166	0.536	97.789			
26	0.156	0.504	98.293			
27	0.145	0.469	98.761			
28	0.131	0.423	99.185			
29	0.123	0.398	99.582			
30	0.097	0.314	99.896			
31	0.032	0.104	100.000			

5.5. Assessment of the research model

The proposed research model was examined using partial least squares structure equation modelling (PLS-SEM). Several rules of thumb (see Chapter 4, Table 4.10) are followed here, and considered as guidelines by researchers (e.g., Chin, 1998; Wong, 2013; Hair et al., 2012, 2017, 2019) on how to interpret the results. The analytical procedures of the path model using the PLS-SEM followed two steps. Suggested by researchers (Chin, 1998; Anderson & Gerbing, 1988; Rahman et al., 2016; Hair et al., 2019; Ramayah et al., 2017; Ting et al., 2019; Sultan et al., 2020), this study has put forward certain criteria to assess partial model structures encompassing following two steps (as shown in Table 5.5):

Step 1: The assessment of the measurement model (see Section 5.5.1)

Step 2: The assessment of the structural model (see Section 5.5.2)

Besides, the path significances and hypotheses were calculated by using a bootstrap re-sampling routine involving 386 respondents and 2000 subsamples, which constitutes a non-parametric approach to examine the significance path of PLS-SEM modelling by which sub-samples are generated by randomly selecting a case from the dataset (Sultan et al., 2020).

The outcomes of the analyses confirmed the validated measurement models and structural model depicted in Figure 5.5, 5.6.

Table 5.5: Step process of PLS-SEM path model assessment

Stage	Analysis	Analysis
1	Measurement model (outer model)	i- Indicator reliability ii- Internal consistency iii- Test of convergent validity iv. Discriminant validity
2	Structural model (inner model Assessment)	i- Significant path coefficients (β) ii- Significance testing (p-values) iii- Coefficient of determination (R^2):

5.5.1. Assessment of the measurement model

After the data preparation phase is completed, the next step is to analyse the measurement models with reference to reliability and validity of the indicator variables The first step in assessing the PLS-SEM findings is to examine the measurement models with a focus on the outer model that shows the relationships between indicators and constructs. In other words, this is the first step to assess the structural model (Hair et al., 2017). According to Hair et al. (2019a) the relevant assessment undertaken in this stage includes tests of reliability (Section 5.5.1.1) and validity (Section 5.5.1.2). Reliability and construct validity tests were used to evaluate the measurement model using a PLS analysis (Wang et al., 2020). The reflective measurement model analysis tests the reliability and validity of the constructs before the structural model is checked. The findings of the measurement model indicated that all the items exhibited loadings above 0.708 (Hair et al., 2019a). Tables 5.6 a and b provide the relevant details concerning outer model evaluation.

5.5.1.1. Model reliability assessment

This section is about the instruments of reliability test of the measurement model assessment in the first stage. The measures commonly used to assess the model reliability were tested in the PLS algorithm using two measures, which are item reliability and internal consistency reliability (Hair et al., 2017).

5.5.1.1.1. Indicator reliability

The first step in assessing indicator reliability (item reliability) is to measure the indicator loadings. The item reliability indicates the proportion of item variance explained by a latent factor tested using item loadings. As a rule of thumb for indicator reliability, the satisfactory indicator loadings should have at least a value of 0.70 (Hair et al., 2019a) as the recommended value indicates that the constructs are better able to explain more than 50% of the indicator’s variance, resulting in providing acceptable item reliability (Hair et al., 2019a). All loadings were above the threshold value of 0.70 (Chin 1998; Hair et al., 2019a), and ranged from 0.742 to 0.943. Tables 5.6 a and b, present each indicator’s outer loadings which met the threshold criteria of 0.70 and this represents satisfactory indicator reliability.

5.5.1.1.2.Internal consistency reliability

To measure the internal consistency reliability, the widely used two metrics Cronbach's alpha (α) and composite reliability (CR) were observed to show the interrelation of the observed items. As evident in prior research the minimum criteria for Cronbach's α and CR are above or equal to 0.7 (Hair et al., 2019a). However, the higher values indicate higher levels of reliability. For example, Cronbach's α and CR scores between 0.60 and 0.70 are considered "acceptable in exploratory research", and values between 0.70 and 0.90 range from "satisfactory to good" (Chin 1998; Hair et al., 2019a). The CRs ranged from 0.834 to 0.937, which exceeded the recommended threshold value of 0.70 (Chin 1998). The Cronbach's α ranged from 0.707 to 0.930, which exceeded the recommended threshold value of 0.70 (Chin 1998). The measurement model items, and constructs (with their reliability coefficients) presented in Table 5.6a.

Table 5.6a: Constructs/measurement-item with their reliability coefficients and loading

Variable	Measurement Item	Outer loading	Alpha(α)
Moral norm (MN)	MN1: I feel a personal obligation to use green energy to prevent climate change	0.742	0.739
	MN2: My motivation is low, and this would prevent me from adopting green energy	0.845	
	MN3: I feel a strong personal obligation to use green energy	0.839	
Environmental concern (EC)	EC1: I would describe myself as an environmentally responsible person	0.872	0.913
	EC2: When I purchase products, I try to make an effort to buy products that are low in pollutants	0.895	
	EC3: Environmental protection is important to me when making purchases	0.893	
	EC4: I am very concerned about the environment	0.891	
Subjective norm (SN)	SN1: Most people who are important to me think I should protect the environment	0.928	0.820
	SN2: My friends often recommend environment friendly products to me	0.913	
Attitude (AT)	AT1: I have a favorable attitude to purchase green energy	0.816	0.835
	AT2: If I can choose between eco-friendly and conventional products, I prefer eco-friendly ones such as green energy	0.848	
	AT3: I am NOT the kind of person who makes efforts to conserve natural resources	0.767	
	AT4: Science and engineering will solve the environmental problems; therefore, we do not need to change our way of live consuming green energy	0.837	
Perceived behaviour control (PBC)	PBC1: It's easy for me to practice green energy consumption	0.907	0.914
	PBC2: I feel that purchasing green energy is not totally within my control	0.943	
	PBC3: I have resources, time, and willingness to purchase green energy	0.921	
Green promotion (GP)	GP1: I would use green energy over conventional energy if offered at a discount or with other promotional incentives	0.924	0.829
	GP2: I would use green energy over conventional energy if offered at subsidized rate.	0.924	

Variable	Measurement Items	Outer loading	Alpha(α)
Green brand perception (GB)	GB1: With Green Brand I have the feeling of contributing to the well-being of humanity and nature	0.912	0.906
	GB2: With Green Brand, I can demonstrate that I care about environment	0.913	
	GB3: With Green Brand, I can express my environmental concern	0.889	
	GB4: The Green brand represents environmental friendliness	0.817	
Retail Service quality (SQ)	SQ1: My energy provider offers adequate information about anticipated supply interruptions	0.943	0.930
	SQ2: My energy provider offers adequate consultation about how to save energy, safety of home installations, etc.	0.938	
	SQ3: My energy provider offers flexible contracts, adapted to client's specific needs.	0.928	
Purchase Intention (PI)	PI1: I would like to practice green energy consumption	0.920	0.886
	PI2: I would consider purchasing environmentally friendly green energy over conventional energy	0.917	
	PI3: I intend to engage myself more intensively in green energy issues	0.869	
Actual behaviour control (AB)	AB1: I have been buying green energy	0.763	0.707
	AB2: In the last three months, my household consumed green energy.	0.749	
	AB3: I always choose green energy when buying it	0.861	

Table 5.6b: Summary of measurement model assessment

Variable	Item	Outer loading	Alpha(α)	CR	AVE
Moral norm (MN)	MO1	0.742			
	MO2	0.845	0.739	0.851	0.656
	MO3	0.839			
Environmental concern (EC)	EC1	0.872			
	EC2	0.895	0.913	0.937	0.788
	EC3	0.893			
	EC4	0.891			
Subjective norm (SN)	SN1	0.928	0.820	0.917	0.847
	SN2	0.913			
Attitude (AT)	AT1	0.816			
	AT2	0.848	0.835	0.890	0.669
	AT3	0.767			
	AT4	0.837			
Perceived behaviour control (PBC)	PBC1	0.907			
	PBC2	0.943	0.914	0.946	0.854
	PBC3	0.921			
Green promotion (GP)	GP1	0.924	0.829	0.921	0.854
	GP2	0.924			
Green brand perception (GB)	GB1	0.912			
	GB2	0.913	0.906	0.934	0.781
	GB3	0.889			
	GB4	0.817			
Retail Service quality (SQ)	SQ1	0.943			
	SQ2	0.938	0.930	0.955	0.877
	SQ3	0.928			
Purchase Intention (PI)	PI1	0.920			
	PI2	0.917	0.886	0.929	0.815
	PI3	0.869			
Actual behaviour control (AB)	AB1	0.763	0.707	0.834	0.628
	AB2	0.749			
	AB3	0.861			

In Table 5.6a, Cronbach's alpha (α) showed that most of the constructs achieved a value of more than 0.70 which indicates that all the items were reliable. However, in the present study, Cronbach's α values for all the constructs except for the core element of TPB model – the actual behaviour (0.707) related to the Australian sample showed an acceptable level of internal consistencies (see Table 5.6a) value above 0.7, which is considered acceptable. However, it is also noted that Cronbach's α value less than 0.7 could also be expected when investigating psychological constructs (Halder et al., 2016). In some previous studies, low Cronbach's α values were reported for the core constructs of the TPB model (e.g., Donald et al., 2014; Yazdanpanah & Forouzani, 2015; Halder et al., 2016). Although the lower Cronbach's value of the construct –

'behaviour' can be satisfactory in the light of what is acceptable, overall, the level of internal consistencies of the TPB constructs in Australia should be interpreted with caution. However, in our study Cronbach's α were above or equal to 0.7 (Hair et al., 2019a) indicating strong reliability.

Another measure of internal consistency reliability, known as 'composite reliability' (CR), demonstrates that all constructs attained a greater value than the threshold value for CR, i.e., 0.7 (Hair et al., 2019a). As presented in Table 5.6b, the CR values for all the variables were greater than 0.80. This means that the items of all variables were reliable. The range for Cronbach's α from 0.707 to 0.930 and the CR range from 0.851 to 0.955 as highlighted in Table 5.6b where most of the values met the recommended value between 0.60 and 0.70 for Cronbach's α and CR. It can therefore be concluded that the measurements demonstrated adequate internal consistency and reliability in the research model.

5.5.1.2. Model validity assessment

A test of validity is defined as the extent to which a measure precisely exhibits the concept it claims to measure (Roberts & Priest, 2006). The following section presents the instruments of validity test of measurement model assessment through the test of convergent validity and discriminant validity used in this research overall satisfied the requirements (Hair et al., 2019a; Sarstedt et al., 2019).

5.5.1.2.1.Test of convergent validity

The metric used for checking a construct's convergent validity assessment of the measurement model is the average variance extracted (AVE). To calculate convergent validity, the satisfactory AVE value should be 0.50 or higher (Chin, 1998; Hair et al., 2019a). As depicted in Table 5.6, the AVE for latent constructs all ranged from 0.65 to 0.81, which is above the cut-off value of 0.5 as recommended by others (e.g., Hair et al., 2019a). Thus, the measurement model reflected valid convergent validity.

5.5.1.2.2.Test of discriminant validity

The second measurement of the measurement model validity is to evaluate the discriminant validity to test whether the latent variables differ from each other. The metric used for assessing a construct's discriminant validity assessment of the measurement model is through cross-loading, Fornell-Larcker criterion (i.e., square root of AVEs), and a heterotrait-monotrait ratio (HTMT).

5.5.1.2.2.1. Cross-loading matrix

The first metric used in this research to confirm the discriminant validity is the cross-loading matrix (Chin, 1998). For adequate cross-factor loadings to be achieved, the loading of each measurement item on its corresponding variable should be greater than loadings for the other variables in the same model to confirm the discriminant validity (Sultan et al., 2020). In the current research, the outcomes of the cross-loading assessment find that, for each construct, the indicator's outer loading was relatively higher than loadings for the other constructs in the same model, confirming the discriminant validity of the items.

As presented in Table 5.7, bold values were item loadings that are above 0.50 and this indicates that all measurement items have significant construct validity (Tan et al., 2017; Hair et al., 2019a). Results show that discriminant validity was satisfied between all the constructs based on the cross-loadings criterion. Table 5.7 highlights the value of cross-loading each measurement item on their designated constructs higher than loadings for the other constructs.

Table 5.7 Loadings and cross-loadings criterion

	AB	AT	EC	GP	GEB	PI	MN	PBC	SQ	SN
AB1	**0.763**	0.122	0.095	0.510	0.166	0.400	0.622	0.394	0.043	0.221
AB2	**0.749**	0.138	0.013	0.359	0.038	0.288	0.418	0.227	0.067	0.154
AB3	**0.861**	0.245	0.009	0.550	0.100	0.428	0.558	0.299	0.091	0.225
AT1	0.202	**0.816**	0.158	0.149	0.306	0.229	0.201	0.107	0.035	0.016
AT2	0.189	**0.848**	0.193	0.148	0.256	0.264	0.219	0.120	0.111	0.088
AT3	0.131	**0.767**	0.193	0.161	0.262	0.211	0.149	0.118	0.002	0.091
AT4	0.176	**0.837**	0.439	0.113	0.216	0.295	0.194	0.184	0.059	0.115
EC1	0.010	0.282	**0.872**	-0.039	0.003	0.095	0.030	0.052	0.010	0.025
EC2	0.046	0.269	**0.895**	0.000	0.048	0.128	0.049	0.117	0.001	0.036
EC3	0.048	0.296	**0.893**	0.054	0.003	0.172	0.095	0.120	0.041	0.052
EC4	0.554	0.167	**0.891**	0.048	0.024	0.164	0.098	0.066	0.034	0.060
GP1	0.576	0.150	0.083	**0.924**	0.217	0.568	0.554	0.419	0.094	0.270
GP2	0.116	0.286	0.034	**0.924**	0.200	0.545	0.464	0.389	0.090	0.194
GEB1	0.122	0.270	0.015	0.200	**0.912**	0.251	0.139	0.133	0.063	0.020
GEB2	0.116	0.273	0.014	0.205	**0.913**	0.270	0.122	0.134	0.043	0.021
GEB3	0.135	0.282	0.039	0.181	**0.889**	0.231	0.150	0.127	0.037	0.070
GEB4	0.454	0.303	0.017	0.214	**0.817**	0.212	0.145	0.144	0.002	0.069
PI1	0.415	0.261	0.246	0.494	0.259	**0.920**	0.448	0.526	0.138	0.413
PI2	0.431	0.273	0.175	0.552	0.232	**0.917**	0.455	0.496	0.162	0.430
PI3	0.433	0.179	0.019	0.587	0.252	**0.869**	0.414	0.423	0.190	0.316
MN1	0.654	0.250	0.107	0.316	0.104	0.398	**0.742**	0.192	0.150	0.158
MN2	0.559	0.130	0.132	0.559	0.152	0.438	**0.845**	0.254	0.065	0.252
MN3	0.383	0.150	0.044	0.431	0.118	0.343	**0.839**	0.169	0.102	0.159

	AB	AT	EC	GP	GEB	PI	MN	PBC	SQ	SN
PBC1	0.380	0.143	0.122	0.317	0.087	0.456	0.215	**0.907**	0.012	0.251
PBC2	0.344	0.166	0.113	0.443	0.177	0.516	0.259	**0.943**	0.006	0.257
PBC3	0.106	0.067	0.051	0.448	0.153	0.507	0.236	**0.921**	0.035	0.218
SQ1	0.045	0.058	0.047	0.092	0.033	0.178	0.143	0.010	**0.943**	0.135
SQ2	0.080	0.059	0.030	0.093	0.038	0.160	0.093	0.031	**0.938**	0.128
SQ3	0.209	0.140	0.003	0.095	0.045	0.168	0.111	0.010	**0.928**	0.090
SN1	0.269	0.035	0.095	0.195	0.048	0.411	0.223	0.245	0.109	**0.928**
SN2	0.018	0.266	0.003	0.271	0.041	0.377	0.218	0.237	0.123	**0.913**

LEGEND: AB-Actual behaviour; AT-Attitude; MN-Moral norm; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail service quality; PI-Purchase intention; AB-Actual behaviour control

5.5.1.2.2.2. Fornell-Larcker criterion (square root of AVEs)

The second metric used for assessing a construct's discriminant validity is the Fornell–Larcker criterion (Fornell & Larcker, 1981) where the square root of the average variance extracted (AVE) is compared (should be higher) with the coefficient of the correlation values of a paired construct (Hair et al., 2017; Sultan et al., 2020). Results of the comparison find that the square root of the AVEs of all constructs in the diagonals matrix were higher (values in bold are the diagonal elements in Table 5.8) than the off-diagonal elements (i.e., the correlation of the same construct with other constructs); thus, all the analysed latent constructs confirmed the discriminant validity in the research model. To do this comparison, Table 5.8 shows the square root of AVE (highlighted in bold) and the correlations between the latent constructs. It describes that the square root of AVE of each construct (see diagonally) is higher than its correlation with other variables (the off-diagonal numbers), thereby satisfying this test of discriminant validity. The results displayed in Table 5.8 clearly indicate that the discriminant validity of the latent constructs is satisfactory (Fornell & Larcker, 1981).

Table 5.8: Squared root of AVE & correlation between constructs of measurement model

*The bolded diagonal elements are the square root of the AVE scores

	AT	EC	GB	GP	MN	PBC	AB	PI	SQ	SN
AT	**0.818**									
EC	0.314	**0.888**								
GB	0.313	0.006	**0.884**							
GP	0.171	0.027	0.226	**0.924**						
MN	0.235	0.083	0.156	0.550	**0.810**					
PBC	0.165	0.103	0.152	0.437	0.257	**0.924**				
AB	0.214	0.038	0.137	0.611	0.688	0.399	**0.792**			
PI	0.309	0.164	0.274	0.602	0.487	0.534	0.480	**0.903**		
SQ	0.066	0.027	0.041	0.100	0.125	0.011	0.083	0.181	**0.936**	
SN	0.098	0.052	0.049	0.252	0.240	0.262	0.258	0.429	0.126	**0.020**

LEGEND: AB-Actual behaviour; AT-Attitude; MN-Moral norm; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail service quality; PI-Purchase intention; AB-Actual behaviour control

5.5.1.2.2.3. Heterotrait-monotrait ratio – HTMT

The third metric used to confirm a construct's discriminant validity was done by assessing the heterotrait-monotrait (HTMT) ratio, a new approach used to evaluate discriminant validity (Henseler et al., 2015; Ting et al., 2019; Wang et al., 2020). The threshold value of HTMT suggested by Henseler et al. (2015) and Hair et al. (2019a) is 0.90. More specifically, the researchers recommend that the HTMT values of the constructs should be a lower threshold value such as 0.85 or 0.90 (i.e., HTMT scores above 0.90 mean that discriminant validity is not present in the structural model). The current result shows that none of the HTMT values of the constructs exceeded 0.90, so this reconfirmed discriminant validity. Table 6.9 highlights that the discriminant values do not violate the threshold value of HTMT.90 (Henseler et al., 2015, Hair et al., 2019a).

Table 5.9: Heterotrait-monotrait ratio (HTMT)

	AT	EC	GB	GP	MN	PBC	AB	PI	SQ	SN
AT										
EC	0.342									
GEB	0.367	0.037								
GP	0.210	0.076	0.261							
MN	0.291	0.141	0.189	0.686						
PBC	0.185	0.109	0.166	0.501	0.308					
AB	0.274	0.077	0.160	0.778	0.314	0.480				
PI	0.355	0.184	0.305	0.704	0.599	0.592	0.592			
SQ	0.074	0.035	0.048	0.114	0.156	0.033	0.102	0.199		
SN	0.130	0.074	0.059	0.307	0.301	0.302	0.332	0.501	0.144	

LEGEND: AB-Actual behaviour; AT-Attitude; MO-Moral norm; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail service quality; PI-Purchase intention

5.5.1.3. Summary of assessing of the measurement model

The discussion above based on the measurement model found that reliability testing with CR produced values ranging from 0.851 to 0.955, all higher than the cut-off value of 0.7 as suggested by Hair et al. (2019a). Cronbach's α values fall in the 0.707–0.930 range, most of which are more than the value of 0.6 as suggested by Hair et al. (2019a). The AVE value (0.50) assessed the convergent validity while the Fornell-Larcker criterion (AVEs of all constructs in the diagonals matrix) and HTMT (cut off 0.90) assessed the discriminant validity. So, the overall measurement model exhibited standard reliability and validity, and each variable is consistent and is distinctive from the others. Table 5.6b depicts the summary of all the constructs or factors along with their respective measurement items in the first phase of the analysis.

5.5.2. Assessment of the structural model

This section is concerned with the structured model and the major processes required to evaluate it. The structural model (inner model) is the second required step to analyse the proposed model. The following sections provide further details on the structural model evaluation following the discussion of two phases:

Phase 1: Assessing the validity of the structural model by checking convergence and multicollinearity (i.e., collinearity issue assessment) discussed in Sections 5.5.2.1 and 5.5.2.2, respectively.

Phase 2: The structural model analysis that specifies the causal relationships between constructs in the research model (i.e., path coefficients, the coefficient of determination, assessment of effect size (Hair et al., 2017, 2019; Tang et al., 2019). To establish valid and reliable scales for each of the research constructs and to determine the causal relationships among them, this study uses PLS-SEM as suggested by other researchers (e.g., Hair et al. (2017, 2019a; Sultan et al., 2020). The key assessment undertaken here is to evaluate the structural model (Chen, 1998; Hair et al., 2019a) where the following the criteria are critical:

- Assessing structural path analysis with path coefficients and significance testing as the basis for hypothesis testing (Section 5.5.2.3)
- Coefficients of determination evaluation and model fit (5.5.2.4)
- Assessment of effect size (5.5.2.5)

The discussion of each criterion for the evaluation of the validity of the structural model previously summarised is in Chapter 4, Table 4.10.

5.5.2.1. Checking for convergence

In the first phase of the structural model assessment, the convergence when the PLS algorithm had been run and completed, was checked. Although convergence is often an important assessment of a PLS algorithm, coefficients in the output could be unreliable if the solution fails to converge (Garson, 2016). Table 5.10 shows that convergence was reached only after seven iterations. Hence, the model estimation was good. So, there was no violence of convergence, and coefficients in output were reliable for the purposes of this research.

5.5.2.2. Collinearity issue assessment

Before assessing the structural model, it is important to ensure there are no problems associated with full collinearity between the constructs (Ting et al., 2019). According to researchers (Kock & Lynn 2012; Hair et al., 2019), even if the criteria of discriminant validity are met, lateral collinearity issues (e.g., predictor-criterion collinearity) may demonstrate misleading findings as they can weaken the strong causal effects shows in the research model. Collinearity in the context of PLS-SEM model evaluation can help to detect whether two or more research variables are highly correlated within the model or not (Hair et al., 2017; Cepeda-Carrion et al., 2019). As such, in this research full collinearity assessment as an effective alternative has been attempted.

To detect and assess the collinearity issue, variance inflation factors (VIF) were used (Hair et al., 2012). As a rule of thumb, ideally the values of tolerance and VIF should pass the thresholds if close to three or lower (Hair et al., 2019a). Notably, the variance inflation values of five or above indicate critical collinearity issues exist among the indicators of formatively measured constructs (Hair et al., 2019a). In the current research the VIF scores for each individual construct are below the threshold value of three, implying there is no potential collinearity in the structural model. In other words, the VIF values in the current research ranged between 1.00 and 1.9, indicating that the outcome of the structural model is not negatively affected by collinearity. Again, Table 5.11 presents that VIFs of all latent constructs are lower than five, which signals no potential collinearity issues with the structural model. Consequently, the constructs included in the research model aiming to predict consumers' intention and behaviour were not correlated and accordingly no variables had to be eliminated from the conceptual model.

5.5.2.3. Structural path analysis

Structural path analysis is the basis of hypothesis testing in this research. The assessment of the structural model makes it possible to evaluate several paths in the research model (Wong, 2013; Sarstedt et al., 2019). All the structural paths represent the hypotheses proposed. After examination of the path estimates of the structural model the study finds that the acceptance (confirmation) or rejection (disconfirmation) of each research hypothesis can be done by examining the path coefficients, p-values and t-values.

The present study aimed to predict the impact of all exogenous constructs in the research model on buying behaviour with reference to green energy products. This means measuring not only the effect of each construct but also comparing their impact with that of other constructs. Therefore, the structural path analysis was performed to:

- Find path coefficients to confirm or disconfirm each of the research hypotheses (i.e., path coefficients in Section 5.5.2.3.1)
- Compare the unique contribution that each of the independent factors makes in predicting the dependent variables (i.e., significance testing in Section 5.5.2.3.2)

Table 5.10: Checking for convergence

	Iteration 0	Iteration 1	Iteration 2	Iteration 3	Iteration 4	Iteration 5	Iteration 6	Iteration 7
AB1	0.420	0.485	0.485	0.485	0.485	0.485	0.485	0.485
AB2	0.420	0.485	0.485	0.485	0.485	0.485	0.485	0.485
AB3	0.420	0.485	0.485	0.485	0.485	0.485	0.485	0.485
AT1	0.306	0.280	0.280	0.280	0.280	0.280	0.280	0.280
AT2	0.306	0.280	0.280	0.280	0.280	0.280	0.280	0.280
AT3	0.306	0.280	0.280	0.280	0.280	0.280	0.280	0.280
AT4	0.306	0.280	0.280	0.280	0.280	0.280	0.280	0.280
EC1	0.281	0.190	0.191	0.191	0.191	0.191	0.191	0.191
EC2	0.281	0.257	0.258	0.258	0.258	0.258	0.258	0.258
EC3	0.281	0.257	0.258	0.258	0.258	0.258	0.258	0.258
EC4	0.281	0.257	0.258	0.258	0.258	0.258	0.258	0.258
GB1	0.283	0.294	0.294	0.294	0.294	0.294	0.294	0.294
GB2	0.283	0.294	0.294	0.294	0.294	0.294	0.294	0.294
GB3	0.283	0.294	0.294	0.294	0.294	0.294	0.294	0.294
GB4	0.283	0.294	0.294	0.294	0.294	0.294	0.294	0.294
GP1	0.541	0.539	0.541	0.541	0.541	0.541	0.541	0.541
GP2	0.541	0.539	0.541	0.541	0.541	0.541	0.541	0.541
PI1	0.369	0.373	0.374	0.374	0.374	0.374	0.374	0.374
PI2	0.369	0.373	0.374	0.374	0.374	0.374	0.374	0.374
PI3	0.369	0.373	0.374	0.374	0.374	0.374	0.374	0.374
MN 1	0.411	0.360	0.355	0.354	0.354	0.354	0.354	0.354
MN 2	0.411	0.360	0.355	0.354	0.354	0.354	0.354	0.354
MN 3	0.411	0.360	0.355	0.354	0.354	0.354	0.354	0.354
PBC 1	0.361	0.347	0.348	0.348	0.348	0.348	0.348	0.348
PBC 2	0.361	0.347	0.348	0.348	0.348	0.348	0.348	0.348
PBC 3	0.361	0.347	0.348	0.348	0.348	0.348	0.348	0.348
SQ1	0.356	0.375	0.376	0.376	0.376	0.376	0.376	0.376
SQ2	0.356	0.375	0.376	0.376	0.376	0.376	0.376	0.376
SQ3	0.356	0.375	0.376	0.376	0.376	0.376	0.376	0.376
SN1	0.543	0.566	0.566	0.567	0.567	0.567	0.567	0.567
SN2	0.543	0.566	0.566	0.567	0.567	0.567	0.567	0.567

LEGEND: AB-Actual behaviour; AT-Attitude; MN-Moral norms; EC-Environmental concerns; SN-Subjective norms; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail service quality; PI-Purchase intention; AB-Actual behaviour control

Table 5.11: Collinearity assessment (inner VIF values)

	AT	EC	GB	GP	MN	PBC	AB	PI	SQ	SN
AT								1.295		
EC								1.130		
GB								1.145		
GP							1.881			
MN							1.525	1.168		
PBC							1.449	1.151		
AB										
PI				1.000			1.944			
SQ								1.030		
SN								1.125		

LEGEND: AB-Actual behaviour; AT-Attitude; MO-Moral norms; EC-Environmental concerns; SN-Subjective norms; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail service quality; PI-Purchase intention; AB-Actual behaviour control

5.5.2.3.1.Relevance of the significant path coefficients (β)

This section presents the results of path coefficients for each of the hypothesised relationships between all the constructs tested in the structural model. According to Hair et al. (2017, 2019), standard values of beta value (β) between +1 (i.e., strong positive correlation) and -1 (i.e., strong negative correlation) are usually statistically significant. In contrast, scores near zero refer to weaker relationships and are typically non-significant. Cohen (1992) recommended a path coefficient less than 0.15 is considered to be weak, while a value ranging from 0.15 to 0.45 is considered to be moderate, and a value more than 0.45 is considered to be strong. PLS algorithm is used to estimate the path coefficient or beta value (β) indicating the strength of each path in the structural model. The bootstrapping technique with a re-sampling of 2000 estimates the significance of the path coefficient (Sultan et al., 2020). In the present research, only the (β) value from 0.1 and above ($\beta > 0.1$) was reported as the significance level. Figure 5.5 depicts the path coefficients employed in the research model.

5.5.2.3.2.Significance testing

To test the significance of both the structural and measurement models, bootstrapping was performed to find the T-statistics. In Smart-PLS, the statistical significance (or insignificance) of each hypothesis or path can be evaluated by applying a bootstrapping analysis (Chin 1998; Hair et al., 2019). T-statistics indicates whether the path coefficients of the hypothesised model are significant (Chin, 1998).

As a rule of thumb (two-tailed test), the t values larger than 2.58 for 1% level of significance or $P < 0.01$ and larger than 1.96 for 5% level of significance or $P < 0.05$ indicate significant path coefficients (Hair et al., 2010; Hair et al., 2011; Wong, 2013). In order to accept the proposed research hypotheses (H1-H20) in the structural model, the path coefficient among dependent and independent variables should be significant. The results of path assessment (β, t-value, and P-value) were used to validate or reject a hypothesis. They are also applied in discovering the link among independent and dependent constructs. In this study, reports on direct effects, indirect effects, and total effects of independent variables on dependent variables were generated using Smart-PLS 3.0.

Table 5.12 summarises the direct effects while Table 5.13 shows the indirect path coefficients effects of independent variables on dependent variables.

5.5.2.3.2.1. Direct path and the significance level

In relation to direct effects, Tables 5.12 and Fig 5.2 show that twelve linkages with attitude ——> green energy purchase intention (GPI), subjective norm ——> GPI, perceived behavioural control (PBC) ——> GPI, environmental concern ——> GPI, moral norm ——> GPI, green brand perception ——> GPI, retail service quality ——> GPI, moral norms ——> green energy buying behaviour (GEB), PBC ——> GEB, green promotion ——> GEB, GPI ——> green promotion are significant at T-statistics of above 1.96 accept intention-behaviour, below 1.96 that is 0.244. The eleven direct path coefficients of aforementioned linkages are statistically significant while the remaining links are not.

In sum, PLS-SEM revealed that eleven out of twelve direct hypotheses were supported by significant relationships at $p = 0.001$ and $p = 0.005$ levels. Noticeably, green energy purchase intention was found to be negative and insignificant ($\beta = -0.013$, t value of 0.244 or $p>0.05$). Figures 5.5 (a, b) present the results of the PLS path analysis for structural model assessment. All the hypothetical relationship discussed in Section 5.7 and results are further discussed in Chapter 6.

Table 5.12: Direct path coefficients (inner model)

Direct path coefficient	Path coefficient	Standard Deviation	T Statistics	P Values
1. Attitude -> Purchase Intention	0.096	0.047	2.046	0.041
2. Environmental Concern -> Purchase Intention	0.060	0.028	2.110	0.035
3. Green Brand Perception -> Purchase Intention	0.131	0.044	2.988	0.003
4. Green Promotion -> Actual Behaviour	0.273	0.050	5.518	0.000
5. Moral norm -> Actual Behaviour	0.504	0.045	11.255	0.000
6. Moral norm -> Purchase Intention	0.278	0.056	4.973	0.000
7. Perceived Behavioural Control -> Actual Behaviour	0.168	0.046	3.747	0.000
8. Perceived Behavioural Control -> Purchase Intention	0.358	0.060	5.959	0.000
9. Purchase Intention -> Actual Behaviour	-0.013	0.055	0.244	0.807
10. Purchase Intention -> Green Promotion	0.602	0.048	12.444	0.000
11. Retail Service Quality -> Purchase Intention	0.099	0.044	2.282	0.023
12. Subjective Norm -> Purchase Intention	0.237	0.049	4.842	0.000

5.5.2.3.2.2. Indirect path and significant level

In terms of indirect effects, Table 5.13 indicates that all the seven indirect linkages (1) attitude –> purchase intention –> actual behaviour; (2) environmental concern –> purchase intention –> actual behaviour; (3) green brand perception –> purchase intention –> actual behaviour; (4) moral norm –-> purchase intention –> actual behaviour; (5) perceived behavioural control –> purchase intention –> actual behaviour; (6) retail service quality –> purchase intention –> actual behaviour (7) subjective norm –> purchase intention –> actual behaviour are insignificant at p-values > 0.05 with negative path coefficients (β). Therefore, it can be said that all seven indirect path coefficients are statistically insignificant.

The results imply that attitude, subjective norm, perceived behavioural control, environmental concern, moral norm green brand perception, and retail service quality betrayed negative correlations. They do not exert indirect effects on GEB through behavioural purchase intention (BI). Notably, the mediation effect of green promotion on the relationship between consumers' behavioural intentions and buying behaviour regarding green energy (H20) were found to be positive reported in Section 5.7.2.2.

Table 5.13: Indirect path coefficient (inner model)

Indirect path coefficient	Path coefficient	Standard Deviation	T Statistics	P Values
1. Attitude -> Purchase Intention -> Actual Behaviour	-0.001	0.006	0.216	0.829
2. Environmental Concern -> Purchase Intention -> Actual Behaviour	-0.001	0.004	0.215	0.830
3. Green Brand Perception -> Purchase Intention -> Actual Behaviour	-0.002	0.008	0.229	0.819
4. Moral norm -> Purchase Intention -> Actual Behaviour	-0.004	0.016	0.236	0.813
5. Perceived Behavioural Control -> Purchase Intention -> Actual Behaviour	-0.005	0.020	0.242	0.809
6. Retail Service Quality -> Purchase Intention -> Actual Behaviour	-0.001	0.006	0.230	0.818
7. Subjective Norm -> Purchase Intention -> Actual Behaviour	-0.003	0.013	0.242	0.809

5.5.2.4. Coefficient of determination (R^2)

R-square values demonstrate the variance reported in the dependent variables of the structural model (Rigdon, 2012; Sultan et al., 2020). Evaluating the structural model makes it possible to assess its predictive power. Hair et al. (2012, 2019) suggested the R^2 value of 0.75 is considered as substantial, values of approximately 0.50 as moderate, while values of 0.25 and lower are considered weak. Hence, a higher value increases the structural model's greater explanatory or predictive power.

In the current research, the PLS-SEM function was performed to calculate the R^2 for the dependent variable intention and behaviour. One of the goals of this analysis was to examine the collective ability of the independent variables, namely attitude, subjective norm, behavioural control, environmental concern, moral norm, green perceived brand, retail service quality and green promotion to explain variances in green energy purchase intention (GPI) and actual behaviour when purchasing green energy.

The findings illustrate that the total predicted R^2 for intention to adopt is 0.521, which indicates that 52% of the variance in individual intention to purchase green energy is explained by its independent variables (attitude, subjective norm, behavioural control, environmental concern, moral norm, green perceived brand, retail service quality and green promotion). For behaviour (i.e., green energy buying behaviour-GEB) it explains 57% of variance occurring in the independent constructs. As shown in Table 5.14, the current study finds the R^2 values of the dependent variables (i.e., intention and behaviour) fall within the moderate range of explanatory power (Chin, 1998; Hair et al., 2012, 2019a).

The research also examined was whether green promotion mediates the intention-behaviour relationship. There was a significant contribution of green promotion, in the prediction of purchase intentions and actual behaviour, suggesting full mediation. The coefficient of determination R^2 is 0.363 for the mediator variable green promotion. This result means that 36% of total variance of green promotion can be explained by intention and behaviour. The discussion regarding the R^2 for the endogenous construct represents a measure of the model's predictive accuracy further discussed in Section 6.2.2.

Table 5.14: R-square of the structural model

	R Square	R Square Adjusted
Actual behaviour	0.570	0.566
Purchase intention	0.521	0.512

5.5.2.4.1.Assessment of model fit

The tests of model fit are an important way to discriminate between well-fitting and ill-fitting models (Henseler et al., 2014). The PLS path modelling results can be evaluated in two ways: local model fit – the measurement models and the structural model and global model fit, that is the overall model fit or approximate model fit (Henseler et al., 2016). Dijkstra and Henseler (2014) confirm that misspecification of both the measurement and structural model can be identified via the tests of model fit. The above sections (5.5.1 and 5.5.2) discussed local model fit (i.e. assessment of the measurement model and evaluation of the structural model). This section aims to test the global model fit (overall model fit / approximate model fit) of the structural model. In other words, this section aims to measure the most fundamental indication of how well the proposed research model fits the data.

The global model fit (overall model fit / approximate model fit) can be assessed in two ways: (1) inference statistics, and (2) fit indices, i.e., assessment of approximate model fit (Henseler et al. (2016). We follow the approximate model fit assessment approach. The approximate model fit, or overall model fit criteria helps to explain the question about how substantial the discrepancy is between the model-implied and the empirical correlation matrix (Henseler et al., 2013; 2016). The model 'fit' can be assessed using several model fitting parameters (include normed fit index (NFI), Chi-square value, (i.e., the squared Euclidean distance) and standardised root mean square residual (SRMR). The model fit also can be checked by the coefficient of determination (R^2) as discussed in Section 5.5.2.4.

In this study to evaluate that for model fit testing, the Goodness of Fit (GoF) index for PLS-SEM was not employed. Since PLS is not a co-variance SEM, having limited applicability in certain model set-ups, GoF is not recommended (Hair et al., 2017; Esfandiar et al., 2020). The model 'fit' was ensured by the SRMR as an alternative means. The following sections examine the test of the global model fit (overall model fit / approximate model fit) of the structural model based on the SRMR.

The standardised root mean square residual (SRMR) value is the most approximate model fit criterion implemented for PLS-SEM path modelling as a goodness-of-fit measure for PLS-SEM (Hu & Bentler, 1998, 1999; Henseler et al., 2016; Ting et al., 2019; Hair et al., 2019a). The model fitting parameter the SRMR value suggested by researchers (Chen, 2007; Henseler et al., 2015; Ting et al., 2019) as a goodness of fit measure for PLS-SEM that can be used to avoid model misspecification. Hair et al. (2019a) and Shi et al. (2020) recently suggested the measure of SRMR should be considered for goodness of-fit for PLS-SEM which can produce more accurate tests of close fit and confidence intervals. The SRMR can be described as the variations between the observed correlation and the model, suggesting that correlation matrix values lower than 0.08 (Hu & Bentler, 1998) are accepted to be a good fit. The cut-off value of 0.08 as suggested by Hu and Bentler (1999) seems to be more satisfactory for the PLS path models. The standardised root mean square residual value of the current research model is 0.059, which is<0.08. It means that all datasets satisfy the requirements for goodness of-fit and thus appear to approximate model fit. Below, Table 5.15 presents the outcomes of the SRMR as a goodness-of-fit measure for PLS-SEM. The complete dataset shows a value of 0.059, indicating that all datasets satisfy the requirements for goodness of- fit (Hu & Bentler, 1999; Hair et al., 2019a).

Table 5.15: Model fit parameters

Model fitting parameters	Saturated Model	Estimated Model
SRMR	0.059	0.065
d_ULS	1.753	2.125
d_G1	1.051	1.099
Chi-Square	2,624.506	2,674.658
NFI	0.708	0.702

5.5.2.5. Assessment of effect size (f^2)

The size of the f2 measures how the removal of a certain predictor construct affects a dependent construct's R-square value (Hair et al., 2019a). The f2 size is a criterion which should be assessed during the process of evaluating a structural model using Cohen's f2 (Cohen, 2013; Asadi et al., 2019). As a rule of thumb, interpreting the effect size values f2 > 0.02, f2 > 0.15, and f2 > 0.35 depict small, medium and large f2 effect sizes (Cohen, 2013; Hair et al., 2019). Based on the estimating approach of f2 size suggested by Cohen (2013) and one suggested by Hair et al. (2019), the outcomes of the f2 size analyses are depicted in Table 5.16.

Considering green energy purchase intention (GPI) as a dependent construct, the results for effect size revealed that – among the factors affecting the intention to purchase green energy – perceived behavioural control ($f = 2.32$), moral norms ($f = 1.38$) had a larger effect size, green brand perception ($f = 0.031$), retail service quality ($f = 0.020$) had a medium effect size, while the other factors had only a small effect. Noticeably, when estimating the path coefficients (β), perceived behavioural control emerged as the most significant predictor of green energy purchase intention – GPI ($\beta = 0.358$, $p<0.01$ or $p = 0.000$) followed by moral norm ——$>$ GPI ($\beta = 0.278$, $p<0.01$ or $p = 0.000$). This correlates with results for f2 size.

Further, considering green energy buying behaviour (GEB) as the dependent construct (direct effect), moral norms ($f = 0.387$), perceived behavioural control ($f=0.040$) had larger effect size and green promotion had a small effect size ($f = 0.092$). The findings regarding moral norms reflect the same results when estimating the path coefficients (β) reported; moral norms were the most significant predictor of GEB. In the intention-behaviour relationship, the results for effect size shows that green energy purchase intention wielded no effect on the dependent variable buying behaviour ($f = 0.000$). This is not surprising because the PLS-SEM-based statistical analysis reveals that the path from buying intention to buying behaviour of green energy was negative and not significant ($\beta = -0.013$, p value of 0.807) as presented in Section 5.7. Finally, considering green promotion as a mediator between intention and behaviour, green promotion had a larger effect size ($f = 0.569$) which correlates with the findings where perfect or complete mediation is reported in the relationship between green energy purchase intention and buying behaviour (discussed in Chapter 6).

Table 5.16: The results of effect size (f^2)

Constructs	Actual behaviour	Green promotion	Green energy purchase intention
Attitude			0.015
Environmental Concern			0.007
Green Brand Perception			0.031
Green Promotion	0.092		
Moral norm	0.387		0.138
Perceived Behavioural Control	0.040		0.232
Purchase Intention	0.000	0.569	
Retail Service Quality			0.020
Subjective Norm			0.104

5.5.2.6. Summary of assessing of the structural model

The discussion above (Section 5.5.2) validated the structural model by checking convergence, checking multicollinearity, assessing the structural path analysis (include significant path coefficients (β) and significance testing), coefficients of determination evaluation and assessment of effect size. Checking convergence, the study concluded there was no violence of convergence, and coefficients in output were reliable. Assessing the variance inflation factors (VIF) of all latent variables (lower than five), the study found no potential collinearity problems with the structural model. The (β) value from 0.1 and above ($\beta > 0.1$) was reported to be a significant level.

To summarise, in the section on significance testing (5.5.2.3.2) all analyses relating to the structural path coefficients presented in Table 5.12 reflect the T-statistics and P values of all direct hypothesised paths. The results shown in Table 5.17 which are consolidated from Tables 5.12 and 5.13 demonstrate that eleven out of 19 (12 direct and seven indirect) path coefficients of the structural model are significant.

In comparison among all the constructs in their path, perceived behavioural control was found to be the most significant predictor of green energy purchase intention – GPI ($\beta = 0.358$, $p<0.01$ or $p = 0.000$), followed by moral norm ——> GPI

(β = 0.278, $p<0.01$ or p = 0.000), subjective norm ——> GPI (β = 0.237, $p<0.01$ or p = 0.00), green brand perception——> GPI (β = 0.131, $p<0.01$ or p = 0.003), retail service quality——> GPI (β = 0.099, $p<0.05$ or p =0.023), attitude——> GPI (β = 0.096, $p<0.05$ or p = 0.041) and environmental concern——> GPI (β = 0.060, $p<0.05$ or p = 0.035). Although most of the psychological predictors reach significance with green energy purchase intention, in the current research model, intention was not a mediator between attitude, social reference, behavioural control, environmental concern, moral norm, green perceived brand, retail service quality and actual buying behaviour. However, the study reports the full mediation of green promotion between intention and behaviour that are proposed in the conceptual model (see Section 5.7.2.2).

In terms of the coefficient of determination (R-square), the findings illustrate that the total predicted R^2 for intention to adopt is 0.521, which means that 52% of the variance in individual intention to purchase green energy is explained by independent variables (attitude, subjective norm, behavioural control, environmental concern, moral norm, green perceived brand, retail service quality and green promotion). Finally, behaviour (i.e., green energy buying behaviour – GEB) explains 57% of the variance of the independent constructs.

The outcome of the effect size (f^2) clearly explains the underlying composition and determinants of green energy buying in Australia. Results of effect size (f2) reveal that green energy purchase intention by Australian households is more affected by perceived behavioural control (f = 2.32), moral norm (f = 1.38) than other factors. Green energy buying is more affected by moral norms (f = 0.387), perceived behavioural control (f = 0.040) and green promotion (f = 0.569) than other predictors.

Table 5.17: Significance level for all paths

Dependent variables	Effcet of Independent variables	Path Coefficients	T-Statistics	Significant levels
Green energy purchase intention (GPI)	←Attitude	0.096	2.046	*
	←Subjective norm	0.237	4.842	**
	←Behavioural control	0.358	5.959	**
	←Environmental concern	0.060	2.110	*
	←Perceptions of green brand	0.131	2.988	**
	←Retail service quality	0.099	2.282	*
	←Moral norm	0.277	4.911	**
Green promotion	←Green energy purchase intention (GPI)	0.602	12.4444	**
Green energy buying behaviour (GEB)	←Moral norm	0.504	11.255	**
	←Behavioural control	o.157	3.396	**
	←Green promotion	0.273	5.518	**
	←Purchase intention	-0.013	0.244	N/S

*Note: **p<0.01, * p <0.05, N/S (not significant) at 0.05 level. t values larger than 2.58 for the 1% level of significance or P < 0.01 and larger than 1.96 for the 5% level of significance or P < 0.05 indicate significant path coefficients (Hair et al., 2010; Hair et al., 2011; Wong, 2013; Hassan, 2014).*

5.6. Phases of the structural model analysis

This section analyses the phases of our structural model including the original TPB model, extended model with additional constructs and the mediation model (proposed model). These were tested consecutively. The widely used PLS-SEM statistical approach was utilised for the analysis (Hair et al., 2017, 2019). The hypotheses for these models were confirmed by examining the path coefficients, p-values and t-value which were obtained from the output of the bootstrapping method using 2000 samples (Sultan et al., 2020) in the 95% confidence interval. Multiple analyses were conducted. First, validation of the core TPB model, then, validation of the second model and finally, evaluation of the full theoretical model incorporating the mediator-green promotion (Figures 5.3 a, b). The results of each estimate of the path parameter for all three models (TPB, extended TPB and mediator TPB) can be compared in Table 5.18. The following section portrays an evaluation of three versions of the model and reveals how it could be the suitable appraisal about understanding the green energy buying behaviour, indicating how consumers believe purchasing green energy to be easy or difficult.

5.6.1. Model Phase 1: Original TPB model

In the original TPB model, the salient constructs of the TPB (attitude, subjective norm, and perceived behavioural control) were found to wield a significant and positive influence on the purchase intention (Ajzen, 1991). The partial least squares (PLS) based statistical analysis reveals that the path from buying intention to buying behaviour of green energy was positive and significant ($\beta = 0.375$, p value of 0.000). In the original TPB (see Figures 5.1, 5.2), PBC was identified as the most important determinant of intention, followed by subjective norm and then attitude. In terms of model variance, the results of the original TPB model reveal that the three antecedent variables included in this model can explain that the variance on one's intention to purchase green energy is 42% and 26% of the variance in buying behaviour, respectively. The results verify that the components of the TPB model can influence one's intention to consume and purchase green energy as expected. However, this research modified, and validated a model originating from the TPB to understand a

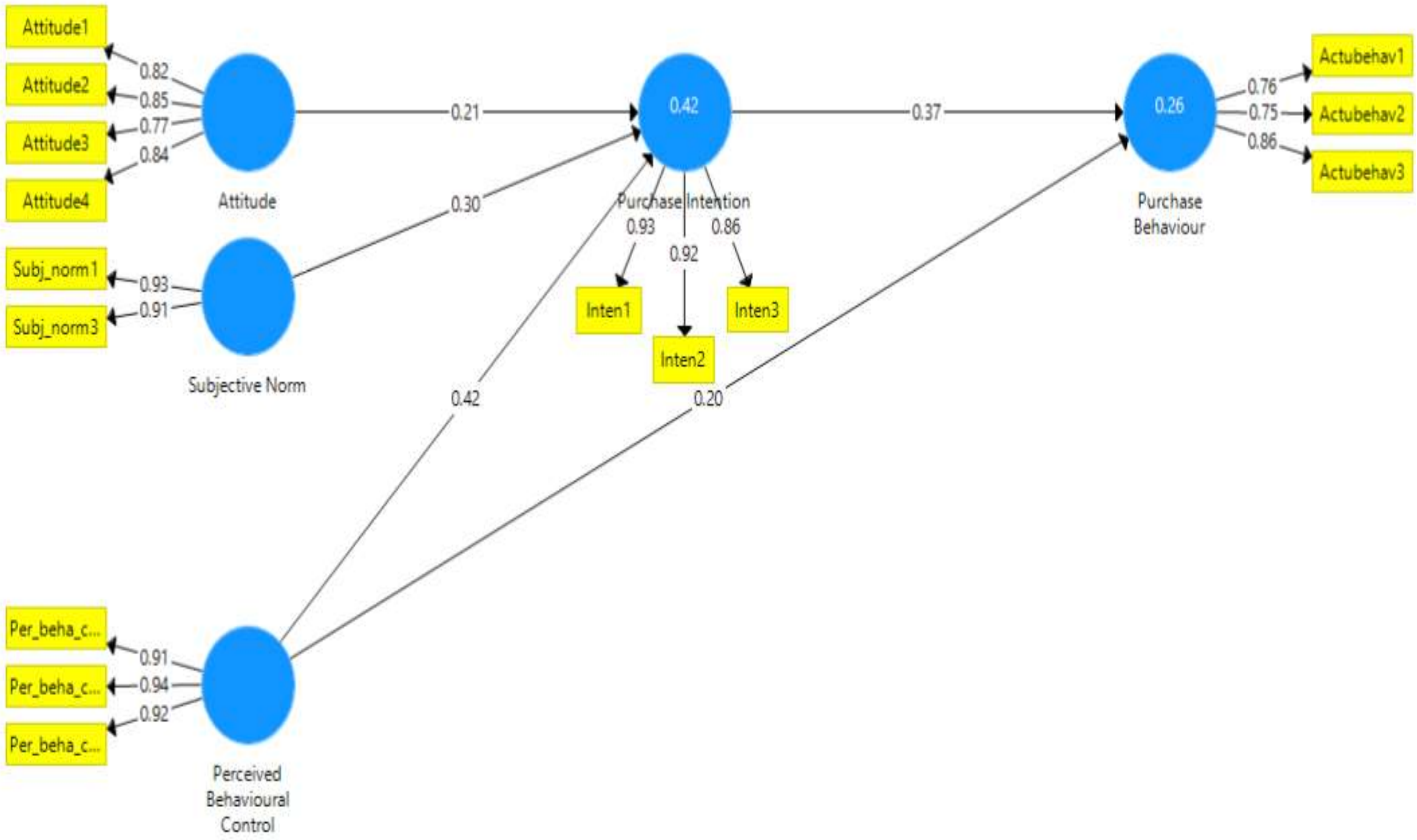


Figure 5.1: TPB model outcome with outer loading, path coefficients and R^2

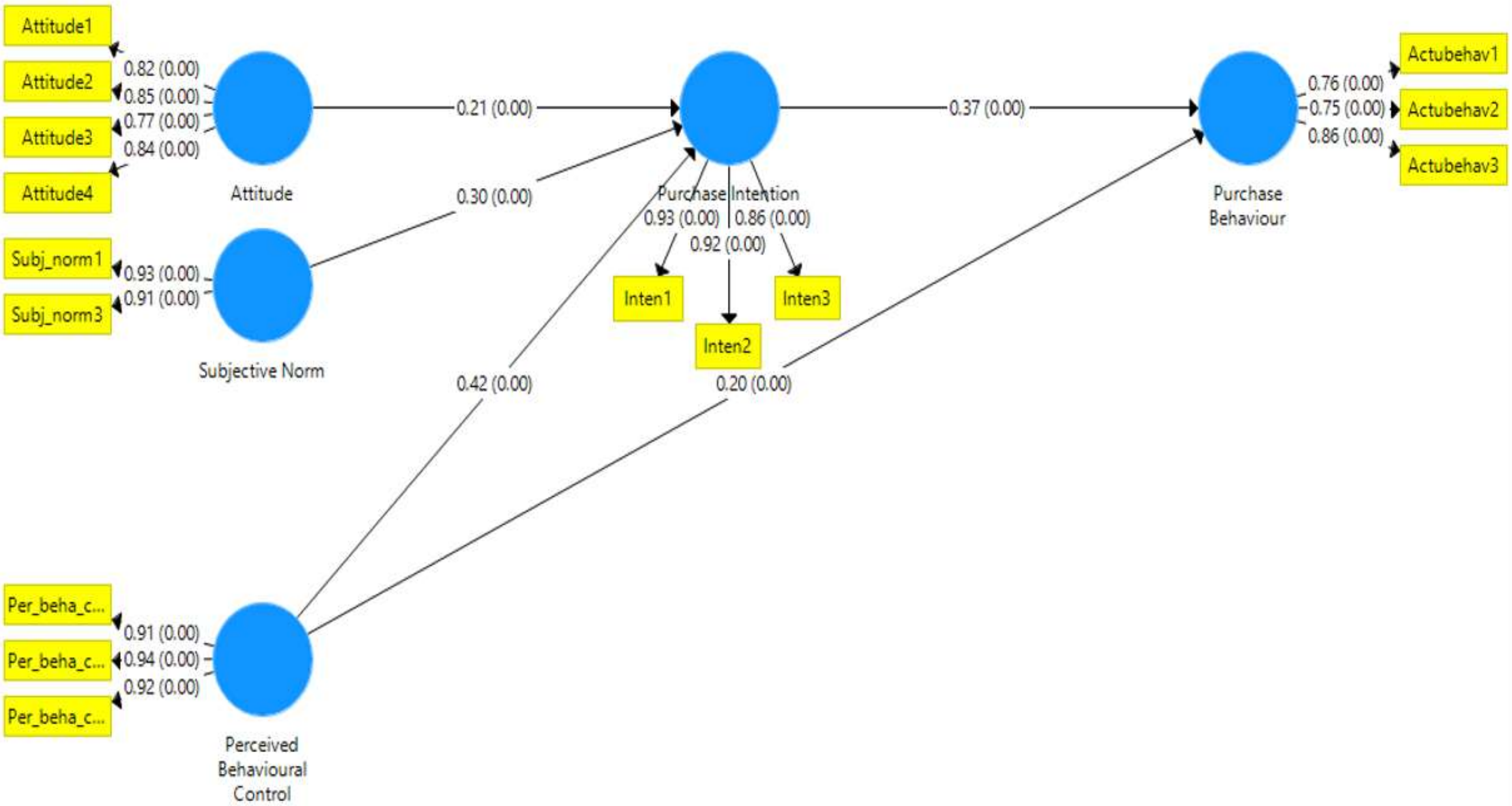


Figure 5.2: TPB model with path coefficients and P-values

5.6.2. Model Phase 2: Extended TPB model

To predict consumers' purchase intentions and buying behaviour of green energy, in the second phase a model was developed to investigate the impact of linking attitude, subjective norm, behavioural control, environmental concern, moral norm, retail service quality and green perceived brand on green energy purchase intention (GPI). In the extended TPB (see Figures 5.3, 5.4), Perceived behavioural control was the most significant predictor of GPI ($\beta = 0.359$, $p = 0.000$), followed by moral norm ——> GPI ($\beta = 0.277$, $p = 0.000$), and then subjective norm ——> GPI ($\beta = 0.239$, $p = 0.000$). However, the structural equation model analysis shows no significant impact of GPI on behaviour about green energy ($\beta = 0.080$, $p = 0.131$), which indicated the intention-behaviour gap phenomenon in the adoption of green energy. Accordingly, model 2 was extended with an additional construct plotting a mediation effect (see Figures 5.5, 5.6). The objective is to see how the mediator changes the relationship between intention and behaviour in buying green energy.

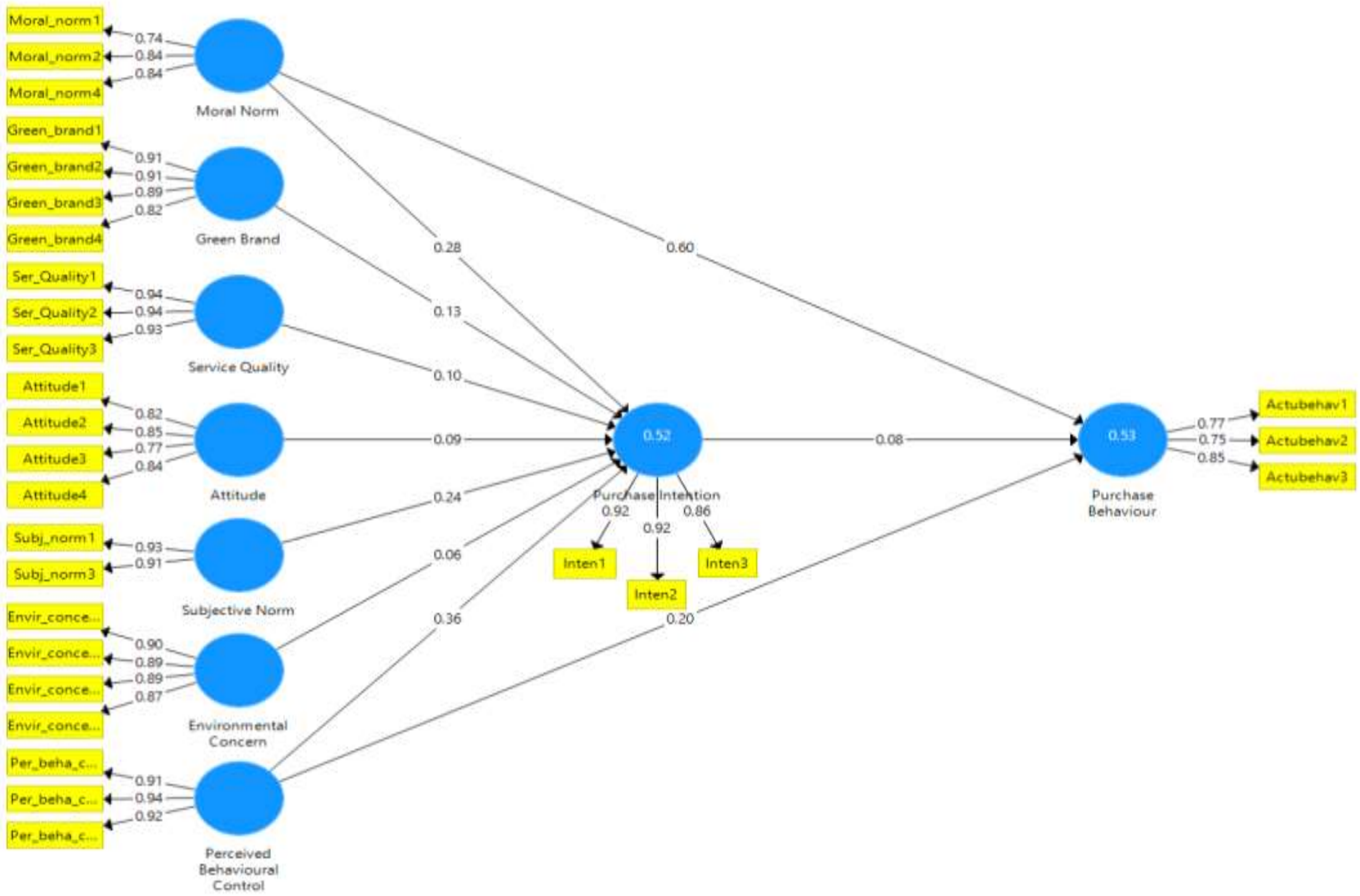


Figure 5.3: Extended TPB model with outer loading, path coefficients and R^2

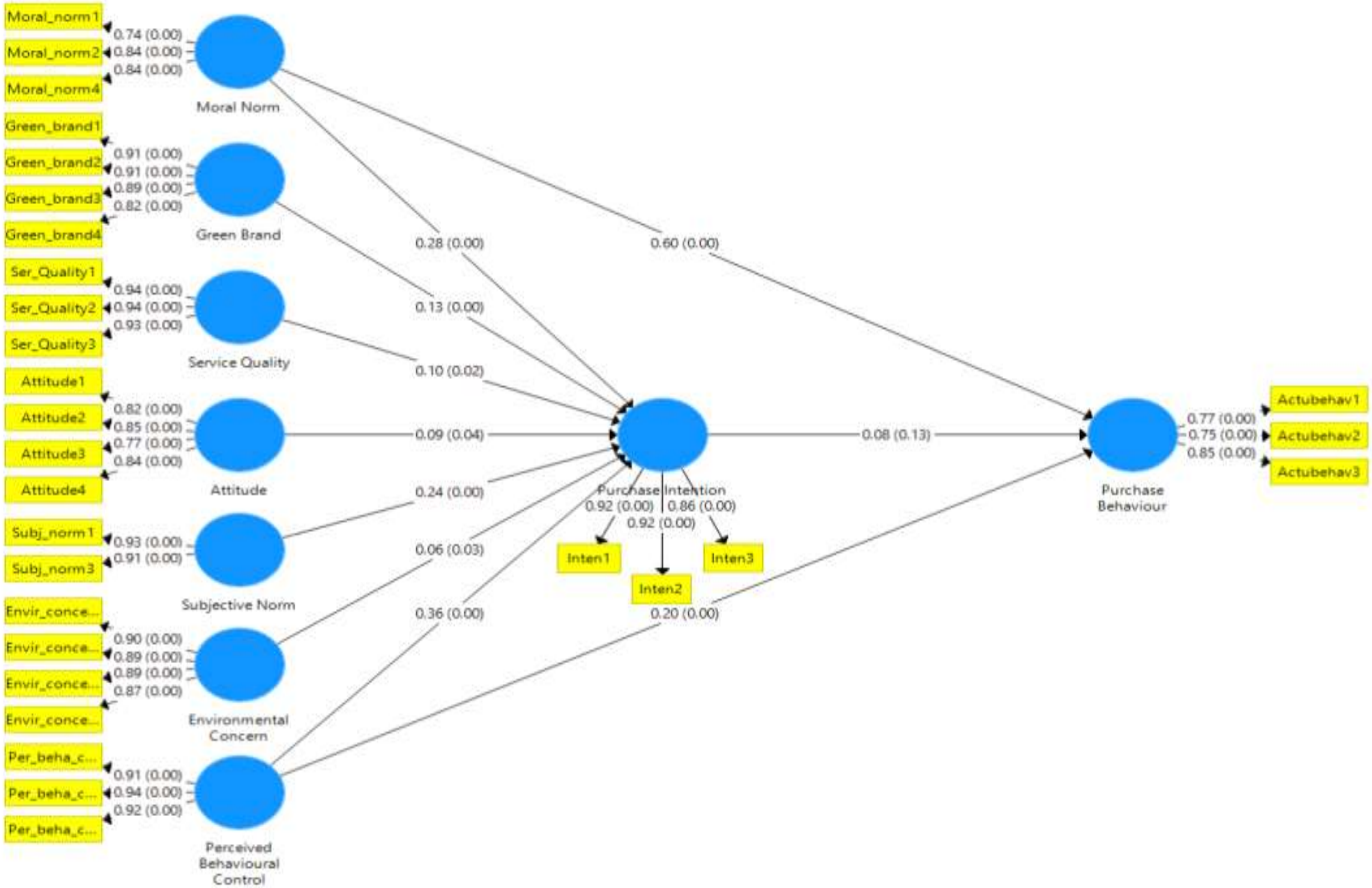


Figure 5.4: Extended TPB model with path coefficients and P values

5.6.3. Model Phase 3: Proposed model with the mediation effect

In the proposed model, the empirical study has explored the intention-behaviour relationships. Current literature fails to explain how the intention-behaviour relationship buying green energy in TPB might be reduced to increase desirable behaviours. This research discovers there is an opportunity to close the gap in the literature by examining the role of a stimulus – “green promotion” as a mediator. Examining the role of a mediator in the intention-behavioural relationship can explain why and how there is an observed relationship between the intention to buy green energy and the motivation to do so (see Chapter 3, Section 3.4.2.5.1).

The model hypothesised (H:20) that green promotion has a mediating effect on the relationships between intention and behaviour to buy green energy. After entering the mediator (green promotion), the relationship between green energy purchase intention (GPI) and green energy buying behaviour (GEB) changed, followed by the mediation criteria of Baron and Kenny's (1986) four conditions (see Section 5.7.2.2). Beta is reduced to 0.067 with a negative effect, and the significance level changes from 0.131 to 0.807. The results indicate that green promotion related to green energy completely mediates the relationship between GPI and GEB. The proposed model (Figures 5.5, 5.6) proves that the inclusion of a green promotion variable as a mediator for intention and behaviour served to diminish the ‘intention-behaviour gap’ as indicated in model 2 (Figures 5.3, 5.4). The final framework accounted for 52% of the variance in individual intention to adopt green energy and 57% of the variance in buying behaviour of green energy.

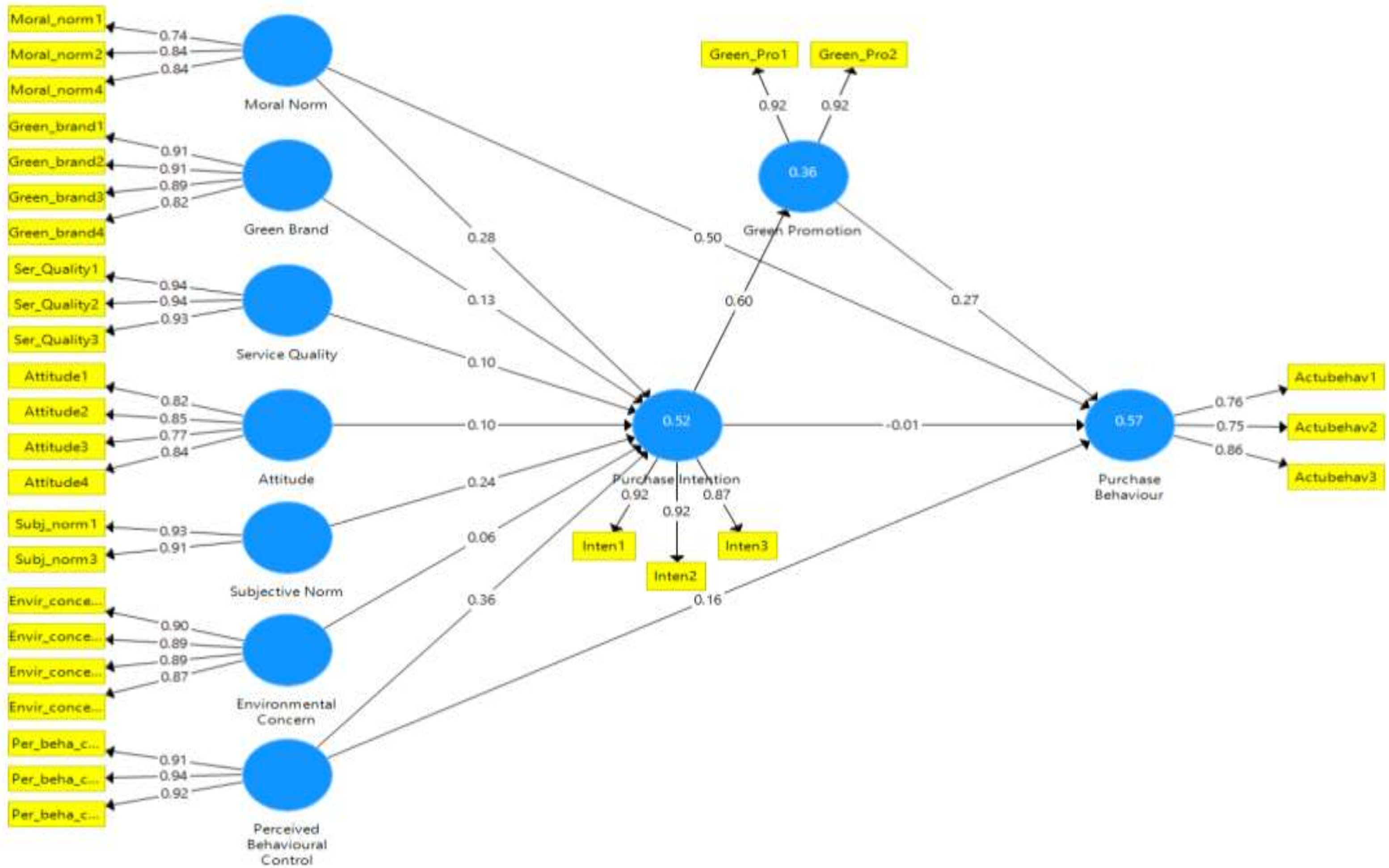


Figure 5.5: Research model with mediation effect with outer loading, path coefficients and R^2

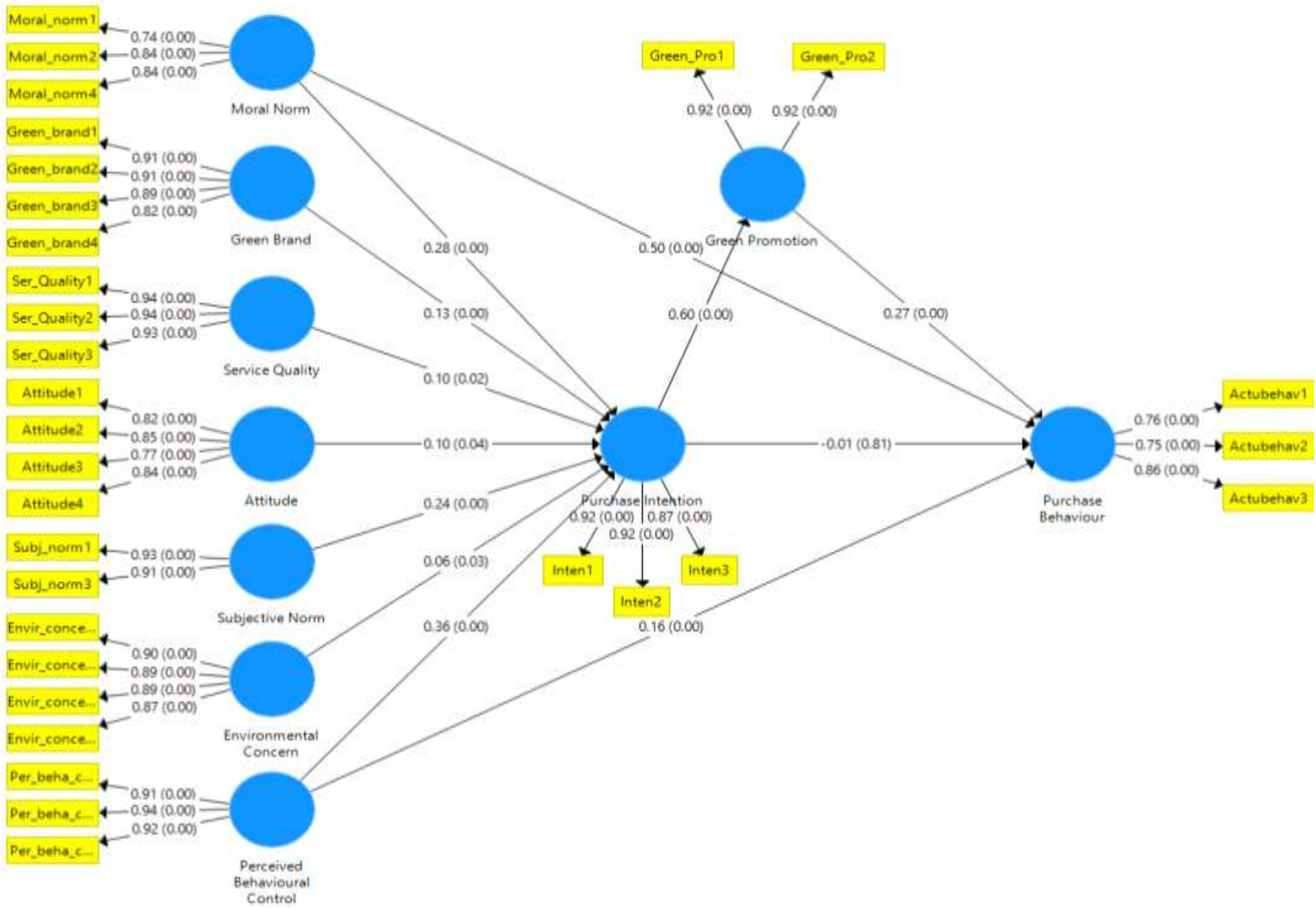


Figure 5.6: Research model with mediation effect with path coefficients and P values

5.6.4. Comparison between the original TPB and extended TPB model

Following the results of the model evaluations, three models were compared for explanatory power. The basic assumptions of the three structural equation models confirmed all the models fitted the data satisfactorily. However, in the model, special attention has been given to the mediation to reduce the intention-behaviour relationship. Difference in terms of predictive ability (R^2) creates important variations to reduce the intention-behaviour gap.

Findings indicated that the basic TPB model accounted for 42% of variance in intentions and 26% in behaviour regarding green energy. In the second phase, the extended model of GPIB (i.e., model 2, Figures 5.3, 5.4) showed a strong explanatory power in predicting consumers' green energy purchase intention (i.e. $R^2 = 0.521$ from i.e., $R^2 = 0.420$) and behaviour (i.e., $R^2 = 0.531$ from $R^2 = 0.259$) in comparison to the standard TPB (model 1, Figures 5.1, 5.2, see Table 5.18). Adding together the environmental concern, moral norm, green brand, retail service quality and green promotion contributed to the overall understanding of intention and behaviour, namely, the proportion of explained variance rose (i.e., by about 10% and 28% in the original TPB). Thus, in model 2's evaluation, attitude, subjective norm, PBC, environmental concern, green brand, retail service quality and moral norm were identified as the predictors of intention. However, the empirical results of model 2 (Figures 5.3, 5.4) reported an insignificant relationship ($\beta = 0.080$, t-value = 1.513, $p = 0.131$) between intention and behaviour regarding the acceptance of green energy.

However, the inclusion of the green promotion variable as a mediator between intention and behaviour served to diminish the 'intention-behaviour gap' in the research model (i.e., model 3, Figures 5.5, 5.6). The proposed model had same explanatory power predicting the GPI as in model 2 (Figures 5.3, 5.4) in predicting Australian consumers' green energy purchase intention, i.e., R^2 for GPI was 52% in both models (model 2 and model 3) but it is noticeable that the proposed model (Figures 5.5, 5.6) had more power predicting Australian consumers' green energy buying behaviour (i.e., $R^2 = 0.570$ from i.e., $R^2 = 0.531$) compared to the extended TPB model (i.e., model 2). Thus, in comparison between models 2 and 3, the R^2 for intention remains the same in models 2 and 3 but the increased predictive power- R^2 of behaviour advocates applying the added novel construct of green promotion (i.e., mediator) in the proposed model and validates the extended version of the TPB model in the Australian context. On the other hand, in comparison between the proposed model (Fig 5.5) and the standard TPB model (Fig-5.1), the proposed GPIB model showed a strong explanatory power in predicting both Australian consumers' green energy purchase intention (i.e. $R^2 = 0.521$ from i.e., $R^2 = 0.420$) and buying behaviour (i.e., $R^2 = 0.570$ from i.e. $R^2 = 0.273$).

To conclude, the proposed model of GPIB accounted for 52% of variance in intentions and 57% in behaviour concerning green energy in an Australian standpoint. Therefore, increased predictive power means that those five added constructs (environmental concern, moral norm, green brand perception, retail service quality and green promotion) in the proposed model can better predict consumers' future green energy buying behaviour in the Australian context.

Table 5.18: A comparison of the structural model phases – original TPB, extended TPB and mediator TPB (proposed model)

	Model phase 1			Model phase 2			Model phase 3		
	Standardised β	t-value	p-value	Standardised β	t-value	p-value	Standardised β	t-value	p-value
AT—>GPI	0.211	4.631	0.000	0.094	2.106	0.035	0.096	2.046	0.041
SN—>GPI	0.299	5.887	0.000	0.239	5.078	0.000	0.237	4.842	0.000
PBC—>GPI	0.423	6.700	0.000	0.359	6.015	0.000	0.358	5.959	0.000
PBC—>GEB	0.198	3.459	0.001	0.204	4.599	0.000	0.1	3.396	0.001
EC—>GPI				0.064	2.242	0.025	0.060	2.110	0.035
GBP—>GPI				0.132	2.975	0.003	0.131	2.988	0.003
RSQ—>GPI				0.098	2.252	0.024	0.099	2.282	0.023
MN—>GPI				0.277	4.985	0.000	0.278	4.973	0.000
MN—>GEB				0.598	15.560	0.000	0.504	11.255	0.000
GP—>GEB							0.273	5.518	0.000
GPI—>GP							0.602	12.444	0.000
GPI—>GEB	0.375	6.761	0.000	0.080	1.513	0.131(N.S)	-0.013	0.244	0.807 (N.S)
	R-square, GPI=0.420 R-square, GEB=0.259			R-square, GPI=0.521 R-square, GEB=0.531			R-square, GPI=0.521 R-square, GEB=0.570		

Notes: *ATT-Attitude; SN-Subjective norms; PBC-Perceived behaviour control; EC-Environmental concerns; GBP-Green brand perception., RSQ-Retail service quality; MN-Moral norms; GP-Green promotion; GPI-Green energy purchase intention; GEB-Green energy buying behaviour*

5.7. Hypotheses and the findings

The proposed research hypotheses are outlined here. Based on prior research examining the TPB in the context of green energy buying behaviour, twenty hypotheses were established. In other words, the eight exogenous constructs framed in the extended TPB model (discussed in Chapter 3) developed 20 research hypotheses (12 direct and eight indirect relationships). The PLS-SEM tested the hypothesised relationships between the research constructs. The hypotheses were confirmed by evaluating the path coefficients, p-values and t-values obtained from the output of the bootstrapping method of 2000 resamples with 95% confidence intervals. Figure 5.7 depicts the research hypotheses results, levels of significance and their relationships with dependent and independent variables. Each of the proposed hypotheses was examined for its acceptance or rejection.

As a rule of thumb, the t values larger than 2.58 for the 1% level of significance or $P < 0.01$ and larger than 1.96 for the 5% level of significance or $P < 0.05$ indicate significant path coefficients (Hair et al., 2011; Wong, 2013; Hassan, 2014; Hair et al., 2019a). The analysis finds that twelve of the twenty hypotheses had a significance level of at least 0.05 and path coefficient value (β) ranging from 0.100 to 0.602. The research hypotheses are explained below.

5.7.1. Results of the hypotheses relationships (direct effect)

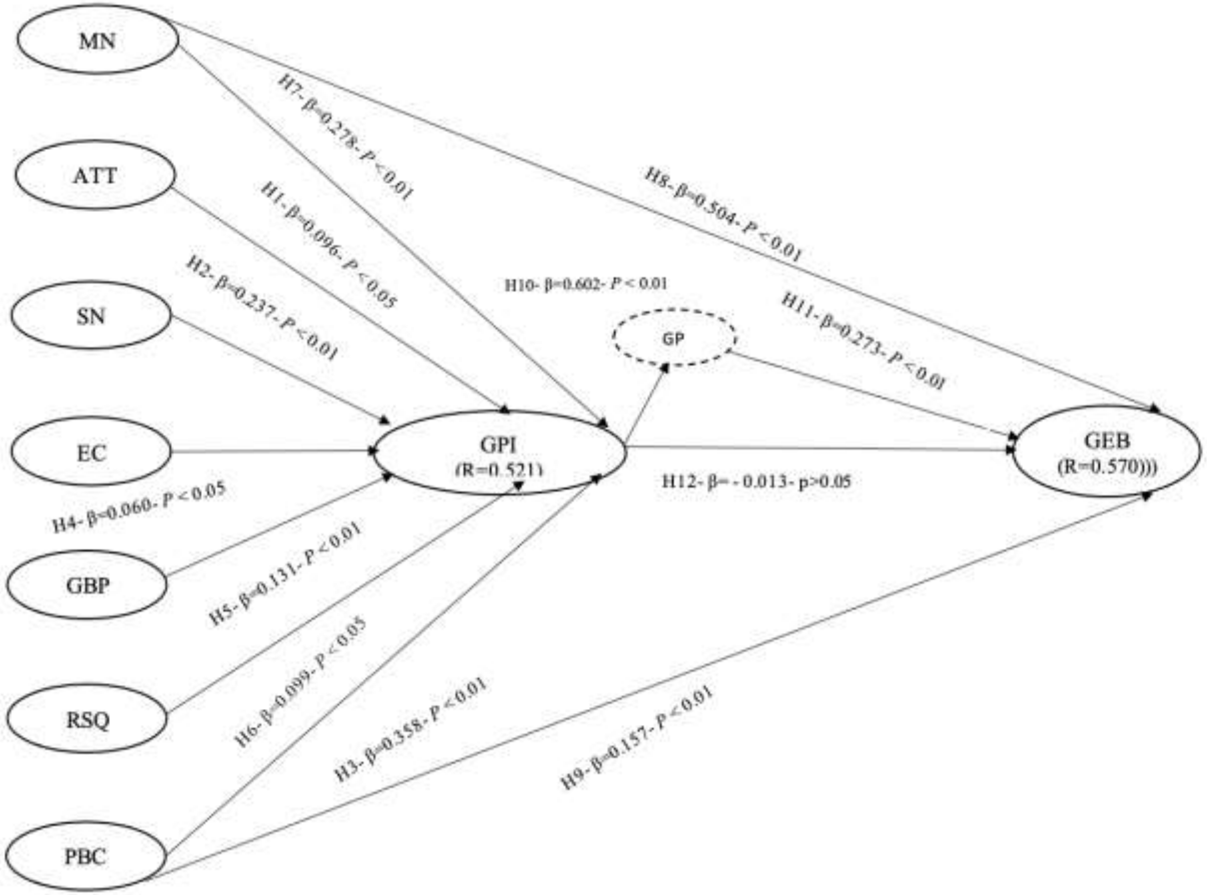
5.7.1.1. Hypothesis 1

H1 focused on the influence of consumer attitude on green energy purchase intention (GPI). It was predicted that consumer attitude positively influences the GPI. Supporting this hypothesis, the research model in Figure 5.7 highlights a positive and significant influence of attitude on purchase intention ($\beta = 0.096$, t-value = 2.046, p value of 0.041 or $p < 0.05$), meaning that there is support for hypothesis 1. Results of PLS analysis support it, as shown in Table 5.19.

Table 5.19: The relationship between attitude (ATT) and anticipated green energy purchase intention (GPI)

The relationship between attitude (ATT) and anticipated green energy purchase intention (GPI)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
ATT	GPI	0.096	2.046	*0.041	Supported

**p<0.01, * p <0.05, N/S (not significant)



Notes: ATT-Attitude; SN-Subjective norm; PBC-Perceived behaviour control; EC=Environmental concern; GBP= Green brand perception, RSQ=Retail service quality; MN-Moral norm; GP=Green promotion; GPI- Green energy purchase intention; GEB-Green energy buying behaviour

Figure 5.7: Hypothesised research model outcome

5.7.1.2. Hypothesis 2

Hypothesis 2 predicted that subjective norm have a positive impact on green energy purchase intention (GPI). In the findings social norms were positively and seen to be significantly related to the GPI (β = 0.237, t-value = 4.842, p value of 0.000 or $p < 0.01$). This lends supports to hypothesis 2, implying that subjective norm will positively affect the GPI. Individuals with high social reference will be more motivated to purchase green energy. The results of PLS analysis supporting Hypothesis 2 are shown in Table 5.20.

Table 5.20: The relationship between subjective norm (SN) and anticipated green energy purchase intention (GPI)

The relationship between subjective norm (SN) and anticipated green energy purchase intention (GPI)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
SN	GPI	0.237	4.842	**0.000	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.3. Hypothesis 3

Hypothesis 3 was tested to observe how perceived behavioural control affects the GPI. Based on the outcomes of the PLS path model, GPI was positively and significantly influenced by PBC (β = 0.358, t-value = 5.959, $p<0.01$ or $p = 0.000$). Thus hypothesis 3 is accepted. The results of PLS analysis supporting it are shown in Table 5.21.

Table 5.21: The relationship between perceived behavioural control (PBC) and anticipated green energy purchase intention (GPI)

The relationship between perceived behavioural control (PBC) and anticipated green energy purchase intention (GPI)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
PBC	GPI	0.358	5.959	**0.000	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.4. Hypothesis 4

Hypothesis 4 examined the environmental concerns of consumers regarding green energy and their direct impact on the GPI. It was found that (β = 0.060, t-value = 2.110, p value of 0.035 or $p < 0.05$). As a result, this hypothesis is supported and the results for PLS analysis are noted in Table 5.22.

Table 5.22: The relationship between environmental concerns (EC) and anticipated green energy purchase intention (GPI)

The relationship between environmental concern (EC) and anticipated green energy purchase intention (GPI)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
EC	GPI	0.060	2.110	*0.035	Supported

**p<0.01, * p <0.05, N/S (not significant

5.7.1.5. Hypothesis 5

Hypothesis 5 examines how green brand perception influences consumers to purchase green energy. There was a positive and significant effect in terms of support for green brands in explaining consumers' green energy purchase intention (β = 0.131, t-value = 2.988, p value of 0.003 or $p < 0.01$), which means that H5 is supported. The results of PLS analysis for it are shown in Table 5.23.

Table 5.23: The relationship between perceived green brand perception (GBP) and anticipated green energy purchase intention (GPI)

The relationship between perceived green brand perception (GBP) and anticipated green energy purchase intention (GPI)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p**	**Hypotheses Result**
GBP	GPI	0.131	2.988	**0.003	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.6. Hypothesis 6

Hypothesis 6 suggests that the quality of retail service has a positive and significant influence on the GPI. Supporting this hypothesis, the research model indicated a positive and significant influence on purchase intention, demonstrating the outcome as $\beta = 0.099$, t-value = 2.282, p value of 0. 023 or $p < 0.05$. This means that H6 is retained and the results of PLS analysis for it are shown in Table 5.24.

Table 5.24: The relationship between retail service quality (RSQ) and anticipated green energy purchase intention (GPI)

The relationship between retail service quality (RSQ) and anticipated green energy purchase intention (GPI)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
RSQ	GPI	0.099	2.282	*0.023	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.7. Hypothesis 7:

Hypothesis 7 posited one of the most important additional constructs to the model, moral norms. It examines whether consumer's moral reflectiveness exerts a significant effect on the GPI. The empirical evidence strongly supports H7 (β = 0.278, t-value = 4.973, p<0.01 or p=0.000). Thus, H7 is accepted and the PLS analysis results for it are reported in Table 5.25.

Table 5.25: The relationship between moral norms (MN) and anticipated green energy purchase intention (GPI)

The relationship between moral norm (MN) and anticipated green energy purchase intention (GPI)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
MN	GPI	*0.278*	*4.973*	***0.000*	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.8. Hypothesis 8

Hypothesis 8 asserts that moral norm significantly and positively influence consumers' actual buying behaviour concerning green energy. The path estimates noted that moral norms do indeed have a significant and positive relationship (β = 0.504, t-value = 11.255, p value of 0.000 or p < 0.01) with buying behaviour. Thus, H8 is also maintained like H7. The results of PLS analysis for H8 are shown in Table 5.26.

Table 5.26: The relationship between moral norms (MN) and anticipated green energy buying behaviour (GEB)

The relationship between moral norm (MN) and anticipated green energy buying behaviour (GEB)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
MN	GEB	0.504	11.255	**0.000	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.9. Hypothesis 9

The coefficient value for the effect of PBC to green energy on behaviour towards green energy (Hypothesis 9) was 0.157 (t-value = 3.396) with a p-value of 0.001 (l% significance level). This finding confirmed that PBC towards green energy had a positive and significant effect on the behaviour towards green energy, so H9 is supported and the results for PLS analysis for it are shown in Table 5.27.

Table 5.27: The relationship between perceived behavioural control (PBC) and anticipated green energy buying behaviour (GEB)

The relationship between perceived behavioural control (PBC) and anticipated green energy buying behaviour (GEB)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p**	**Hypotheses Result**
PBC	GEB	0.157	3.396	**0.001	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.10. Hypothesis 10

Hypothesis 10 states that green energy purchase intention positively influences green promotion. The researcher found a positive and significant effect support of GPI on green promotion (β = 0.602, t-value = 12.444, p value of 0.000 or p < 0.01), Hence, H 10 is accepted and shown in Table 5.28.

Table 5.28: The relationship between green energy purchase intention (GPI) and green promotion (GP)

The relationship between green energy purchase intention (GPI) and green promotion (GP)					
Endogenous construct	**Exogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
GPI	GP	0.602	12.444	**0.000	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.11. Hypothesis 11

Hypothesis 11 asserted that green promotion has a positive effect on green energy buying behaviour. Based on the outcomes of the PLS, the path model resulted in β = 0.273, t-value = 5.518, p value of 0.000 or $p < 0.01$), so H11 is retained. The results of PLS analysis for H11 are shown in Table 5.29.

Table 5.29: The relationship between green promotion (GP) and anticipated green energy buying behaviour (GEB)

The relationship between green promotion (GP) and anticipated green energy buying behaviour (GEB)					
Exogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p** value	**Hypotheses Result**
GP	GEB	0.273	5.518	**0.000	Supported

**p<0.01, * p <0.05, N/S (not significant)

5.7.1.12. Hypothesis 12

Hypothesis 12 investigated an important phenomenon, the intention-behaviour relationships for green energy buying. H12 states that green energy purchase intention positively influences consumers' actual buying behaviour. The PLS-based statistical analysis reveals that the path from purchase intention to actually buying green energy was negative and not significant (β = − 0.013, t-value = 0.244, p value of 0.807 or $p>0.05$), which means H12 is not supported. It can be concluded that intention does not necessarily strengthen buying behaviour commitment (as discussed in Chapter 7). The results of PLS analysis for this hypothesis are shown in Table 5.30.

Table 5.30: The relationship between green energy purchase intention (GPI) and anticipated green energy buying behaviour (GEB)

The relationship between green energy purchase intention (GPI) and anticipated green energy green energy buying behaviour (GEB)					
Exogenous construct OR Endogenous construct	**Endogenous construct**	**path coefficient (β)**	**t value**	**p value**	**Hypotheses Result**
GPI	GEB	− 0.013	0.244	0.807	Not supported

<0.01, * p <0.05, N/S (not significant)

5.7.1.13. Summary of the direct hypothetical relationship

This study analysed the paths between the constructs with PLS-SEM and represented each path with a standardised coefficient. This analysis verified the path assumptions and found eleven out of 12 paths were supported with significant relationships in the hypothesised directions at a 95% confidence interval. The eleven hypotheses (H1~H11) were supported with $p < 0.01$ (H2, H3, H5, H7, H8, H9, H10 and H11) and $p < 0.05$ (H1, H4 and H6). The model (Figure 5.7) shows the hypothesised relationships of the latent items and their corresponding items as designed in a conceptual model.

Attitude, subjective norm, perceived behavioural control, perceived green brand perception, moral norm, retail service quality, and environmental concerns do significantly affect intention to purchase a green energy product. Moreover, consumers' green energy purchase intention (GPI) affects green promotion and moral norms, PBC does significantly affect the buying behaviour concerning green energy. The results notably demonstrate that the relationship between intention and behaviour (H12) is negative and insignificant ($\beta = -0.013$, t-value = 0.244, p value of 0.807 or $p>0.05$). In other words, consumers' green energy purchase intention (GPI) does not increase the green energy buying behaviour as hypothesised (H12). Table 5.31 tabulates the results for the structural model (i.e., hypothesis results) and the importance level of relationships in the structural model. The discussion on the research findings from hypothesis testing is presented in Chapter 6.

Table 5.31: Hypothesis testing results (direct relationship)

Hypothesis		Hypothesised direction	Path coefficient (β)	T Statistics	P-value	Hypothesis Supported?
H1	Consumer's attitude towards the green energy positively influences their intention to purchase green energy.	Positive	0.096	2.046	0.041 *	Yes
H2	Subjective norm positively influences the consumer's intention to purchase green energy.	Positive	0.237	4.842	0.000 **	Yes
H3	Consumers' greater behavioral control significantly increases consumer intentions to purchase green energy	Positive	0.358	5.959	0.000 **	Yes
H4	Environmental concern positively influences consumer's intention to purchase green energy	Positive	0.060	2.065	0.035 *	Yes
H5	Green brand positively influences the consumer's intention to purchase green energy	Positive	0.131	2.988	0.002 **	Yes
H6	Service quality of energy retailer influences consumer's intention to purchase green energy	Positive	0.099	2.282	0.023 *	Yes
H7	Moral norm significantly and positively influences consumer's intention toward green energy	Positive	0.278	4.973	0.000 **	Yes

H8	Moral norm significantly and positively influences consumer's actual buying behaviour toward green energy	Positive	0.504	11.255	0.000 **	Yes
H9	Consumers' greater behavioral control significantly influences consumer's actual buying behaviour toward green energy	Positive	0.157	3.396	0.001 **	Yes
H10	Green energy purchase intention influences green promotion positively.	Positive	0.602	12.444	0.000 **	Yes
H11	Green promotion influences green energy buying behaviour positively.	Positive	0.273	5.518	0.000 **	Yes
H12	Green energy purchase intention posits a positive relationship with consumer's actual buying behaviour	Positive	− 0.013	0.244	0.807 N/S	No

**p<0.01, * p <0.05, N/S (not significant). t values larger than 2.58 for the 1% level of significance or $P < 0.01$ and larger than 1.96 for the 5% level of significance or $P < 0.05$ indicate significant path coefficients (Hair et al., 2010; Hair et al., 2011; Wong, 2013; Hassan, 2014).

5.7.2. Results of the hypotheses relationships (Indirect effect)

5.7.2.1. Results of the indirect effect of purchase intention

This section illustrates the indirect effect of seven exogenous constructs which are the antecedents of green energy purchase intention (GPI) on green energy buying behaviour (GEB). In the model seven hypotheses were formulated relating to indirect relationships and these are listed below:

H13: Green energy purchase intention mediates the relationship between consumer attitude and actual buying behaviour towards green energy.

H14: Green energy purchase intention mediates the relationship between social norms and actual buying behaviour towards green energy.

H15: Green energy purchase intention mediates the relationship between perceived behavioural control and actual buying behaviour towards green energy.

H16: Green energy purchase intention mediates the relationship between environmental concerns and actual buying behaviour towards green energy.

H17: Green energy purchase intention mediates the relationship between green brand perception and actual buying behaviour towards green energy.

H18: Green energy purchase intention mediates the relationship between the retail service quality and actual buying behaviour towards green energy.

H19: Green energy purchase intention mediates the relationship between moral norms and actual buying behaviour towards green energy.

Regarding the mediating effects of intention to purchase green energy, attitude, subjective norm, PBC, moral norm, retail service quality, green brand, and environmental concerns on green energy, this study presented an indirect effect coefficient, confidence intervals, and p values. It emerged that hypotheses H13 to H19 had $\beta<0.1$ (negative outcome) and did not have a significant (p-values > 0.05) indirect effect on consumption of green energy. This confirmed that intention to buy green energy did not mediate the relationship between attitude, subjective norm, behavioural control, environmental concern, perceived green brand, retail service quality, and moral norms in terms of buying behaviour. Reported here is a negative relationship between the aforementioned factors with the GEB. Table 5.32 summarises the results for the indirect effect assessment.

Table 5.32: Hypothesis testing results (indirect relationship)

Hypothesis		Hypothesised direction	Path coefficient (β)	T Statistics	P-value	Hypothesis Supported?
H13	Intention mediates the relationship between consumer attitude and actual buying behavior towards green energy	Positive	-0.001	0.216	0.829 N/S	No
H14	Intention mediates the relationship between social norm and actual buying behavior towards green energy	Positive	-0.003	0.242	0.809 N/S	No
H15	Intention mediates the relationship between perceived behavioural control and actual buying behavior towards green energy.	Positive	-0.005	0.242	0.809 N/S	No
H16	Intention mediates the relationship between environmental concern and actual buying behavior towards green energy	Positive	-0.001	0.215	0.830 N/S	No
H17	Intention mediates the relationship between green brand perception and actual buying behavior towards green energy	Positive	-0.002	0.229	0.819 N/S	No
H8	Intention mediates the relationship between the retail service quality and actual buying behavior towards green energy	Positive	-0.001	0.230	0.818 N/S	No
H19	Intention mediates the relationship between moral norm and actual buying behavior towards green energy	Positive	-0.005	0.321	0.749 N/S	No

***p<0.01, * p <0.05, N/S (not significant). t values larger than 2.58 for the 1% level of significance or P < 0.01 and larger than 1.96 for the 5% level of significance or P < 0.05 indicate significant path coefficients (Hair et al., 2010; Hair et al., 2011; Wong, 2013; Hassan, 2014).*

Given the results from the significance testing of indirect effects in Section 5.5.2.3.2.2, no determinants were found to have indirect impacts on buying behaviour through the GPI. The discussion of the findings relating to the supported indirect effects is presented in Chapter 6.

5.7.2.2. Results of the mediating role of green promotion closing the intention-behaviour gap

To test the mediating effect of green promotion on the relationship between consumers' behavioural intentions and buying behaviour regarding green energy (H20), the analysis follows Baron and Kenny's (1986) four conditions. Most scholars (Zhou et al., 2012; Zhu et al., 2013; Prayag et al., 2013; Singh & Verma, 2017; Chen et al., 2018; Shafique et al., 2018; Kumar & Kaushik, 2020) followed a procedure similar to that proposed by Baron and Kenny (1986). According to Baron and Kenny (1986), to confirm mediating effects the following four conditions must be satisfied (Kumar & Kaushik, 2020).

The first condition asserts that the exogenous construct (independent construct) must affect the endogenous variable (dependent variable). In our research, the independent construct (green energy purchase intention) influenced the dependent variable (green energy buying behaviour). Results show that the beta coefficient (β) for the direct path between intention and behaviour was 0.080 (p value 0.131). Thus, the first condition is supported. Note that this result appeared in model 2 before the mediator (green promotion) was included.

The second condition is that an independent variable should influence the mediating variable. Green energy purchase intention (GPI) influences the mediating variable green promotion (GP). To confirm this, the direct influence of GPI on the mediator GP was checked for green energy consumption, and it was found that GPI positively and significantly affects the GP ($\beta = 0.602$, t-value = 12.444, p value of 0.000 or $p < 0.01$).

The third condition states that the mediating variable should influence the dependent variable. Our research confirms that the mediator affects green promotion positively and significantly affects the dependent variable – the green energy buying behaviour ($\beta = 0.273$, t-value = 5.518, p value of 0.000 or $p < 0.01$). Thus, the third condition for testing mediation is met in the study.

The fourth condition wants to prove the mediation effect, the path from independent variables to dependent variables must change after including the mediator in the model. Perfect mediation (i.e., full mediation) holds when the independent variable exhibits zero or insignificant effects on the dependent variable and also changes the path coefficient (β) on the dependent variable after the mediating variable is introduced (Won & Ngai, 2009; Zhu et al., 2013; Shafique et al., 2018).

In the research model, the direct relationship between the independent variable (i.e., purchase intention) and a dependent variable (i.e., buying behaviour) regarding green energy is weakened when green promotion is incorporated into the structural model. To elaborate, the fourth condition is achieved when the magnitude of the direct relationship between the green energy purchase intention and buying behaviour dramatically changes (i.e., $\beta = -0.013$ from 0.080, p value of 0.807 from 0.131) after the inclusion of green promotion as a mediator, thus confirming the full mediation effect of green promotion (see Fig 5.5). Thus, H20 is supported.

While condition 1 was tested in model 2, conditions 2, 3, and 4 were investigated in model 3 (as discussed in Section 5.6). All the four necessary conditions of the mediating relationship are satisfied based according to Baron and Kenny (1986). The results of mediation analysis are presented in Table 5.33. The final hypothesis (H20) was supported with respect to green energy buying behaviour.

Baron and Kenny’s (1986) four conditions are therefore fulfilled: (1) intention predicts the behaviour although it was not significant in the initial model; (2) intention and green promotion are highly related; (3) green promotion has a substantial impact on buying behaviour; and (4) the mediator variable ‘green promotion’ reduces the gap between intention and behaviour (full mediation according to the 4th condition of Baron and Kenny,1986). The green promotion variable resulted in 38% increase in variance predicting the GEB. The observed increase in variance accounted for in the behaviour is accompanied by a much-reduced direct link between intention and behaviour. This full mediation effect of green promotion emphasises the role of green energy purchase intention as a main predictor of behaviour. It also reflects “theory deepening” whereby green promotion as a strong mediator variable can improve the predictive validity of the original TPB model. The relevant discussion about the mediation hypothesis is presented in Chapter 6.

Table 5.33: Mediation tests using PLS

Baron and Kenny's (1986) 4 steps: Mediation		**β**	**t -value**	**p-value**
Step 1: Independent variable effect the dependent variable	Green energy purchase intention -> Green energy buying behaviour	0.080	1.513	0.131
Step 2: Independent variable effect the mediating variable	Green energy purchase intention -> Green promotion	0.602	12.444	0.000
Step 3: Mediating variable effect, the dependent variable	Green promotion -> Green energy buying behaviour	0.273	5.518	0.000
Step 4: Mediator to outcome variable (mediator green promotion)	Green energy purchase intention -> Green energy buying behaviour	− 0.013	0.244	0.807

5.8. Partial least squares based multi-group analysis (PLS-MGA)

The study employed the partial least squares structural equation modelling (PLS-SEM) approach to test the determinant factors that affect the green energy purchasing intention and buying behaviour of an Australian (Sydney, NSW) residential population sample. However, in order better to understand the group differences in these residents' green energy buying behaviour, this research combined the PLS-SEM with multi-group analysis (MGA). In this way the structural equation model analysis (i.e., PLS-MGA) can clarify whether there are differences in hypothesised relationships among different demographic groups. The categorical variables investigated to the PLS-MGA were age, gender, education level, energy usage, income and user group. The research applied a percentile bootstrapping (Sultan et al. 2000) method to examine the differences among the categorical variables. The findings indicated a significant difference among groups at the 5% error level if the p-value was greater than 95% or less than 5%.

5.8.1. Impact of age on green energy purchase intention

This section deals with the impact of age on the critical factors influencing green energy purchase intention and actual buying behaviour. Table 5.34 shows the path coefficient and p-value for both age groups (18-40 years and 40 and above) and the difference of path coefficient between these two groups. In general, if the p-value is less than 0.05, then the path coefficient is treated as significant. In the 18-40 age group, purchase intention to green promotion (0.583) is the highest path coefficient value followed by the moral norm to actual behaviour (0.540). Both coefficients are statistically significant at the 5% level. Interestingly, like the 18-40 age group the 40 and above group is one where purchase intention to green promotion (0.627) is the highest path coefficient value followed by the moral norm to actual behaviour (0.492). The coefficient for the 40 and above age group is higher than that of the 18-40 age group when considering the influence of purchase intention on actual behaviour (path coefficient difference= 0.244). Thus, the overall difference between both age groups is not significant.

Table 5.34: Impact of age on purchase intention and path coefficient difference for age

	Age: 18-40 years		Age: 40 and above years		18-40 years to 40 and above	
	Path coefficient	p-Values	Path coefficient	p-Values	Path coefficient diff	p-values
AT -> PI	0.112	0.042	0.047	0.647	0.064	0.291
EC-> PI	0.051	0.115	0.135	0.082	0.084	0.860
GB -> PI	0.125	0.010	0.195	0.050	0.070	0.749
GP -> AB	0.292	0.000	0.164	0.227	0.128	0.182
MO -> AB	0.540	0.000	0.492	0.000	0.048	0.357
MO-> PI	0.281	0.000	0.144	0.140	0.137	0.116
PBC -> AB	0.173	0.000	0.133	0.207	0.040	0.347
PBC -> PI	0.334	0.000	0.427	0.001	0.092	0.733
PI -> AB	-0.042	0.461	0.202	0.144	0.244	0.947
PI -> GP	0.583	0.000	0.627	0.000	0.044	0.665
SQ -> PI	0.132	0.006	-0.052	0.625	0.184	0.052
SN-> PI	0.217	0.000	0.309	0.003	0.093	0.792

LEGEND: AB- Actual Behaviour; AT-Attitude; MO-Moral obligation; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail Service quality; PI-Purchase Intention; AB-Actual behaviour control

5.8.2. Impact of education on green energy purchase intention

This section deals with the impact of education on the critical factors influencing green energy purchase intention and actual buying behaviour. Table 5.35 shows the path coefficient and p-value for education level groups (below tertiary and tertiary) and the difference of path coefficient between both. In the below tertiary group, moral norm to actual behaviour (0.506) is the highest path coefficient value followed by purchase intention to green promotion (0.414). Both coefficients are statistically significant at the 5% level. In the tertiary education group, purchase intention to green promotion (0.670) is the highest path coefficient value followed by the moral norm to actual behaviour (0.517). Both coefficients are also statistically significant at the 5% level. For the educational level groups, the coefficient of below tertiary is higher than (highest difference compares to other coefficients) that of tertiary when considering the influence of moral norm to purchase intention (path coefficient difference = 0.276). Thus, the overall difference between both education groups is not significant.

Table 5.35: Impact of education on purchase intention and path coefficient difference for education

	Education: below tertiary		Education: tertiary		below tertiary to tertiary	
	Path coefficient	p-Values	Path coefficient	p-Values	Path coefficient diff	p-values
AT -> PI	0.215	0.013	0.071	0.153	0.144	0.071
EC-> PI	0.090	0.228	0.019	0.593	0.071	0.182
GB -> PI	0.161	0.035	0.129	0.009	0.031	0.366
GP -> AB	0.320	0.000	0.251	0.000	0.069	0.255
MO -> AB	0.506	0.000	0.517	0.000	0.011	0.548
MO-> PI	0.077	0.380	0.353	0.000	0.276	0.994
PBC -> AB	0.152	0.023	0.185	0.001	0.033	0.651
PBC -> PI	0.328	0.001	0.352	0.000	0.023	0.571
PI -> AB	-0.035	0.630	0.016	0.822	0.051	0.696
PI -> GP	0.414	0.000	0.670	0.000	0.257	0.989
SQ -> PI	0.163	0.038	0.081	0.107	0.082	0.190
SN-> PI	0.199	0.013	0.262	0.000	0.062	0.735

LEGEND: AB- Actual Behaviour; AT-Attitude; MO-Moral obligation; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail Service quality; PI-Purchase Intention; AB-Actual behaviour control

5.8.3. Impact of usage on green energy purchase intention

This section deals with the impact of energy usage on the critical factors influencing green energy purchase intention and actual buying behaviour. Table 5.36 shows the path coefficient and p-value based on the level of the electricity usage (over 400 kWh vs less than 400 kWh) and the difference of path coefficient between over 400 kWh and less than 400 kWh. For those who are using less than 400 kWh, moral norms to actual behaviour (0.551) is the highest and significant path coefficient value followed by purchase intention to green promotion (0.534) at the 5% level. On the other hand, those using more than the 400 kWh usages group, purchase intention to green promotion (0.770) is the highest path coefficient value followed by green promotion to actual behaviour (0.579). Both coefficients are also statistically significant at the 5% level. The coefficient over 400 kWh is significantly higher than that less than 400 kWh user group when considering the influence of moral norm to purchase intention (path coefficient difference = 0.389), green promotion to actual behaviour (path coefficient difference = 0.320), and purchase intention to green promotion (path coefficient difference = 0.243).

Table 5.36: Impact of energy usage on purchase intention and path coefficient difference for energy usage

	Electricity usage: less than 400		Electricity usage: over 400		Over 400 to less than 400	
	Path coefficient	p-Values	Path coefficient	p-Values	Path coefficient	p-values
AT -> PI	0.106	0.048	0.138	0.048	0.032	0.372
EC-> PI	0.052	0.144	-0.001	0.144	0.053	0.780
GB -> PI	0.111	0.019	0.122	0.019	0.011	0.443
GP -> AB	0.259	0.000	0.579	0.000	0.320	0.026
MO -> AB	0.551	0.000	0.119	0.000	0.432	0.996
MO-> PI	0.177	0.000	0.566	0.000	0.389	0.002
PBC -> AB	0.169	0.000	0.088	0.000	0.081	0.793
PBC -> PI	0.405	0.000	0.211	0.000	0.194	0.946
PI -> AB	-0.009	0.863	0.114	0.863	0.122	0.226
PI -> GP	0.534	0.000	0.777	0.000	0.243	0.015
SQ -> PI	0.112	0.030	0.099	0.030	0.013	0.553
SN-> PI	0.253	0.000	0.159	0.000	0.094	0.818

LEGEND: AB- Actual Behaviour; AT-Attitude; MO-Moral obligation; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail Service quality; PI-Purchase Intention; AB-Actual behaviour control

5.8.4. Impact of gender on green energy purchase intention

This section deals with the impact of gender (sex) on the critical factors influencing green energy purchase intention and actual buying behaviour. Table 5.37 shows the path coefficient and p-value based on gender status (male and female) and the difference of path coefficient between male and female. For those who are female, moral norms to actual behaviour (0.481) is the highest and most significant path coefficient value followed by purchase intention to green promotion (0.465) at the 5% level. In case of males, purchase intention to green promotion (0.673) is the highest path coefficient value followed by perceived behaviour control to purchase intention (0.401) at the 5% level. All the path coefficients for female are higher than male but not statistically significant.

Table 5.37: Impact of sex on purchase intention and path coefficient difference for gender

	Gender: Female		Gender: Male		Female- Male	
	Path coefficient	p-Values	Path coefficient	p-Values	Path coefficient diff	p-values
AT -> PI	0.224	0.010	0.092	0.132	0.132	0.104
EC-> PI	0.098	0.138	0.011	0.774	0.087	0.124
GB -> PI	0.053	0.571	0.086	0.121	0.033	0.611
GP -> AB	0.325	0.001	0.340	0.000	0.015	0.549
MO -> AB	0.481	0.000	0.397	0.000	0.084	0.237
MO-> PI	0.212	0.028	0.373	0.000	0.161	0.906
PBC -> AB	0.098	0.244	0.156	0.018	0.058	0.708
PBC -> PI	0.257	0.010	0.401	0.000	0.144	0.866
PI -> AB	0.025	0.797	0.055	0.534	0.030	0.601
PI -> GP	0.465	0.000	0.673	0.000	0.207	0.967
SQ -> PI	0.075	0.412	0.120	0.035	0.046	0.653
SN-> PI	0.279	0.001	0.176	0.008	0.103	0.164

LEGEND: AB- Actual Behaviour; AT-Attitude; MO-Moral obligation; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail Service quality; PI-Purchase Intention; AB-Actual behaviour control

5.8.5. Impact of income on green energy purchase intention

This section deals with the impact of income on the critical factors influencing green energy purchase intention and actual buying behaviour. Table 5.38 shows the path coefficient and p-value for different income level groups (income below $80K vs over $80K) and the difference in the path coefficient between them. For those with incomes below $80K, moral norms to actual behaviour (0.562) is the highest path coefficient value followed by purchase intention to green promotion (0.497). Both coefficients are statistically significant at the 5% level. On the other hand, for those people on more than $80K per year, purchase intention to green promotion (0.729) is the highest path coefficient value followed by the moral norm to actual behaviour (0.457). Both coefficients are also statistically significant at the 5% level. The coefficient for below $80K is higher than that above $80K when considering the influence of purchase intention to green promotion. Notably, the coefficient of below $80K is significantly higher than that above $80K when considering the influence of retail service quality to purchase intention. All other path coefficients for below $80K are higher than those above $80K but are not statistically significant.

Table 5.38: Impact of income on purchase intention and path coefficient difference for income

	Income: Income below $80K		Income: Income over $80K		Income below $80K-over $80	
	Path coefficient	p-Values	Path coefficient	p-Values	Path coefficient diff	p-values
AT -> PI	0.133	0.040	0.070	0.318	0.063	0.254
EC-> PI	0.049	0.318	0.071	0.224	0.023	0.606
GB -> PI	0.057	0.296	0.266	0.000	0.209	0.993
GP -> AB	0.307	0.000	0.212	0.050	0.095	0.220
MO -> AB	0.562	0.000	0.457	0.000	0.105	0.153
MO-> PI	0.190	0.001	0.394	0.000	0.204	0.975
PBC -> AB	0.115	0.016	0.265	0.000	0.150	0.953
PBC -> PI	0.398	0.000	0.218	0.006	0.180	0.053
PI -> AB	-0.026	0.632	0.036	0.737	0.061	0.699
PI -> GP	0.497	0.000	0.729	0.000	0.232	0.993
SQ -> PI	0.158	0.007	-0.004	0.944	0.162	0.030
SN-> PI	0.206	0.002	0.342	0.000	0.136	0.934

LEGEND: AB- Actual Behaviour; AT-Attitude; MO-Moral obligation; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail Service quality; PI-Purchase Intention; AB-Actual behaviour control

5.8.6. Impact of green energy user group on green energy purchase intention

This section deals with the impact of the user group on the critical factors influencing green energy purchase intention and actual buying behaviour. Table 5. 39 shows the path coefficient and p-value based on whether they are using green electricity user (or not) and the difference in the path coefficient between them. For the green electricity user group, purchase intention to green promotion (0.593) is the highest path coefficient value followed by the moral norm to actual behaviour (0.5). Both coefficients are statistically significant at the 5% level. Conversely, referring to the green electricity non-user group, purchase intention to green promotion (0.593) is the highest path coefficient value followed by the moral norm to actual behaviour (0.489). Both coefficients are statistically significant at the 5% level. The coefficient of the green energy user group is higher than the green energy non-user group when considering the influence of perceived behaviour control on purchase intention. All the path coefficients for the green electricity user group are higher than the green energy non-user group; however, it is not statistically significant.

Table 5.39: Impact of green energy uses on purchase intention and path coefficient difference for green energy user or not

	Green Electricity User: No		Green Electricity User: Yes		Green Electricity User: Yes-No	
	Path coefficient	p-Values	Path coefficient	p-Values	Path coefficient diff	p-values
AT -> PI	0.072	0.151	0.176	0.184	0.104	0.208
EC-> PI	0.043	0.193	0.124	0.313	0.081	0.248
GB -> PI	0.133	0.005	0.232	0.057	0.100	0.218
GP -> AB	0.226	0.000	0.351	0.002	0.124	0.158
MO -> AB	0.551	0.000	0.489	0.000	0.062	0.690
MO-> PI	0.247	0.000	0.127	0.252	0.120	0.830
PBC -> AB	0.195	0.000	0.038	0.636	0.157	0.950
PBC -> PI	0.411	0.000	0.201	0.094	0.210	0.936
PI -> AB	0.002	0.973	0.146	0.070	0.144	0.074
PI -> GP	0.593	0.000	0.593	0.000	0.000	0.497
SQ -> PI	0.082	0.076	0.162	0.194	0.081	0.264
SN-> PI	0.220	0.000	0.391	0.000	0.171	0.079

LEGEND: AB- Actual Behaviour; AT-Attitude; MO-Moral obligation; EC-Environmental concern; SN-Subjective norm; PBC-Perceived behaviour control; GP-Green promotion; GB-Green brand perception; SQ-Retail Service quality; PI-Purchase Intention; AB-Actual behaviour control

5.9. Chapter summary

The chapter examines in detail how the psychological factors influence Australian consumers' green energy purchase intention and buying behaviour. The chapter discussed the research results for this quantitative research using PLS-SEM statistical methods for assessing the structural model. The evaluation of PLS-SEM included two analytical stages: firstly, the assessment of the measurement model; and secondly, evaluating the structural model. Finally, the results of hypotheses testing were discussed. The reliability and validity tests were satisfied in the measurement model.

For assessing the measurement validity reliability and validity diverse tested including Cronbach's α, composite reliability (CR), convergent validity, and discriminant validity were tested. The reliability of the latent items was examined using Cronbach's α and composite reliability. The value of Cronbach's α 0.70 was suggested as a standard measure for each construct. The CR values for the constructs were deemed to be satisfactory (> 0.60). The study reported the range for Cronbach's α from 0.707 to 0.930 and the CR varied from 0.834 to 0.955 as highlighted in Table 5.6 where most of the values met the recommended value between 0.60 and 0.70. The measurement model also shown satisfactory convergent and discriminant validities. The convergent validity was evaluated by the means of factor loadings average and variance extracted (AVE). For all constructs the range of AVE in the research model was from 0.628 to 0.854, which was above the recommended threshold value of 0.5 recommended by researchers (e.g., Hair et al. 2019a). The discriminant validity was ensured by the Fornell-Larcker criterion (the square root of AVE), cross loading and by the means of heterotrait-monotrait (HTMT) ratio. In Fornell-Larcker's criterion, the results of the AVE's square root values of all constructs was greater than the highest correlation value for other constructs which confirmed the satisfactory discriminant validity. The current result shows that none of the HTMT values of the constructs exceeded the score above 0.90, reconfirmed discriminant validity (see Table 5.9). Cross-loadings were also examined for discriminant validity of the measurement model. The result of the cross-loading assessment reveals (Table 5.7) that each cross-loadings of items on its corresponding construct should was relatively higher, compared to the loading on other constructs, which confirmed the discriminant validity of the items in the research model. Thus, based on the findings, the evaluation of measurement model reflected valid reliability, satisfactory convergent and discriminant validities.

In terms of validating the structural model, the study followed the standard assessment criteria include collinearity, structural path analysis, significance testing, coefficients of determination and assessment of effect size. Basically, the research model explains 52% of the variance in purchase intention (GPI), and 57% in buying behaviour. Following the criteria adopted by Hair et al. (2019), the model R square for purchase intention and behaviour is moderate. Finally, the standardised root mean square residual value of the current research model is 0.059 which is<0.08, thus indicating that all datasets satisfy the requirements for goodness of-fit and appear to approximate model fit.

Using PLS-SEM, the study also analysed whether the proposed conceptual model can explain the mechanism of green energy consumer behaviour in Australia. Considering the path coefficient assessment of the 20 hypotheses, 12 hypotheses (seven had a direct effect on green energy purchase intention, one hypothesis of intention to promotion, three hypotheses on green energy buying behaviour, and finally the mediating role of green promotion) were duly supported with significance levels between 0.01 and 0.05. Although all the factors (attitude, subjective norm, behavioural control, environmental concern, moral norm, green perceived brand, retail service quality) do have a powerful effect on green energy purchase intention (GPI), the study did not find an indirect effect of these factors on actual buying behaviour via the GPI. However, the study reports green promotion fully mediates the link between intention and behaviour as proposed in the conceptual model. Overall, the outcomes of the current study proved that the conceptual model was statistically credible and could predict consumers' green energy buying behaviour in Australia. In addition to the PLS-SEM, the multi group analysis (MGA) was also tested to see if demographic factors lead to critical disparity in their group-specific parameter estimates. The results (PLS-SEM and PLS-MGA) of this research and their theoretical and practical implications are explained in detail in the following chapter.

CHAPTER 6
DISCUSSIONS, CONTRIBUTIONS, AND IMPLICATIONS

This chapter is the most comprehensive section of this thesis. It explains and discusses the results based on the survey data collected, building on the previous chapter to present the conclusions. The research question answers are documented here followed by the research objectives, whereby the results of the research hypotheses are stated. Also provided here is a comparative discussion about the findings of multiple group analysis (MGA) based on demographic factors. A critical analysis of the conceptual model and comparing it to others is presented. Finally, the research contributions and recommendations are offered.

Chapter outline:

- Introduction
- Discussion of findings relating to the research question
- Discussion relating to the research objectives
- Discussion relating to the structural model
- Discussion relating to the multiple group analysis
- Research contribution
- Research implications and recommendations
- Chapter summary

6.1. Introduction

The basic premise of this research was to generate empirical evidence on the intention and buying behaviours of Australian consumers with reference to green energy. Using the TPB framework, an extended structural model was developed by constructing elements of green energy purchase intention and buying behaviour (GPIB). The resulting research model formulated 20 research hypotheses (twelve causal relationships and eight mediation relationships) on the influence of variables related to personal (attitude, subjective norm, perceived behavioural control, environmental concern, and moral norm) and contextual factors (green perceived brand, retail service quality, and green promotion) influencing consumers' GPIB.

To establish the valid and reliable scales for all variables and to assess the causal relationships between the constructs, the partial structural equations of least squares (PLS-SEM) tested the hypotheses. In this chapter the results of the research hypotheses are discussed, and the respective findings are also compared with prior studies to identify how likely previous studies' reports are to be valid or otherwise. The chapter also compares the structural model to identify and justify its applicability. In line with the interpretation and discussion of the research findings, the chapter also discusses implications of the study for marketing theory and practice.

The chapter is structured into seven sections. Section 6.2 discusses the research question, firstly in terms of the direct causal relationships with the constructs, and then the indirect effects. Five research objectives are covered in Section 6.3, while the discussion of the structural model (i.e., coefficient of determination – R^2) is the focus of Section 6.4. Some new and interesting findings relating to demographic factors using PLS-MGA analysis are noted in Section 6.5. The research contributions relating to theoretical, methodological issues are stated in Section 6.6, followed by the practical implications of this research in Section 6.7. Finally, the chapter concludes with a summary in Section 6.8 of the main themes.

6.2. Discussion of findings relating to the research question

The centre of this research is the behavioural model which delivers theoretically concrete and quantitative findings, which could be used by marketers and practitioners to formulate a strategic framework towards green energy consumption. This research considers two overriding research questions as previously articulated in Chapter 1, which are:

(i) What factors determine green energy purchase intention and behaviour?

(ii) What can reduce the gap between purchase intention and actual behaviour?

To answer the research questions, the social cognitive theoretical framework (i.e., TPB), (Ajzen, 1991) was employed to assess consumers' green energy purchase intention and buying behaviour (GPIB). The research framework for this study was conceptualised by considering environmental concern, moral norm, green brand perception, retail service quality and green promotion in addition to the core variables of TPB, including attitude, subjective norm, perceived behavioural control, intention and actual behaviour. This was done to better understand the relational significance between these key factors in predicting the buying behaviours of Australian households. The model developed a series of hypotheses (H1~H20) to be evaluated against intention and buying green energy. The sample used to validate the modified TPB model (H1~H20) consisted of 386 participants from NSW, Australia.

Considering the hypotheses (H1~H20) presented in this research, the subsequent sections (i.e., 6.2.1 to 6.2.2) will discuss how these determinants influence purchase intention and buying behaviour of consumers of green energy in Australia. Sections 6.2.1 to 6.2.2 discusses the first research question. In relation to the intention-behaviour gap (i.e., the second research question) discussion is highlighted under Section 6.2.2 (H20).

6.2.1. Discussion relating to the direct effect

The research tested the structured research model and hypotheses based on two main dependents constructs – green energy purchase intention (GPI) and green energy buying behaviour (GEB). In the model, GPI acted as both endogenous (dependent variable) and exogenous (predictor variable) of green energy buying behaviour (GEB). The research reports that the purchase intention and buying behaviour regarding green energy is affected by personal (attitude, subjective norm, environmental concern, moral norm) and contextual factors (behavioural control green perceived brand, retail service quality, green promotion). A detailed discussion on each determinant (direct effect) as hypothesised (H1~H12) follows below.

H1: Attitude influences the green energy purchase intention

This research examined the consumer attitude to green energy and their direct impact on green energy purchase intention (GPI). The partial least squares (PLS)-based statistical analysis demonstrated strong support for the relationship between attitude and intention to purchase green energy (H1). In the empirical findings, H1 was supported at the 5% significance level, confirming that attitude to green energy had a positive effect ($\beta = 0.096$, p value of 0.041 or $p < 0.05$) on consumers' intention to purchase green energy. The finding for H1 indicates that consumer attitude significantly influences the dependent variable, i.e., intention to purchase green energy, and therefore H1 was accepted. Attitude, referring to the evaluation of performing a particular behaviour (Ajzen, 1991), emerged as a significant predictor having a direct effect on green energy purchase intention. It implies that Australian consumers exert a positive attitude concerning green energy purchasing.

The findings are consistent with TPB theory (Ajzen, 1991) to predict Australian consumers' intention to purchase green energy and is consistent with other studies, for example Halder et al. (2016), who studied antecedents to green energy purchase intention. They found that attitudes had a significant effect on behavioural intention in India. The findings relevant to attitude and intention are also consistent with the recent work of Sultan et al. (2020) on Australian consumers. A summary of H1 and how it compared to previous work is shown in Table 6.1.

Table 6.1: Comparison of H1 with prior research

Support (Current research)	Rebut (Prior research)
Attitude is more likely to influence positive purchase intention: Ajzen, 1991; Fishbein & Ajzen (1977); Halder et al., (2016), Palandino & Pandit, 2019; Ahmed et al., 2019b); Sultan et al., 2020	A negative attitude towards green practices is unlikely as reported in current literature. There are limited studies in the green literature that have examined the attitude in negative association with green energy purchase intention. E.g., Palandino & Pandit (2019)

Knowing that consumers' strong positive attitude contributes to a stronger green energy purchasing intent, it is essential for marketers to emphasise the perceived advantages of green energy consumption to get people to buy more of it. Several implications are suggested (see section 6.7.1) for energy retailers, policymakers and marketing professionals when expanding the green energy market in Australia.

H2: Subjective norm influences the green energy purchase intention

In the empirical findings, H2 was supported at the 1% significance level, demonstrating that subjective norm toward green energy had a positive effect (β = 0.237, p value of 0.000or $p < 0.01$) on purchase intention, so H2 is accepted. The subjective norm, referring to perceived social pressure or demand to comply with expectations about engaging any specific behaviour (Ajzen, 1991), is significant for the direct effect on purchase intention, meaning that for Australian consumers, social referents view from family, peer and friends can affect purchase green energy intention.

The strength of the relationship between subjective norm and GPI is strong, whereas the beta derived a value of 0.237. When individuals perceive themselves to be influenced by others, then they are more likely to purchase green energy because they value others' opinions. The existence of such a relationship between subjective norm and intention to purchase green energy has been acknowledged by many researchers (e.g., Smith & Palandino, 2010; Yazdanpanah & Masoumeh, 2015; Halder et al. , 2016; Palandino & Pandit, 2019), who reported that social reference was highly correlated with intention and therefore correctly predicted consumers' actual buying behaviour. This is also in line with the driving influence of TRA/TPB theory, where consumers reflect the behaviour of others (Ajzen, 1991). Prior studies in marketing show mixed results (positive and negative) on the relationship between subjective norm and purchase intentions of green energy. Our research findings contradict others which reported that subjective norm had the weakest link with intention, for example Tarkiainen & Sundqvist (2005), Paul et al. (2015), Yadev & Pathak (2015), and Taufique and Vaithianathan (2018). They all found a negative relationship between subjective norm and consumers' purchase intention for green products in a developing country, India. Interestingly, subjective norm in the current study posited greater influence on purchasing intention among Australian households; it is one of the top three predictors. This might be due to the cultural differences between India and Australia creating such a discrepancy. Positive social references generate positive intentions to purchase green energy. Educational background may be linked to this intention, which eventually exerts a positive or negative effect on the predictive strength of subjective norm or social references. H2 is compared to prior research and summarised in Table 6.2.

Table 6.2: Comparison of H2 with prior research

Support (Current research)	Rebut (prior research)
Social references are more likely to influence positive intention: e.g. Ajzen, 1991; Smith & Palandino, 2010; Halder et al (2016); Palandino & Pandit (2019); Sultan et al., 2020	The findings of the current research are in contradiction with prior research who found a negative relationship between subjective norm and consumers' purchase intention for green products: e.g.- Paul et al (2015), Yadev & Pathak (2015), Yazdanpanah & Masoumeh (2015); Taufique, & Vaithianathan (2018)

Subjective norm is an interesting emotional predictor of the intention to purchase green energy in Australia because the findings strongly support the relationship between subjective norm and purchase intention. It reflects that buying green energy has become a social norm in Australia where households feel that approval of "significant others" is an essential factor. Caution should be taken in strategic communications delivered by governments and energy marketers. This research has suggested further several implications (see section 6.7.2) for policymakers, energy retailers and marketing professionals for the green energy market in Australia.

H3: Perceived behavioural control influences green energy purchase intention

This research examined the perceived behavioural control (PBC) regarding green energy and its direct impact on green energy purchase intention (GPI). The partial least squares (PLS)-based statistical analysis of this research has demonstrated a strong empirical support for the relationship between PBC and intention to purchase green energy (H3). The perceived behavioural control, referring to the extent to which a person feels able to engage in the behaviour (Ajzen, 1991), is the strongest predictor of direct effect on the GPI ($\beta = 0.358$, $p<0.01$ or $p = 0.000$). It means that the Australian market exerted the strongest influence (compared to other variables) on green energy purchase intention. Consumers have higher levels of volitional control over themselves while deciding about their green energy purchase decisions. Also, consumers have more control over the ability and resources to purchase green energy and they are more likely to act on them. The findings also signify the importance of non-motivational factors in consumers' purchase intention (Alam et al., 2014). Therefore, consumers with high PBC can be contrasted to the social norm or any other intervention (e.g., government), as they believe they can handle any sustainability issues by themselves (Ellen et al., 1991; Jaiswala & Kant, 2017).

These findings are consistent with the literature that used TPB as the underlying theory. The direct effect results are consistent with those documented elsewhere (Cheng et al., 2006; Baker et al., 2007; Paul et al., 2015; Jaiswala & Kant, 2017; Sultan et al., 2020) where PBC is regarded as one of the main drivers of purchase intention. Also, the result appears to validate the findings of Halder et al. (2016) and especially regarding Australians (Palandino & Pandit, 2019). H3 as presented in this study is compared with prior research as shown in Table 6.3.

Table 6.3: Comparison of H3 with prior research

Support (Current research)	Rebut (Prior research)
Perceived behavioural control is more likely to influence positive intention: e.g. Cheng et al., 2006; Baker et al., 2007 Ajzen, 1991; Smith & Palandino, 2010; Paul et al., 2015; Halder et al (2016); Palandino & Pandit (2019); Jaiswala & Kant, 2017; Sultan et al., 2019	The findings of the current research are in contradiction with prior research who found a negative relationship between subjective norm and consumers' purchase intention for green products: e.g.- Trafimow & Finlay (1996); Petrea (2001); Dean et al. (2008); Yazdanpanah & Masoumeh (2015)

As indicated, PBC has a stronger influence on intention to purchase green energy, so it is important for green marketers to focus on communicating a mix of green energy products. Several implications are reported (see Section 6.7.3) for policymakers, energy retailers and marketing professionals to improve Australia's green energy market.

H4: Environmental concern influences green energy purchase intention

This research examined the environmental concerns of consumers regarding green energy and their direct impact on consumers' purchase intention (H4). In the empirical findings H4 was supported at the 5% significance level, in that environmental concern regarding green energy had a positive effect (H4: $\beta = 0.060$, p value of 0.035 or $p < 0.05$) on people's intention to purchase green energy. So H4 is accepted. Environmental concern, which refer to the responsibility to perform an environmental behaviour (Fujii, 2006; Prakash & Pathak, 2016) are a significant predictor of the intention. Thus, Australian consumers are concerned about environmental issues and express their strong intention to purchase green energy. It is safe to say that consumers in Australia are concerned about various environmental problems such as air pollution, greenhouse gas emissions and climate change.

The additional construct (environmental concern) in the TPB model examined had a direct effect on the GPI but is not consistent with prior studies like Ramayah et al. (2010) in Malaysia. This could be because although Malaysian consumers may be concerned about the environment, they may not feel morally obligated to exhibit a green purchase intention. However, the result of this study does agree with other researchers (e.g., Yadav & Pathak, 2015, 2016; Paul et al., 2015). The occurrence of such a relationship between environmental concern regarding green energy and purchase intention is noted by Bang et al. (2000). Their findings were highly correlated with consumers' intention to buy green energy, which is also a reasonable predictor of their actual buying behaviour. More recently, Palandino and Pandit (2019) and Ahmed, I et al. (2019b), found that Australian consumers are morally aware and concerned about environmental impact, so they feel obliged to demonstrate their intention to buy green energy. H4 is compared with prior research and results are displayed in Table 6.4 below.

Table 6.4: Comparison of H4 with prior research

Support (Current research)	Rebut (Prior research)
Environmental concern is more likely to influence consumers' green purchase intention: e.g. Bang et al (2000); Smith & Palandino, 2010; Yadav & Pathak, 2015, 2016; Paul et al., 2015); Palandino & Pandit, (2019) and Ahmed et al., (2019b)	In general consumers are concern for environment and hence it is very unlikely that environmental concern found to have negative impact on green purchase intention. e.g.- Ramayah et al., 2010

Environmental concern is a strong emotional predictor of the intention to purchase an intangible green energy product in Australia. The findings strongly support the relationship between environmental concern and purchase intention, reflecting Australian consumers' pro-environmental behaviour. Knowing that environmental concern exerts a stronger intention to purchase green energy, it is important for green energy marketers to stress the strong emotional appeal, relevant information and convince people about conventional energy's effects on the environment and why green energy is better (see section 6.7.4).

H5: Green perceived brand influences green energy purchase intention

This research examined the green perceived brand and its direct impact on intention to buy green energy (H5). The outcomes of the analysis confirms an appropriate representation of H5 at the 1% significance level, demonstrating that green perceived brand had a positive effect (H5: $\beta = 0.131$, p value of 0.003 or $p < 0.01$) on intention to purchase green energy. Thus, the green brand perception as it referred to green energy purchasing was observed to have a positive effect on green energy purchase intention. Hence, H5 is accepted. The green perceived brand, referring to a specific set of green brand attributes which can endow products with trust and quality benefits (Janiszewski & Vanosselaer, 2000), turned out to be a significant predictor for the direct effect on green energy purchase intention.

The findings indicate that Australian consumers are attracted to the green image of a green energy source. The significance of the psychological benefit of green energy brand predicting consumer intention toward green energy is confirmed. This observation can also be explained thus – a green perceived brand leading to green energy consumption is formed by an individual's rational assessment of the importance of trust in the green brand promoted by energy retailers. Consumers who have positive attitudes to green energy brands will generally trust the energy retailer, and there is minimal scepticism in their attitude to green energy purchase decisions.

When comparing the findings reported in the present research, virtually no prior empirical studies examined the appropriate representation of H5: green perceived brand has a positive and significant influence on the intention to purchase green energy. However, the results agree with the findings of Hartmann and Ibáñez (2011), who included ‘brand attitude’ in their research framework as a dependent (endogenous) construct and studied the impact of brand attitude on green energy purchase intention. Notably, this study conceptualised ‘green perceived brand’ as an independent (exogenous) construct based on the green brand literature (Bhattacharya & Korschun, 2006; Hartman et al., 2005) as exogenous construct (e.g., Sultang & Wong, 2018; Pimonenko et al., 2019). The relationship (i.e., H5) between green brand perception and green energy and its effect on GPI has been acknowledged by Palandino and Pandit (2012) in their qualitative study. They reported that green brand was highly correlated with consumers’ green energy purchase decision, which is a reasonable predictor of consumers’ buying behaviour. However, in the marketing literature, empirical examination of this issue is limited. H5 as presented in this study is compared to other reported research; see Table 6.5.

Table 6.5: Comparison of H5 with prior research

Support (Current research)	Rebut (Prior research)
Green perceived brand is more likely to influence consumers' green purchase intention: e.g. Palandino & Pandit, 2012; Hanimann et al., 2015	There are limited studies in the literature that have examined the green perceived brand in negative association with green energy purchase intention

Given the findings for H5, it is assumed that a well-planned green branding strategy can lead to a stronger perception of green energy, thus supporting the green energy marketing approach. Several implications are made here (see section 6.7.5) for energy retailers, policymakers, and marketing professionals for stimulating the green energy market in Australia.

H6: Retail service quality influences green energy purchase intention

This research examined the role of retail service quality in green energy and its direct impact on purchase intentions. The outcomes confirm an appropriate representation of the proposed hypothesis, H6, at the 5% significance level. Retail service quality leading to green energy purchase intention had a positive effect (β = 0.099, p value of 0. 023). So H6 is fully supported. Results indicate the significant influence of the construct on the endogenous (dependent) construct-green energy purchase intention. Notably, no other prior empirical studies have investigated the role of retail service quality on the GPI. So, there are no empirical findings to compare with this research. The current empirical findings investigated the direct impact of retail service quality on green energy purchase intention. Table 6.6 summarises H6 as presented in this thesis.

Table 6.6: Comparison of H6 with prior research

Support (Current research)	Rebut (Prior research)
Green energy retail service quality found to be an interesting predictor influencing consumer's green energy purchase intention. Palandino & Pandit (2012) found to be an interesting predictor influencing consumer's green energy purchase decision in their qualitative research.	To the best of our knowledge, no other empirical studies in the green consumption literature have examined the retail service quality for green energy in association with green energy purchase intention. Therefore, there are no empirical findings to compare with this research in negative association.

Retail service quality is a significant factor that could sway consumers' intention to purchase green energy especially for an intangible product, while price perception and authenticity about green energy are important barriers (Palandino & Pandit, 2012, 2019). This research confirms that Australian consumers are motivated by retail service attributes (i.e., price, information, authenticity, flexible payment options) that green energy retailers must offer. Energy retailers, therefore, need to communicate their retail service options, values and performance to prospective consumers. The present research has suggested several implications (see section 6.7.6) for energy retailers to improve the quality of their services in the green energy market in Australia.

H7: Moral norm influences consumers' green energy purchase intention

A growing body of research supports the role of moral norm as a significant predictor of intentions (e.g., Manstead, 2000; Godin, 2005; Conner & Armitage, 1998; Onel, 2017; Verma & Chandra, 2017; Tan et al., 2017; Sia & Jose, 2019) even when attitude, subjective norm and perceived behavioural control are taken into account. This research examined consumers' moral norms regarding green energy and its direct impact on purchase intentions (H7). H7 posits that consumers' moral norms significantly influence the intention to purchase green energy. The partial least squares (PLS)-based statistical analysis demonstrated strong support for the relationship between moral norm and intention to purchase green energy. H7 was supported at the 1% significance level with a p-value of 0.000.

The moral norm, which is referred to as perceived moral norm or responsibility to perform or not to perform certain behaviour (Ajzen, 1991; Tan et al., 2017), is a significant predictor of direct effect on green energy purchase intention. Australian consumers' strong moral norm can be translated into action through behavioural intention by prioritising eco-friendly green energy product purchase criteria. The inclusion of moral norms in the extended TPB model revealed a significant relationship with green energy purchase intention. It signifies that individual and social consequences are associated with green energy purchases in Australia.

The result of this research is in line with many green consumption behavioural analyses like Tan et al. (2017), Sia & Jose (2019), and Asadi et al. (2019) who asserted that for moral values, norms contribute substantially to behavioural intentions and behaviours in an environmental context (López-Mosquera et al., 2014; Tan et al., 2017; Taufique & Vaithianathan, 2018). The findings also support the driving influence of norm-activation theory (NAT) (Schwartz, 1977). Notably, Ajzen (1991) supported the importance of moral norm in the TPB model in predicting an individual's behavioural intention. H7 is summarised in Table 6.7 and compared to other studies.

Table 6.7: Comparison of H7 with prior research

Support (Current research)	Rebut (Prior research)
Moral norm found to be a significant predictor with regard to direct effect on green purchase intention. e.g., Godin et al. 2005; Arvola et al., 2008; Yeon Kim & Chung, 2011; Ha & Janda, 2012; Chen, 2015; Tan et al., 2017; Sia & Jose, 2019; Asadi et al., 2019; Ahmed et al., 2019b	To the best of our knowledge, no empirical studies in the green literature have reported negative association between green purchase intention and moral norm.

Considering the discussion above, the research confirms that Australian consumers have strong ethical motives and strong moral values that favour purchasing green energy for environmental sustainability. Managerial implications regarding purchasing intentions are discussed in section 6.7.7.

H8: Moral norm influences green energy buying behaviour

In this research, morality has been expressed in the form of moral norm linked to green buying motives and behaviour as noted elsewhere (Aguilera et al., 2007; Kim et al., 2014; Yadev & Pathak, 2015, Verma & Chandra, 2017). This research examined consumers' moral norm regarding green energy and its direct impact on buying behaviour (H8). H8 states that moral norm significantly and positively influences consumers' actual buying behaviour. The partial least squares (PLS) method analysed the relationship between green perceived brand and a consumer's intention to purchase green energy. The outcomes of the dataset confirm an appropriate and strong representation of the proposed hypotheses at the 1% significance level. The path estimates noted that consumers' moral norm does indeed have a significant and positive relationship with green energy buying behaviour ($\beta = 0.504$, p value of 0.000 or $p < 0.01$). Thus, the findings fully support the usefulness of incorporating moral measures into the TPB framework. Accordingly, moral norm in the context of green energy consumption appears to suggest a direct relationship with actual buying behaviour. H8 is supported and is consistent with norm-activation theory (NAT; Schwartz, 1977).

Despite the growing support for including moral norms as an additional significant predictor, as well as the accumulating evidence that moral norms explain a significant portion of the variance in green buying behaviours (Bamberg & Moser, 2007; Botetzagias et al., 2015), no evident prior research has investigated the direct relationship between moral norms and buying behaviour in the classic TPB model. Moreover, this empirical study reveals that moral norms are tested for the first time with reference to green energy buying behaviour. This is the first research on this topic to find such associations. This is an important lacuna in our knowledge since consumers' moral norms can drive a strong sense of responsibility, so there are real possibilities for green energy consumption. Interestingly this research has revealed that the most prominent predictor influencing one's pro-environmental behaviour is the moral norm. Based on this significant finding, the empirical evidence proved that moral norms have a profound impact on increased variance in buying behaviour. Thus, among the various additional predictors included in the current research model, moral norms hold a special place.

As indicated, an interesting finding is that this research is the first to demonstrate that moral norms have an important and direct impact upon whether Australian consumers enact their actual buying behaviour. Accordingly, marketers (see subsection 6.7.7) should seek to build on consumers' positive attitude to green energy and enhance the quality of their retail services.

H9: Perceived behavioural control influences green energy buying behaviour

This research examined perceived behavioural control (PBC) regarding green energy and their direct impact on the actual buying behaviour (H9). H9 was supported at the 1% significance level, demonstrating that PBC for green energy had a positive effect (H9: $\beta = 0.157$, p value of 0.000 or $p < 0.01$) on consumers' actual buying behaviour, thus H9 is accepted. Also, PBC is tested for the first-time concerning actual buying behaviour for green energy. Therefore, this result establishes for the first time that Australian households perceive that their efforts positively influence their buying behaviour. This measures the extent to which individuals believe that their own actions or abilities make a difference in solving environmental problems.

The findings agree with many past studies claiming that PBC has the highest explanatory power in predicting green buying behaviour (e.g., Vicente-Molina et al., 2013; Taufique & Vaithianathan, 2018; Sultan et al., 2020). The findings also confirm Ajzen (1991) who reported that PBC was highly correlated with consumers' purchase intentions and subsequently their actual buying behaviour. H9 is compared with prior research in Table 6.8 below.

Table 6.8: Comparison of H9 with prior research

Support (Current research)	Rebut (Prior research)
Perceived behavioural control (PBC)found to be a significant predictor with regard to direct effect on green buying behaviour. e.g., Ajzen (1991); Vicente-Molina et al., 2013; Taufique & Vaithianathan, 2018; Emekci, S. (2019)	There are hardly any studies in the literature that have reported the PBC in negative association with green purchase behaviour

H10: Green energy purchase intention influences green promotion

The current research explores the role of green promotion as a strong motivator which can help explain the relationship between intention and promotion in green energy purchase decisions. This research examined consumers' intention to purchase green energy and their direct impact on green promotion (H10). H10 is supported. The outcomes of the dataset confirm an appropriate and strong representation of the proposed hypotheses at the 1% significance level, and green energy purchase intention influences green promotion positively (H10: $\beta = 0.602$, p value of 0.000 or $p < 0.01$). The findings also suggest that consumers who have a positive intention toward green energy would generally have a further motivational factor (i.e., green promotion) to purchase. Consumers' intention to purchase green energy will influence the contextual factors (i.e. promotion) that may ultimately impact on the green energy purchase decision. No other relevant studies in the green consumer literature reported the direct impact of purchase intention on green promotion, and thus, there are no research findings to compare to. Since no hypotheses were developed in the current literature to capture the direct effect of intention on green promotion, the findings of this research might be considered new on this topic.

H11: Green promotion influences green energy buying behaviour

The current research examines the role of green promotion a strong motivator that helps explain the actual buying behaviour, as stated in H11. The partial least squares (PLS)-based statistical analysis demonstrated strong support for the relationship between green promotion and behaviour to purchase green energy (H11) at the 1% significance level, with a p-value of 0.000. The path estimates ($\beta = 0.273$) noted that green promotion does indeed have a significant and positive relationship with green energy buying behaviour, so it supports the usefulness of incorporating green promotion into the TPB model. This measures the extent to which green promotion can encourage pro-environmental behaviour.

Prior studies suggest that green promotion can influence the green energy purchase decision in today's challenging energy market (Del & Gual, 2004; Pethig & Wittlich, 2009; Palandino & Pandit, 2012). To the best of the author's knowledge no other research has established hypotheses for the impact of green promotion on actual buying behaviour. Since there is no equivalent study in the green consumption literature finding such associations, there are no comparisons to be made.

However, the finding from the quantitative research affirms that the application of green promotion has a deep effect on Australian consumers' green energy buying behaviour. Accordingly, energy retailers should build on customers' positive attitude to green energy, improve the quality of their services and generate promotional strategies that encourage the purchase of green energy (also see subsection 6.7.8 for more details).

H12: Green energy purchase intention influences consumers' green energy buying behaviour

The current study has investigated the link between the intention-behaviour relationships regarding green energy purchase as stated in H12. Most prior research is restricted to measuring the intention to purchase green energy, so this thesis explored the association between purchasing intent with actual buying behaviour. H12 states that green energy purchase intention influences positively consumers' actual buying behaviour. The partial least squares (PLS)-based statistical analysis of this research reveals that the path from intention to buy green energy to buying behaviour was negative and not significant ($\beta = -0.013$, p value of 0.807). There is no support for the hypothesised relationship between these two constructs - intention and behaviour.

The result for the surveyed consumers in Sydney suggests that although they possess positive attitudes and intentions regarding green energy buying, they may not be likely or willing to purchase it. Findings reported here contradict those documented elsewhere (e.g., Kumar et al., 2016; Yadev & Pathak, 2017; Richa, 2018; Sultan et al., 2020) who found a positively significant relationship between consumers' purchase intention and buying behaviour. Although the findings go against TPB theory, they are supported by the extant literature. For example, when exploring the TPB model and the link between intention and behaviour, empirical findings reported a less strong relationship, and also a more distant one (Godin & Kok, 1996; Conner & Armitage, 1998; Bălău, 2018). Ajzen (1991) stated that the intention-behaviour relationship was subject to many factors and a decline in the relationship between intention and behaviour could be expected. Thus, H12 is also consistent with TPB theory (Ajzen, 1991) and the other hypotheses (H1~H11) agree with the TPB model.

In general, the behavioural literature reports a positive relationship between purchase intention and behaviour. However, in the field of green behavioural research, empirical findings are far from clear (Sultan et al., 2020; Yang et al., 2020). Researchers like Wicker (1969, 1971), Katona (1960, 1963), Bird & Brown (2006), Sharma & Iyer (2012), Moser (2015) and Mishal et al. (2017) reported an insignificant and weak relationship between consumers' purchase intention and buying behaviour. This current study's result is in line with Palandino and Pandit (2019), who found that consumers' green energy purchase intention is not a significant predictor of buying green energy in Australia.

The empirical findings proved that consumers' intention may not always be consistent with their actual buying behaviours; instead, it may reflect an insignificant and negative relationship. The intention-behaviour gap/discrepancy as reported here is not a new phenomenon and supports the rejection of the hypothesis (H12). H12 is compared to prior research as shown in Table 6.9.

Table 6.9: Comparison of H12 with prior research

Support (Current research)	Rebut (prior research)
The intention-behaviour relationship is subject to many factors and the relationship between intention and behaviour expected to be positive and necessarily may predict the subsequent behavior e.g., Kumar et al., 2016; Yadev & Pathak, 2017; Richa, 2018; Sultan et al., 2020	Several studies argued that intention do not necessarily may predict the actual behavior. e.g. Wicker (1969, 1971); Katona (1960, 1963), Bird & Brown's 2006; Ottar & Grunert (2010); Sharma & Iyer 2012; Moser (2015); Mishal et al., (2017); Palandino & Pandit (2019)

The practice of measuring intention to predict subsequent behaviour is not always easy to do. Sometimes the intentional measurement may not be close to a specific behaviour, and external or situational factors may interrupt the intention-behaviour relationship. Although the findings of the current research reveal that intention to buy green energy influences buying behaviour negatively ($\beta = -0.017$), there should be reasons for such evidence. This might be because consumers do not trust green energy providers (Arkesteijn & Oerlemans, 2005). The discrepancy may also be due to a lack of consumer information, knowledge, and the perceived advantage of green energy consumption (Arkesteijn & Oerlemans, 2005; Ozaki, 2011).

Although Australian households (i.e., in the Sydney market) have demonstrated a significant positive intention to purchase green energy, it does not reflect their actual buying decision or action. It is an interesting finding for the Australian market in that it reveals an unexpected and distinct negative trend. This finding suggests that policymakers and energy marketers must initiate active measures in the form of public awareness, policies, regulations and promotions to encourage Australian households to develop more knowledge about green energy goods and services. This finding also gives researchers and academicians a much stronger basis for shifting consumers' purchase intention into actuality. Retailers need to devise suitable ways to overcome possible barriers (e.g., price, information, service, authentic supply of green energy) that impact on the green energy purchase decision.

As mentioned earlier, the rejection of H12 regarding the original TPB relationship between purchase intention and behaviour indicates that only intention does not play any significant role in green energy buying behaviour. It also suggests that consumers' actual buying behaviours are determined by external and important influences and not just their intentions. Hence, the external stimulus is a mediator in the present research. The inclusion of green promotion as a mediator between the intention and behaviour lessens the 'intention-behaviour gap' in the research model, which is posited in H20, as discussed in section 6.2.2.

6.2.2. Discussion relating to the indirect effect

The following section assesses the findings for the relationships between determinants of intention (attitude, social reference, behavioural control, environmental concern, moral norm, retail service quality, green perceived brand) and their indirect effect on one main dependent variable, i.e., green energy buying behaviour (GEB). The current research proposed that all the aforementioned factors affect the GEB through the mediation of purchase intention (see Chapter 5, Table 5.13). Specifically, the research reported that green promotion was the main mediation pathway between the intention-behaviour relationship (H20). A detailed discussion on each determinant (indirect effect) as hypothesised (H13~H20) in the research model is presented below.

H13-H19: The indirect effect of attitude, social reference, behavioural control, environmental concern, moral norm, retail service quality, green perceived brand on green energy buying behaviour

This research examined the indirect effects of attitude, subjective norm, perceived behavioural control (PBC), environmental concern, moral norm, retail service quality, green perceived brand on green energy buying behaviour (GEB) through the mediator behavioural intention. That is, consumers' green energy purchase attitudes wield a positive indirect influence on GEB through purchase intention (H13), subjective norm has a positive indirect influence on GEB through purchase intention (H14), PBC has a positive indirect influence on GEB (H15), environmental concern has a positive indirect influence on GEB (H16), green brand perception has a positive indirect influence on GEB (H17), retail service quality has a positive indirect influence on GEB (H18), moral norm has a positive indirect influence on GEB (H19). Table 5.13 (Chapter 5) shows the indirect effect estimates to test the mediating effects of green energy purchase intention (GPI) on each hypothesised path.

When analysing the hypothesised relationships (H13-H19) in the proposed model, the results do not support H13-H19 regarding the indirect relationship, because the indirect effect was negative and non-significant (see table 5.13). In other words, the GPI does not produce any mediating effect on the relationship between attitude, social reference, behavioural control, environmental concern, moral norm, retail service quality, green perceived brand and the GEB (H13-H19). This finding is inconsistent with past research.

For example, Sultan et al. (2020) examined the intervention efficacy or mediating effects of attitude, subjective norm, behavioural control and asserted that behavioural intention mediates the relationship between attitude, subjective norm, PBC with behaviour. In this study, the indirect effect may be due to survey respondents' lack of knowledge regarding green energy consumption issues. However, the findings of the current study are supported by other studies (Mateos et al., 2002; Ziadat, 2015) who examined intention as the mediating variable between independent variables and actual behaviour. Results of their research asserted that the behaviour intention does not have a mediating effect.

Regarding the indirect effect of environmental concern, moral norm, retail service quality, green perceived brand on green energy buying behaviour (GEB), barely any green literature has investigated the indirect effect of those factors on GEB. Consequently, there are no related findings to correlate what this present research reports. Since no research hypotheses were devised in any prior literature to capture the indirect effect of the aforementioned factors on the GEB, there is no data to compare. The indirect effect of these factors on the GEB in particular, constitutes a new discovery. The unsupported hypotheses (H13~H19) provide scope for further study on green energy consumer behaviour.

H20: The effect of green promotion as a mediator between intention-behaviour relationships

One of the overarching aims of this research was to examine the mediating effect of green promotion on the relationship between intention and behaviour with an aim to reduce the intention-behaviour gap. A review of the current literature reveals that no prior researchers looked at any factor that could explain the gap between intention and behaviour in green energy consumption settings. This limitation dissuaded researchers from looking for external stimuli or contextual factors transforming consumers' intention into actual buying of a green energy product and thus led to identifying the stimulus – green promotion as the key factor explaining the intention-behaviour gap underpinning the TPB model. The use of green promotion is very important, in particular green energy buying decisions because of the related external barriers, especially the price premium (Paladino & Pandit, 2012, 2019). Studies (e.g., Claudy et al., 2013; Halder et al., 2016; Hartmann et al., 2016; Palandino & Pandit, 2012, 2019) stressed the importance of marketing incentives and promotional activities to motivate consumers to buy green energy. Given the potential pitfalls, the current research endeavours to explore the role of green promotion as a strong mediator to explain firstly, the intention-behaviour gap in green energy consumption behaviour; and secondly, why individuals intend to behave in an environmentally friendly way but do not actually purchase the green energy product.

Mediators in the research model can provide helpful information on 'how' and 'why' the independent variable predicts or causes the outcome variable (Wu & Zumbo, 2008; Prayag et al., 2013). Mediation analysis could also play an important role in prediction (Nitzl et al., 2016; Shmueli et al., 2016). One key issue in this research is to examine the role of an external stimulus – a mediator for green energy consumption which can close the gap between the intention-behavioural relationship. The mediating role of green promotion in the research model was examined. Several scholars (i.e., Zhu et al., 2013; Hartmann et al., 2016; Yadev & Pathak, 2017; Palandino & Pandit, 2019) have stressed motivational factors – green promotion as able to bridge the gap between the GPI and GEB. Examining the role of green promotion for green energy as an intermediate factor can explain why and how there is an observed relationship between intention and behaviour.

To check the mediating effect of green promotion on these two dimensions (intention-behaviour), the approach recommended by Baron and Kenny (1986) was adopted in this research (see Chapter 5, Section 5.7.2.2). In the structural model the magnitude of the direct relationship between the green energy purchase intention (GPI) and green energy buying behaviour (GEB) dramatically changes after including green promotion (GP) as a mediator. In other words, the direct relationship between the independent variable (i.e., purchase intention) and a dependent variable (i.e., buying behaviour) regarding green energy is weakened when green promotion as the direct relationship between the independent variable (i.e., purchase intention) and a dependent variable (i.e., buying behaviour) regarding green energy is weakened when green promotion is incorporated into the research model. To elaborate, the magnitude of the direct relationship between the green energy purchase intention and buying behaviour dramatically changes (i.e., $\beta = -0.013$ from 0.080, p value of 0.807 from 0.131) when the mediator is incorporated into the research model (as discussed in Section 5.7.2.2, also see Table 5.33). This result indicates green promotion plays a full mediating role between the intention and behavioural dimensions (Baron & Kenny, 1986).

The findings imply that intention to purchase green energy does not directly influence the buying behaviour but is acted through a certain mediator variable (i.e. green promotion), which differs from other analyses (Bang et al., 2000; Claudy et al., 2013; Halder et al., 2013, 2016). More importantly, the recent work of Palandino & Pandit (2019) in Australia reported the negative relationship between intention and buying behaviour regarding green energy. This research verifies that the negative relationship between GPI and GEB regarding green energy is fully mediated by the external stimulus – green promotion.

This research does fill in the gaps in the literature regarding the mediation effect of green promotion on the relationship between intention and behaviour to purchase green energy. The findings indicate that consumers who intend to buy green energy have a strong interest in having the incentive to accept promotional activities offered by government or energy retailers, and these will help green energy being used for household activities. Thus, the findings from the current research offer insights into the widespread support of green promotional activities to enhance green energy consumption.

Examining the mediational effect of green promotion in the TPB model and including the Australian context are new contributions to the subject. This is the first research to find such associations and hence, there are no similar findings to compare them. The present study validated the role of an important mediating factor (green promotion) predicting the actual purchase of green energy by Australian consumers.

It has important implications for both practitioners, researchers and the energy marketers discussed in section 6.7.8.

6.3. Discussion of findings relating to the research objectives

The aim of the research was to investigate the factors affecting consumers' purchase intention towards green energy and their relative importance in predicting green energy buying behaviour among residential consumers in Australia. The research aim of this thesis is clarified with four research objectives (highlighted in Chapter 1). To investigate them, a well-known socio-psychological classical theory of planned behaviour (TPB) (Ajzen, 1991) was adopted to elucidate the impact of key psychological factors on Australian households' purchase intention and behaviours. The study employed TPB as its basic theoretical framework along with its three core elements (attitude, subjective norm, perceived behavioural control) and further attempted to extend TPB by including five new constructs:

(1) Environmental concern, (2) Green brand perception, (3) Retailer service quality, (4) Moral norm and (5) Green promotion. The following sections summarise the key findings of the thesis in line with the four research objectives.

The first objective was to examine the predictive power of psychological factors and their effects on consumers intending to buy green energy and their buying behaviour (GPIB) in Australia. Of the 20 hypotheses, 12 hypotheses (seven direct effect towards GPI, one hypothesis of intention to promotion, three hypotheses towards GEB, and finally the mediating role of green promotion) were duly supported (see Tables 6.12 and 6.13). In the case of basic TPB, all variables of TPB (ATT, SN and PBC) had a significant influence on the GPI. These findings agree with prior studies (Bamberg, 2003; Halder et al., 2016; Palandino & Pandit, 2019). Of these three constructs of the TPB model, perceived behavioural control was the key driver exerting the strongest influence ($\beta 1 = 0.358$) on the GPI, showing that consumers in Sydney have higher levels of volitional control over themselves when deciding about their green energy purchases. Concerning the additional constructs in the TPB model, moral norm had the most significant influence ($\beta 1 = 0.278$) on the GPI which indicates that when an individual has a strong moral norm for environmental sustainability then that person is significantly more likely to have adopt green energy due to the dangers of global warming.

In relation to the strongest predictors having the most significant influence on intention to purchase green energy, the strongest influence behind the GPI is that of perceived behavioural control (PBC). The last predictor of intention in the TPB is the perceived behavioural control (PBC), which refers to an individual's perceived ease or difficulty of enacting a particular behaviour (Ajzen, 1991). The PBC was the strongest predictor in explaining the Australian consumers' green energy purchase intentions. Although consumers face difficulties due to the presence of inhibitors of their behaviour (e.g., time, money, and skills), if consumers perceive that switching to green energy is advantageous, then they are likely to purchase it. This measures the extent to which consumers believe that their personal actions make a difference in promoting sustainable environment. The inclusion of moral norm as the second significant predictor affecting the intentions to purchase green energy, indicates that marketers should exhibit green communication strategies that appeal to consumers' moral feelings/values and conscientiousness (Ahmed, I et al., 2019). The significant identifier of consumers' intentions to purchase green energy was determined by social factors (i.e., subjective norm) rather than the personal factors (i.e., attitude).

The second objective was to test and validate the applicability of the theory of planned behaviour (TPB), (Ajzen, 1991) in determining consumers' intention and behaviour about purchasing green energy in Australia. This research employed TPB to test the relationship between GPI and GEB and it validated TPB in Australia. The outcomes of the research have also validated the practicality of extending the TPB model, as the additional constructs (environmental concern, perceived green brand, retailer service quality, green promotion and moral norm) improved the robustness and predictive power of the proposed framework. These constructs have advanced the model's predictive ability explaining the variance (R^2), which increased from 42% (TPB) to 52% (proposed framework) for behavioural intention and 25% (TPB) to 57% (proposed model) for buying behaviour. It is demonstrated that this research model has good predictive efficiency (see Table 5.18).

The third objective was to examine the extended TPB model with the mediation effect that may close the intention-actual behaviour gap. While most prior studies have only measured the intention to purchase green energy, this research goes beyond that by exploring the interdependence of GPI and GEB. There is a gap between consumers' green energy purchase intentions and actual buying behaviours (discussed in Chapters 2, 3). In this study, by looking at factors that can help close the gap between behavioural intention and actual behaviour in particular green energy, the role of green promotion was identified (and discussed in chapter 3). The current empirical findings show that the path from buying intentions of green energy to buying behaviour was negative ($\beta = -0.013$) and not significant ($p = 0.807$, $p > 0.05$). The scientific literature also highlights that individuals with strong intentions do not always translate these into action (Godin et al., 2010; Mishal et al., 2017). For instance, using the TPB model, Godin and Conner (2008) observed that 54.5% of participants in their study having a positive intention to exercise did not follow this up. On the same note, Claudy et al. (2013) reported the same thing for Irish consumers, and again this is echoed by Palandino & Pandit (2019) about Australian consumers. The findings of the current research are in line with previous research, whereby intentions to buy green energy do not predict actual purchase behaviour among Australians.

However, by looking at the motivational factors that can help close the gap between Australian consumers' green energy purchase intention and their actual behaviour, the impact of one key mediating variable – green promotion – was identified and examined. The data with Australian consumers in Sydney, NSW helped to confirm the hypothesis (H:20, see Chapter 5) that green promotion fully mediates the relationship between GPI and GEB (elaborated in Chapter 5, see Figure 5.1).

The fourth objective was to investigate the impact of demographic factors that may determine the likelihood of purchasing green energy by Australian consumers. partial least squares multi-group analysis (PLS-MGA) examined the role of gender, age, income, education, usage and user-non-user differences in green energy purchase decisions. The coefficient of the 40 and above age group is higher than that of the 18 to 40 age group when considering the influence of purchase intention on actual behaviour (path coefficient difference = 0.244). In the education group, the coefficient of below tertiary is higher than tertiary (highest difference compared to other coefficients) when considering the influence of moral norm to purchase intention (path coefficient difference = 0.276). For energy usage, the coefficient over 400 kWh is significantly higher than the less than 400 kWh user group when considering the influence of moral norm to purchase intention (path coefficient difference = 0.389), green promotion to actual behaviour (path coefficient difference = 0.320), and purchase intention to green promotion (path coefficient difference = 0.243).

Referring to the gender effect, men's purchase intention for green energy (0.673) is the highest path coefficient value followed by perceived behaviour control to purchase intention (0.401) at the 5% level. Notably, the coefficient for the below $80K income is significantly higher than that above $80K when considering the influence of retail service quality on purchase intention. Finally, the coefficient of green energy user group was higher than green energy non-user group when considering the influence of perceived behaviour control to purchase intention. All the path coefficients for green energy user group are higher than green energy non-user group but not statistically significant.

Overall, the PhD thesis achieved all the research objectives and thus expected that the findings elucidated the factors using a comprehensive theoretical framework in order to predict a clear picture of the Australian households' green energy adoption.

6.4. Discussion relating to the structural model

The study developed a parsimonious research model for measuring consumers' green energy purchase intention and buying behaviour (GPIB) and it explained the mediating relationship among the predictors (attitude, subjective norm, perceived behavioural control, moral norm, retail service quality, environmental concern, green brand perception and green promotion) for buying green energy in Australia. Although there has been some effort in the past predicting the intention to purchase green energy with an emphasis on attitude, social norm, and behavioural control (e.g., Bang et al., 2000; Litvine & Wüstenhagen, 2011; Halder et al., 2016), there was less attention paid to moral norm, environmental concern, green energy brand, service quality and green promotion. Other studies have explored factors influencing GPI (Bang et al., 2000; Bamberg, 2003; Halder et al., 2016), but not with respect to this range of aforementioned antecedents in one model.

In addition, it is important to note that intentions are good predictors of behaviour, and express people's motivation to buy (Honkenen & Young, 2014; Sultan et al., 2020). The relationship between purchase intention (PI) and green behaviour (GB) regarding green products is conceptualised in the literature (e.g., Kumar, 2012; Velnampy and Achchuthan, 2016; Sultan et al., 2020). Further, a positive relationship between these two constructs has been established in several empirical studies, such as those done on Chinese (Chan, 2001) and Indian consumers (Chaudhary, 2018). They proved that PI is the strongest predictor of GB for green products. However, Narula & Desore (2016) and Yadav & Pathak (2016, 2017) reported that investigating purchase intention and buying behaviour for green products may differ due to the circumstances under which consumers are willing to purchase a specific green product. To date there is no study published on the purchase intention-behaviour relationship with reference to a specific green product or "green energy". The importance of and the role played by individual cognition about green energy consumption-related behaviour (Bamberg, 2003; Palandino & Pandit, 2008, 2012; Halder et al., 2016) provides the rationale for this study. There is still a lack of genuine knowledge about the relationship between the determinants of purchase intention with buying behaviour regarding green energy products.

The study extends the theoretical and empirical evidence on the twelve causal and eight mediating (see Chapter 3) relationships between the proposed constructs. To establish and determine the causal relationships to confirm the theory's viability and structural model analysis, partial least squares-structural equation modelling (PLS-SEM) (Hair et al., 2014; Lohmöller, 2013) tested the hypothesised model. The structural model clarifies the causal relationships between structures in the model (path coefficients and R^2 value) (Hair et al., 2019a). Methodologically, the application of the PLS-based SEM technique provided renewed rigor and in-depth detail to the interpretation of results.

The following section is a comparative discussion of the structural model (R^2) with the extant literature to identify and justify the structural model developed for this thesis.

6.4.1. Explained variance (R^2) comparing with extant literature

Statistical analysis shows the total predicted R^2 for intention to adopt is 0.521, which means that 52% of the variance in individual intention to adopt green energy and R^2 for actual behaviour to adopt is 0.570, which indicates 57% variance in buying behaviour. To compare the R^2 with prior research findings, several studies on the subject of intention and behaviour are discussed in this section. Table 6:10 presents the results of variance which explained the GPI and GEB construct from extant studies on green energy goods and services. These articles were selected randomly because they all examined green purchase intention and/or buying behaviour from 2015 onwards, which is relevant to this thesis. Determinants of green purchase intention and buying behaviour were reviewed from existing empirical studies and are summarised below.

Table 6.10: Comparison of results of variance explained for intention and behaviour

Authors	Findings	Variance explained (Intention)	Variance explained (Behaviour)
Leeuw ET AL (2015)	This research used the theory of planned behavior (TPB) to identify the beliefs that influence high school student's pro-environmental behavior Luxembourg.	68.1	27.3
Halder et al (2016):	This research used the basic framework of Theory of Planned Behaviour (TPB) and used its three core constructs: attitude, subjective norm, and behavioral control to predict their effects on green energy purchase intention in cross cultural context between India and Finland. The results supported the basic TPB model.	0.68	NA
Yadav & Pathak (2017)	This research extended the Theory of Planned Behaviour (TPB) by adding additional constructs environmental concern and environmental knowledge to make an extended model to examine young Indian consumers' GPI. The results supported the inclusion of environmental concern and environmental knowledge in the extended TPB model.	0.619	0.317
Chaudhary (2018)	The study used the theory of planned behavior (TPB) by additional constructs personal norm, environmental concern, perceived value, willingness to pay premium with an aim to examine the antecedents and their relative importance in predicting green buying behavior among young educated consumers in India. The results supported the inclusion of perceived value and willingness to pay premium as significant predictors in the extended TPB model.	0.910	0.327

Taufique & Vaithianathan (2018)	The study used the insights of Theory of Planned Behavior integrating environmental attitudes, subjective norms, perceived consumer effectiveness, and behavioral intention in the model to investigate the determinants of ecologically conscious consumer behavior (ECCB) among young urban consumers in India. The findings reported that attitudes and perceived consumer effectiveness both have a significant direct and indirect positive influence on ECCB.	0.53	0.74
Emekci (2019)	This research extended the Theory of Planned Behaviour (TPB) by adding additional constructs environmental concern, environmental knowledge, and perceived consumer effectiveness (PCE) for exploring the factors that affect the green buying behaviours in Turkey.	0.062	0.034
Wang et al (2020)	This research extended the Theory of Planned Behaviour (TPB) by adding additional constructs environmental concern to examine the determinants of green purchasing intentions among different resident groups in a developing-country china. The R^2 (0.469) indicates that 46.9% of the variance in green purchasing intention.	0.469	NA
Sultan et al., (2020)	The aim of the study was to examine the intervention efficacy or moderating effects of perceived communication, satisfaction, and trust on the intention-behaviour gap and PBC-behaviour gap from organic food consumption behavior in Australia. The research framework for this study was founded on the theory of planned behavior (TPB) model. The research finds that perceived communication, satisfaction, and trust positively and significantly enhance purchase behaviour and lessen gaps in the intention -behaviour and PBC-behaviour relationships in the TPB model.	0.662	0.088

Of the cited studies in Table 6.10 it is evident that the variance explaining purchase intention and buying behaviour in five previous studies ranges from 0.469 to 0.910 and 0.74 to 0.088, respectively. Compared to the above-mentioned studies, the research model in this thesis explained (R^2) variables (i.e. intention and behaviour) 0.521% and 0.570% of the variance in purchase intention and buying behaviour, respectively, with regard to green energy purchasing, which is in the medium range of most cited studies presented in Table 6.10 It is worth noting that of the analyses cited in Table 6.10, only Halder et al. (2016) examined green energy purchase intention and found that relatively high variances explain significant differences in consumers' pro-environmental behavioural intention, most likely due to cultural differences. However, the relatively high variances explained by the extended TPB model in the present research are comparable with some other studies, in that the conceptual model for this thesis could explain significant variances in consumers' pro-environmental intentions.

Of the cited studies in Table 6.10, (Yadav & Pathak, 2017; Halder et al., 2016; Taufique & Vaithianathan 2018; Chaudhary, 2018; Emekci, 2019; Sultan et al., 2020) most were able to describe relatively high variances explained by the TPB model in individuals' purchase intentions in comparison with the present study. Two studies, specifically the R^2 of buying behaviours, make a useful observation (e.g., Taufique & Vaithianathan, 2018; Sultan et al., 2020). However, this study finds the explanatory power of buying behaviour higher for its successful adoption compared with most of the prior studies (Leeuw et al., 2015; Yadav & Pathak 2017; Emekci 2019; Chaudhary, 2018).

The results of this study's structural model to some extent seem to be lower in comparing with other studies (e.g., Sultan et al., 2020, cited in Table 6.10). This may be due in part to issues related to the validity of the scale measures. In addition, the sample of pro-environmental behaviours used was not perfectly representative of all possible measures. Testing the comprehensive and modified version of the TPB model is not easy considering the large sample size of participants required. The findings of the current research are related to the relationships' several predictors, including both personal determinants and contextual determinants on consumers' purchase intention and behaviour regarding green energy. These have not been previously tested together in one model.

Even though the gist of the structural model results to some extent seem to be lower in comparing with other studies, the R^2 values of the current study are relatively valid, consistent with the findings of other behavioural domains and fall within the moderate range (0.333) of explanatory power as recommended by Chin (1998) and Hair et al. (2019a). The findings of the proposed research model based on 'intention-behaviour' are very valuable for improving how the green energy market operates in Australia.

6.5. Discussion relating to the demographic factors using PLS-MGA

This study set out to create knowledge about the factors (attitude, social norm, behavioural control, moral norm, environmental concern, green energy brand, retail service quality and green promotion) influencing Australian households' green energy purchase intention and buying behaviour (GPIB). The study employed the partial least squares structural equation modelling (PLS-SEM) to: firstly, determine these factors by generating a path coefficient for the relationships (Section 5.5.2.3) and tested the hypothesised relationships (Section 6.2). While there is some marginal support for this hypothesis (e.g., Halder et al. 2016; Palandino & Pandit, 2019), no studies investigated the correlation between gender, income, age, education, energy use and user/nonuser perceptions of green energy. Given that socio-demographic factors are likely to influence the GPIB (Rowland et a.2013), the current study adds to this literature by investigating the socio-demographic factors of an important element. A multiple group analysis (MGA) was applied to investigate and identify the differences in the effects of GPIB and their influencing factors among different groups (see Chapter 5, Section 5.8).

Considering Australian households' demographic aspects, the PLS-based approach to multi-group analysis: PLS-MGA was used to investigate and evaluate the impact of gender, age, education, energy usage, user-non-user of green energy and income differences concerning the GPIB. These were the same categories made available for the MGA. The results of the PLS-MGA p-value showed there were significant group differences. The following section discusses the PLS-MGA analysis with reference to GPIB.

6.5.1. Effects of age on green energy purchase intention and buying behaviour

With reference to age group, the multi-group permutation test revealed important differences between the 18 to 40 age group and other groups (40 and above). While both age group groups revealed the positive influence of personal and contextual factors on green energy purchase intention (GPI), results indicated that the path coefficient between intention-behaviour relationship was negative ($\beta = -0.042$) for the 18-40 age group. In contrast, older participants (40 and above) showed a positive path coefficient (β = 0.202) for the relationship between intention and behaviour in adopting green energy (see Chapter 5, PLS-MGA Table 5.34).

A possible explanation for the negative (β = -0.042) path coefficient between the intention-behaviour relationship, could be that the 18 to 40 age group participants may not have accumulated sufficient knowledge about green energy, and therefore gave it only limited consideration. One important factor that can be highlighted is that this same age group demonstrated an insignificant effect of (β = 0.051, t= 1.577, p value = 0.115) environmental concern on GPI. This may explain why the respondents in the 18 to 40 age group do not intend to purchase green energy. Therefore, government and policymakers should promote the importance of environmental benefits to heighten consumers' environment concerns. Education or awareness should be emphasised in this age group (18 to 40) with respect to the importance of green energy.

Compared with the younger group, the older groups' (40 and above) environmental concerns have a significant influence on the GPI, which is related to the fact that this group knows more about green energy. The findings report that whereas both age groups (18 to 40 and 40 and above) support the positive influence on GPI, the younger group reports greater significant and positive impacts on green energy purchase intention and buying behaviour (see Table 5.34) than the older one. However, one common factor that can be highlighted is that both age groups (18 to 40 and 40 and above) demonstrated an insignificant path coefficient (p value = 0.461 and 0.144, respectively) for the relationship between intention and behaviour in adoption of green energy. Notably, the 18 to 40 age group showed a negative (β = - 0.042) relationship between intention and behaviour in regard to adopting green energy. Several explanations support the findings of the present research (see Section 6.2.1, H12). With reference to understanding the influence of age on investigating the factors affecting consumers' green energy buying behaviour, this is not addressed. So, there is no other research with which this thesis can be compared on this issue.

6.5.2. Effects of education on green energy purchase intention and buying behaviour

For the education groups (i.e., tertiary group and below tertiary group), the multi-group permutation test showed significant differences in terms of attitude and moral norm influencing the green energy purchase intention (see PLS-MGA Table 5.35, Chapter 5). The path coefficient of attitude and moral norm positively affected the GPI for both groups, but the tertiary group's attitude had an insignificant (β = 0.071, t = 1.429, p value = 0.153) effect on GPI when compared to the below tertiary group. In PLS-SEM moral norms constituted the second strongest predictor affecting the GPI. However, the MGA analysis found that the path coefficient of moral norm positively affected the GPI for both groups, but the below tertiary group's moral responsiveness had an insignificant (β = 0.077, t = 0.878, p value = 0.380) effect on GPI when compared to the tertiary group.

However, one common factor that can be highlighted is that both the tertiary group (β = 0.019, t = 0.534, p value = 0.593) and below tertiary group (β = 0.090, t = 1.206, p value = 0.228) demonstrated an insignificant effect of environmental concern on green energy purchase intention. There was also a significant difference between the intention-behaviour relationship. The multi-group permutation test highlighted that the tertiary and below tertiary groups demonstrated an insignificant path coefficient (p value = 0. 630 and 0.822, respectively) for the relationship between intention and behaviour in adoption of green energy. Several plausible explanations exist to support the findings of the present research (see Section 6.2.1, H12). In reference to investigating the role of education level in influencing green energy buying behaviour, no evidence persists in prior research and so there is no data to compare with the present research.

6.5.3. Effects of energy usage on green energy purchase intention and buying behaviour

The research investigates the important differences between two categories of energy usage (less than 400 KWH and more than 400 KWH). The findings report that both levels of usage positively influence attitude, social norm, moral norm, environmental concern, behavioural control, green energy brand, service quality, green promotion on the issue of green energy purchase intention (GPI). Moral norm, behavioural control and green promotion exerted a positive influence on buying behaviour as supported by both usage levels. Whereas both usage levels support the positive influence on GPI, the less than 400 KWH group reports greater significance ($p < 0.01$), and positive impacts on green energy purchase intention and buying behaviour (as shown in PLS-MGA Table 5.36, Chapter 5) than the above 400 KWH group.

In PLS-SEM analysis, Australian households showed a strong moral norm affecting the GPI. However, the MGA analysis finds that the path coefficient of moral norm positively affected the GPI for both usage levels, but high usage (i.e., above 400 KWH) had an insignificant ($\beta = 0.119$, p value = 0.422) effect on GPI when compared to the less than 400 kwh ($\beta = 0.119$, p value = 0.000) usage level. However, one common factor for both usage levels demonstrated an insignificant effect ($\beta = 0.052$, t = 1.460, p value = 0.144 and $\beta = - 0.001$, t = 0.017, p value = 0.986, respectively) of environmental concern on green energy purchase intention. Again, for both usage kevels it was demonstrated that an insignificant relationship (p value = 0.863 and 0.465, respectively) existed between intention and behaviour in adoption of green energy. Notably, the less than 400 KWH energy group showed a negative ($\beta = - 0.009$) relationship between intention and behaviour. A possible explanation for this is discussed in Section 6.2.1, H12.

6.5.4. Effects of gender on green energy purchase intention and buying behaviour

The results of the research demonstrated that both male and female gender groups had a positive influence from personal (i.e., attitude, social norm, moral norm, environmental concern) as well as contextual factors (i.e. behavioural control, green energy brand, service quality, green promotion) in green energy purchase intention (GPI). The findings show that whereas both male and female gender groups support the positive influence on GPI, the male group comparatively reports greater significant and positive impacts on green energy purchase intention and buying behaviour (as shown in PLS-MGA Table: 5.37, Chapter 5) than the female group.

In support of this finding, Ladhari and Leclerc (2013) noted the role of gender difference in the evaluation of online services by men and women. In Australia, males more positively evaluate green energy consumption behaviour in terms of attitude, subjective norm, behavioural control moral norm, retail service quality and green promotion than females. One common factor for both genders is the demonstrated and insignificant effect of environmental concern and green brand perception on green energy purchase intention. Policymakers, governments and marketers should focus on targeted communications relating to environmental problems, such as making short documentaries to educate the targeted market and inform them about environmental problems caused by conventional energy sources. In Australian households, there is a significant difference between intention-behaviour relationships, but both males and females demonstrated an insignificant relationship on the issue of adopting green energy. A number of plausible explanations exist to support the findings of the present research, see Section 6.2.1, H12.

6.5.5. Effects of income on green energy purchase intention and buying behaviour

The study examines the critical differences between two income levels (i.e., over \$80K and under \$80K) regarding the adoption of green energy (see PLS-MGA Table 5.38, Chapter 5). The results highlight that the impact of attitude and green brand perception positively affected the GPI for both groups. However, the attitude on GPI is found to produce a significant difference between both groups. Whereas respondents earning more than \$80k present an insignificant impact ($\beta = -0.070$, $t = 0.998$, p value $= 0.318$) on GPI, the reported attitude of participants earning less than \$80K exerted a significant influence ($\beta = -0.133$, $t = 2.054$, p value $= 0.040$) on GPI. Possibly, participants with higher incomes may not have accumulated sufficient knowledge about green energy. In contrast, participants earning less than \$80K have more knowledge about green energy and are more likely to purchase it.

The MGA analysis finds that the path coefficient of green brand perception revealed a positive influence on the GPI for both income groups, but the low-income group's green brand perception had an insignificant ($\beta = 0.057$, $t = 1.045$, p value $= 0.296$) effect on GPI when compared to the higher income group ($\beta = 0.266$, $t = 4.273$, p value $= 0.000$). This indicates that the positive effect of green energy brand is one where the consumers perceive the purchase of green energy as important. When residential households' attitude to green energy brands becomes more positive, the intention to purchase green energy increases. However, a closer examination of the MGA results finds that the lower income group's standardised path coefficients of green brand perception were an insignificant determinant of green energy purchase intention. This group needed to know more about brands that sold green energy. Successful green branding can be seen as a strong competitive advantage for energy marketers to differentiate what they sell as being better than conventional energy and helps environmental sustainability. The multi-group permutation test also highlighted that both income level groups demonstrated an insignificant path coefficient (p value = 0. 737 and 0.632, respectively) for the relationship between intention and behaviour when adopting green energy. Several explanations exist to support the findings (see section 6.2.1, H12). Regarding addressing the influence of income level on the green energy purchase intention and buying behaviour, no evidence has been found in prior studies, unlike the present study.

6.5.6. Effects of users and non-users on green energy purchase intention and buying behaviour

The study investigated different influences on purchase intention and buying behaviour for green energy between non-green and green energy users (see PLS-MGA Table 5.39, Chapter 5). The PLS-MGA approach investigated how different factors (attitude, subjective norm, behavioural control, moral norm, environmental concern, green perceived brand, retail service quality and green promotion) led to differences between non-green and green energy users' purchase intention and buying behaviour. Subjective norm, behavioural control, green perceived brand, green promotion, moral norm and retail service quality positively affected the GPI for both groups. The path coefficient of perceived behavioural control (PBC) positively affected and predicted the GPI for both groups, but users' PBC had an insignificant ($\beta = 0.201$, p value = 0.094) effect on GPI, whereas non-users' PBC had a significant ($\beta = 0.411$, p value = 0.000) effect on GPI. Similarly, PBC was positive in predicting the actual buying behaviour for both groups, but users' PBC had an insignificant ($\beta = 0.201$, p value = 0.636) effect on buying behaviour. Conversely, non-users' PBC had a significant ($\beta = 0.411$, p value = 0.000) effect on buying behaviour.

The core elements of PBC, which refers to the degree to which an individual can engage in a stated behaviour (Ajzen, 1991), reflects the fact that green energy users have volitional control over themselves when deciding about their green energy purchases, but it is not very strong compared to non-users. In other words, users have less control over their ability and resources to purchase green energy, but they still intend to buy it. This is possibly because this group has both a strong moral norm and the motivation to do so. Marketers therefore need to concentrate on educating consumers with the necessary information so that households will purchase green energy. To consolidate PBC, energy retailers and marketers can use 'infomercials' that promote the benefits of green energy. Furthermore, a deeper investigation of the MGA results reveals that users and non-users of green energy had standardised path coefficients of the structural model that were positive and significant. There was also a significant difference in the intention-behaviour relationship. The multi-group permutation test highlighted that both user and non-user groups demonstrated an insignificant path coefficient ($\beta = 0.146$, $t = 1.814$, p value = 0.070 and $\beta = 0.002$, $t = 0.034$, p value = 0.973, respectively) for the relationship between intention and behaviour in the adoption of green energy. A possible explanation for this is documented in Section 6.2.1, H12.

6.6. Research contribution

The study contributes to the corpus of knowledge on green energy consumption, and there are important implications for marketers and policymakers to consider. The contribution of this research is discussed from both the theoretical and methodological viewpoints below.

6.6.1. Theoretical contributions

The theoretical/knowledge contributions are ones that build on what is already known, but also provide a new perspective on green energy consumer behaviour. The repetition of similar results is important because they confirm existing theories so many of the findings here and in other studies are in fact reliable and valid. Table 6.11 shows the theoretical contribution based on the hypothesised model.

6.6.1.1. Contributions providing new perspectives to existing knowledge

1. A new kind of research framework concerning GPIB

Modelling behavioural intention and buying behaviour remains an important area of research in green consumer behaviour literature. The study draws on knowledge from existing literature and has identified several important predictors influencing consumers’ green energy purchase intention and buying behaviour (GPIB). Given that the intention to purchase green energy is influenced by several factors, there is a strong need for further research to determine the relationships between many important factors. This research employed eight determinants of GPIB: (1) attitude, (2) subjective norm, (3) perceived behavioural control, (4) environmental concern, (5) perceived green brand, (6) retailer service quality, (7) green promotion, and (8) moral norm. Attitude, subjective norm and perceived behaviour control were extracted from the TPB and the remaining five factors are noted in other literature as important determinants of GPIB.

While the significance of the aforementioned factors has been stressed in various research contexts, to the best of our knowledge no research has integrated these factors into the TPB model to predict customer intentions/behaviours regarding green energy. This research extended the TPB model by taking variables such as environmental concern, perceived green brand, retailer service quality, green promotion and moral norm into account in order to better predict the consumer GPIB.

Therefore, presented here is a new behavioural framework that can predict consumers’ future buying behaviour of green energy. Whereas prior research has examined a few of the relationships relevant to the model, the current research goes beyond that by expanding its horizons to incorporate green perceived brand, moral norm, retail service quality and the role of green promotion. In particular, the model examines the mediating role of green promotion in a developed country (Australia) and offers a generalised view of the mediation effects of green promotion on intention and behaviour when people purchase green energy. In this way the research produced more extensive findings on the effects of GPIB. The proposed research model can hopefully serve as an important step in generating a wider understanding of consumer behaviour in the context of green energy.

2. The antecedents of Australian consumers' purchase intention and buying behaviour

Much research has been done on consumers' intention to purchase green energy and how they behave in doing so, in various countries (USA, UK, India, China). However, the determinants of green energy buying behaviour exhibited by Australian consumers are not really known (Ahmed, I et al., 2020). Only one analysis (Palandino & Pandit, 2019) has done this, but their research centred on evaluating consumer attitudes. The direct effect and/or relationship of important personal and contextual factors to the intention to buy green energy remains uninvestigated (Ahmed, I et al., 2019b, 2020b). The present study attempts to fill this gap in the literature.

This thesis is apparently the first comprehensive research undertaken to understand the current state of green energy consumer behaviour, and to determine the antecedents of GPIB as well as their relative importance, in Australia. This is the first study that measures five novel constructs, i.e., perceived behavioural control, moral norm, green energy brand, service quality and green promotion. They are validated as the antecedents of GPIB for a sustainable green energy product. This study is also one of the first to attempt a comprehensive study of GPIB using the TPB framework, combining both behavioural intention and behaviour so that it can be employed in an Australian context and thus expands the marketing literature on this topic.

3. Contribution to theory

The present research advances our understanding of the factors influencing the GPIB by expanding the basic framework of TPB. Most previous studies only observed the relationship between three salient elements of TPB (attitude, subjective norm, behavioural control). In the present study, the inclusion of five additional constructs (environmental concern, moral norm, green perceived brand, green promotion, and retail service quality) improved the predictive power of the TPB model specific to the GPIB and thus improved the TPB framework. In this study, most of the relationships (direct) appeared to be significant as conceptualised according to the theory. It is worth noting that, until now, no studies have combined those factors in one framework to observe consumers' GPIB. So, the extended TPB model presents represents a new way to generate deeper insights in predicting people's green energy buying behaviour.

4. Closing the intention-behaviour gap

A careful review of the literature finds that most prior studies looked at behavioural intention but did not thoroughly measure the actual behaviour or the intention-behaviour relationship. To remedy this, the present study set out to understand the effects of different determinants of green energy purchase intention (GPI) and their effect on consumers' buying behaviour. Understanding the relationship between intention and behaviour will help retailers, marketers and policymakers to understand negative behaviours and address the intention-behaviour gap accordingly. The current research makes a robust contribution by resolving the intention-behaviour gap through the mediation effect of green promotion to increase green energy purchase. This corresponds to two dimensions, green energy purchase motivation and degree of confidence in buying. The level of motivation can encourage purchases and eliminate any perceived price barriers to embracing green energy. The degree of confidence may help consumers to understand environmental sustainability and thus, actualise their own environmental goals. Green promotion directly involves such confidence. Notably, the current research is the first to test such influential factors in a developed economy, Australia. This kind of research is rare in that it builds on prior studies by really focusing on the intention-behaviour model.

5. Contribution to research on green energy buying

Much of the research has wanted to understand consumer psychology with reference to people's buying behaviours (e.g., Kumar et al., 2016; Joshi and Rahman, 2015, 2019; Jaiswala & Kant, 2017). Several have been done on the determinants of green product purchases. It is worth noting that each green product has its own features, quality, performance, and functional benefits. The factors which influence consumers' green buying behaviour are based on their own individual needs (Kumar, 2014; Liobikienė & Bernatonienė, 2017). Industry-specific and product-specific research studies are required to better understand the factors affecting an individual's actions (Taufique & Vaithianathan, 2018). Academics and practitioners (e.g., Yadev & Pathak, 2016; 2017; Narula & Desore, 2016; Kumar, 2014; Liobikienė & Bernatonienė, 2017) have called for rigorous research into those factors affecting consumers' decision-making behaviours for a specific type of green product. These can vary from green energy, organic food, organic meat, etc.

Answering the call to consider the importance of psychological factors affecting the specific green product, and to strengthen existing green consumer research, the present research has contributed by advancing the understanding of determinants of the consumers' intention as well as behaviour towards purchasing a specific green product – green energy in the Australian context which can help the policymakers and green energy retailers to formulate certain strategies and programs to uptake green energy consumption practices, and thus can address the current issue of global warming, climate change and environmental sustainability affected by the electricity industry, which the whole world is struggling with.

6.6.1.2. Contributions reinforcing existing knowledge

1. Reinforcing existing knowledge measuring the purchase intention

A review of studies published between 2000 and 2020 on purchase intention in green energy reveals that consumers' intention to buy green energy products is influenced by three basic elements (i.e. basic elements of TPB): attitude, social norm and behavioural control. These may vary according to country, culture, values and industry. The extant literature (Bamberg, 2003; Halder et al., 2016) reported that the salient elements of TPB have a positive effect on people's intention to purchase green energy goods and services. The findings of the present study on this intention agree with other what other studies have found. Not much is known about the factors that influence consumers' intention and behaviours when adopting green energy. This consideration further expands the role of attitude, social pressure (subjective norm) and PBC which are linked to the purchase of green energy products and expands the current literature.

2. Reinforcing existing knowledge about attitude, subjective norm, PBC and environmental concern affecting the purchase intention

The extant literature (Bang et al., 2000; Bamberg, 2003; Hartmann et al., 2011; Halder et al., 2016; Palandino & Pandit, 2019) suggests that attitude, subjective norm, PBC and environmental concern affect consumers' intention to purchase green energy. The finding of this study also supported the contention that consumers' attitude, subjective norm, PBC and concern for the environment are evident in Australia.

3. Reinforcing existing knowledge towards intention-behaviour relationship

The literature is inconclusive about the relationship between intention and buying behaviour, especially in the context of green energy purchases. Intentions are good predictors of behaviour and express the motivation to buy (Honkenen & Young, 2014). The relationship between purchase intention (PI) and green behaviour (GB) regarding green products has been conceptualised (e.g., Kumar, 2012; Velnampy and Achchuthan, 2016). A positive relationship between these two constructs has been established, for example with reference to Chinese consumers, in the study by Chan (2001) and Indian consumers (Chaudhary, 2018). Narula & Desore (2016) and Yadav & Pathak (2016, 2017) reported that investigating purchase intention and buying behaviour concerning green products may differ due to the range of green products and it is important to consider the circumstances in which a person is willing to purchase a specific green product. Only one study (Palandino & Pandit, 2019) found that intention has a negative and insignificant effect on green energy buying behaviour. The PLS approach of the present study reinforced the existing knowledge and diminished the negative relationship between intention and behaviour via the external stimulus-green promotion.

6.6.2. Methodological contributions

1. The questionnaire design

The questionnaire used in green energy consumer behaviour research (Bang et al., 2000; Bamberg, 2003; Halder et al., 2016) possesses some limitations including double-barrelled questions relevant to green energy, lack of focus on items that are not consistent with certain factors, etc. The questionnaire designed for the present study attempted to fill the gap of these limitations and was validated through experts' comments. All the relevant items were adopted from the literature and worded so that they fitted the green energy context. The questionnaire design of the present study was also validated by pilot survey processes.

2. Convergent validity discriminant validity tests for new constructs

Four new constructs (green perceived brand, moral norm, retail service quality, green promotion) passed through six rigorous convergent validity tests and five discriminant validity tests. These tests have not been reported in many studies that attempted to develop a model for analysing green energy (Palandino & Pandit, 2019; Halder et al., 2016). Thus, the use of thorough convergent and discriminant validity tests in this study was advantageous. Furthermore, the methodology adopted was innovative for investigating causal relationships of the determinants.

3. Employing partial least squares structural equation modelling (PLS-SEM)

The major methodological contribution to this study is the role played by partial least squares structural equation modelling (PLS-SEM) path modelling to test the proposed structural model and hypotheses. It made possible a simultaneous analysis of multiple effects. Previous green energy consumption studies have been rather exploratory in nature and used only in-depth interviews (Salmela & Varho, 2005), or focus groups (Ozaki, 2011; Palandino & Pandit, 2012). A recent study used logistic regression, and this refers to Palandino and Pandit (2019).

From a methodological point of view, this thesis employs PLS-SEM path modelling that produces an effective outcome. Since PLS is very suitable for evaluating complex relationships in the model (Chin, 2010; Fornell & Bookstein, 1982; Hair et al., 2019; Sultan et al. 2020), therefore, PLS-SEM used in this research, expands the analytical scope for analyzing the factors affecting green energy buying behaviours. PLS-SEM technique modelling was used in many other studies before, however not employed investigating the green energy purchase intention and behaviour. Thus, the study contributes to and extends the methodological contributions of this research using the PLS-SEM identifying the rationales for predicting green energy purchase.

4. Partial least squares multi-group analysis (PLS-MGA)

Our final contribution is the application of partial least squares structural equation (PLS-SEM) combined with multi-group analysis (MGA) to deepen the understanding of group differences in Australian households' (NSW) green energy purchase intention and buying behaviour. This research is apparently the first to combine the partial least squares structural equation model with multi-group analysis (MGA) to investigate demographic factors, namely age, gender, income, education, occupation, and geographic location in relation to green energy purchasing.

Table 6.11: Summary of the research contribution based on the hypothesised model

Hypothesized Relationship	β value	P values	Results	Current research contribution
H1: Consumer's attitude towards the green energy positively influences their intention to purchase green energy.	0.096	0.041	Supported	Contributions reinforcing existing knowledge
H2: Subjective norm positively influences the consumer's intention to purchase green energy.	0.237	0.000	Supported	Contributions reinforcing existing knowledge
H3: Consumers' greater behavioral control significantly increases consumer intentions to purchase green energy	0.358	0.000	Supported	Contributions reinforcing existing knowledge
H4: Environmental concern positively influences consumer's intention to purchase green energy	0.060	0.035	Supported	Contributions reinforcing existing knowledge
H5: Green brand positively influences the consumer's intention to purchase green energy	0.131	0.003	Supported	Contributions providing **new perspectives** to existing knowledge
H6: Service quality of energy retailer influences consumer's intention to purchase green energy.	0.009	0.023	Supported	Contributions providing **new perspectives** to existing knowledge
H7: Moral norm significantly and positively influences consumer's intention toward green energy	0.278	0.000	Supported	Contributions providing **new perspectives** to existing knowledge
H8: Moral norm significantly and positively influences consumer's actual buying behaviour toward green energy	0.504	0.000	Supported	Contributions providing **new perspectives** to existing knowledge
H9: Consumers' greater behavioral control significantly influences consumer's actual buying behaviour toward green energy	0.168	0.000	Supported	Contributions providing **new perspectives** to existing knowledge
H10: Green energy purchase intention influences green promotion positively.	0.602	0.000	Supported	Contributions providing **new perspectives** to existing knowledge
H11: Green promotion influences green energy buying behaviour positively.	0.273	0.000	Supported	Contributions providing **new perspectives** to existing knowledge
H12: Green energy purchase intention posits a positive relationship with consumer's actual buying behaviour.	-0.013	0.807	Not supported	Contributions reinforcing existing knowledge

6.6.3. Summary of contributions

Overall, the present research is intended to provide information about the nature of consumers' green energy buying behaviour and provides comprehensive theoretical insights underpinning a new theoretical framework in predicting behavioural intent with respect to green energy choice. In brief, by addressing the research question of this thesis, this research contributes to the literature in several ways.

First, it addresses the recent call of several researchers (e.g., Halder et al., 2016; Palandino & Pandit, 2019) for some rigorous research into green energy consumer behaviour. Second, this research uncovers a set of new perspectives in understanding consumers' green energy purchase intention and buying behaviour (GPIB) via attitude, subjective norm, perceive behavioural control, environmental concern, moral norm, perceived green brand, retail service quality and green promotion. Though researchers in the past have studied the reasons for influencing their predecessors' motives for buying green energy, there are contrasting findings due to the socio-cultural differences and the samples used. Further, no studies were found that evaluated the four cognitive factors (moral norm, perceived green brand, retail service quality and green promotion) as the antecedents of GPIB directly and/or indirectly based on 'intention-behaviour' model of green energy consumer behaviour in the literature. Third, this research contributes to our knowledge of the process by which intention impacts green energy buying behaviour. Fourth, antecedents are presented to examine the GPIB as one of the first attempts that has incorporated the aforementioned factors in the TPB framework to measure consumers' GPIB in the academic literature. Fifth, this study first examines the mediating role of green promotion in the relationship between green energy purchase intention and actual buying behaviour and contributes to the academic literature. Thus, it contributes to reduce the intention-behaviour gap. Sixth, this research allowed for the first time, the gain of a greater theoretical understanding in regard to consumers' intention as well as behaviour towards purchasing green energy in the Australian context. Seventh, considering the marketing aspect, this research also provides several important additions examining the effects of individual differences in gender, age, income, education, usage and user-non-user in adoption of green energy choice behaviour provides new contributions by comparing the group differences in green purchasing intention and buying behaviour employing a multi-group analysis (MGA).

Based on the contributions discussed, this doctoral research contributed to the development of the current state of knowledge by developing a parsimonious model of GPIB understanding consumers' green energy buying behaviour exploring a range of both personal and external contextual factors. The extended research model was used in the current research to identify which factors significantly influence the GPIB in the market context of Australia. The issues of global warming, climate change have become more pressing for such a developed country Australia, knowledge of key influential determinants of green energy buying behaviour might yield helpful insights to the policymakers, relevant stakeholders, and energy marketers in stimulating the green energy market and also for the sake of the environment.

6.7. Research implications and recommendations

Based on a practical viewpoint, this research provides a strong rationale for exploring consumer attitude, subjective norm, behavioural control, environmental concern, green perceived brand, retail service quality, moral norm and green promotion dimensions in policies and programs that intend to encourage Australian households to purchase green energy. By looking specifically at the Australian green energy household consumer, the research provides several implications for marketers that are specifically relevant to the Australian household market of green energy. The research findings of this thesis are helpful for the continued development of the green energy industry. As a result, several marketing implications and suggestions derived from the findings of the present research for markers and policymakers are provided below.

6.7.1. Research implication of consumer attitude in adoption of green energy

The empirical finding reported that attitude is a stronger predictor of the intention to purchase green energy because purchasing green energy is a more individual behaviour (especially in this era) which is consequently influenced by a variety of individual beliefs among Australian households. However, it is assumed that in Australia, the success of green energy purchase decision and policy implications will be limited unless marketers and policymakers succeed in offering consumers a more positive attitude towards a sustainable environment. In view of this, the energy marketers should effectively communicate the emotional environmental appeal (claiming the environmental benefit of green energy consumption) among the targeted segments. Since consumer attitude towards green energy is positive, marketers should take this opportunity to provide clearer messages and detailed information about green energy quality, its production process, environmental benefits and any price benefit promotion. Such detailed information would enable potential consumers to compare the service of utility providers and help them to choose a competitive retailer and thus encourage them to sign up for green energy.

6.7.2. Research implication of subjective norm in adoption of green energy

Subjective norm is defined as the perceived social referent to implement a particular behaviour found to be strong regarding its impact on consumer intention of green energy in this study. Findings such as the significant impact of social pressure on purchase intention of green energy would be a novel observation into a collectivistic culture like Australia; hence, marketers and energy providers need to abstain from the traditional marketing approaches targeted exclusively at the collectivistic nature of Australian consumers. The government and other relevant stakeholders need to help create stronger social campaigns and critical mass to boost adoption processes of green energy consumption in Australian society. This will encourage consumers of the positive effects of green energy consumption and will create common social norms among consumers.

6.7.3. Research implication of perceived behavioural control (PBC) in adoption of green energy

This research has established that the most striking factor influencing green energy buying is PBC and it emerged as the most significant and strongest determinant of green energy purchase intention among all the constructs in the research model. This reflects that Australian consumers have greater levels of volitional control over themselves while making decisions about green energy purchase. Consumers believe their personal actions make a difference in solving the problem of global warming, climate change through the consumption of green energy as an initiative. Therefore, it is important for green marketers to now focus on educating consumers and ensuring the required information should be available that may save the time, effort and expand more opportunities to buy green energy among households. Furthermore, to mitigate the perceived difficulty, green marketers must focus on communication strategies to provide knowledge, information, mode of acquisitions, and availability or easy access to energy green options with a view to increase consumers' capability in the adoption of green energy.

6.7.4. Research implication of environmental concern in adoption of green energy

Environmental concern was also supported as an influence on green energy purchase intentions of Australian consumers. So, energy providers, marketers and policymakers should develop social interventions communicating the messages about how the adoption of green energy by the ecofriendly concerned consumers potentially can contribute to addressing environmental issues such as global warming and climate change. Therefore, there is a need to create awareness among Australian household consumers with an emotional appeal using personal engagement that may positively influence their attitude and intention regarding green energy. In this aspect, an integrated marketing communication strategy, for instance, advertisements in social media and green sponsorship practices can not only stimulate consumers' environmental concerns but can also educate them about the benefits for purchasing green energy.

6.7.5. Research implication of green energy brand in adoption of green energy

This study confirms that the perceived green energy brand is one of the important factors that influences the consumer's intent to purchase energy while consumers are very sceptical about the authenticity about green energy (Palandino & pandit, 2012; Hartmann et al., 2014). Therefore, marketers should highlight the green energy brand that may positively influence their intention regarding green energy purchase. For this reason, marketers can directly promote, and advertise the authenticity and benefits of green energy consumption via traditional and electronic media to stimulate green energy brand perception in the consumers' mind. This is important as consumers are influenced to buy green products if they are familiar with the green brand perception (Norazah, 2013; Suki, 2016). Therefore, energy providers should establish green energy brand positioning to strengthen the perception of current and potential consumers, to easily differentiate the advantages of brand from non-brand. In this aspect, green energy retailers need to establish themselves as independent and credible brand leaders, supported by green certification from the government or any independent regulators, to strengthen the credibility of their brand positioning.

6.7.6. Research implication of retail service quality in adoption of green energy

In this research, retail service quality was supported as a significant predictor that influences the purchase intention of green energy. Since green energy is a challenging and intangible product, there is a definite need to provide a consistent retail customer service option to build a positive market perception of green energy consumption. Energy retailers should attempt to increase their service process quality where they can use strong interaction with their customers to enhance consumers' perceptions about green energy. For example, in terms of service quality, energy retailers should provide all required information and tips on how to use green energy, attributes of green energy, pricing options available to potential customers, the authenticity of green energy, educate customers about the reliability and technology used for the production of green energy supply, provide a green energy hotline for authentic information and recognise customers for green initiatives. Thus, the service quality of green energy can alleviate consumer doubt about the authenticity of green energy (Palandino & Pandit, 2012) and enhance consumer trust in green energy consumption, and foster green energy buying behaviour.

6.7.7. Research implication of moral norms in adoption of green energy

The moral norms in this study exerted a significantly strong effect on consumers' intention to purchase green energy. Therefore, marketing campaigns as well as other promotional activities should focus on the inter-relationship between green energy consumption and consumers' moral norms. With an aim to develop the consumer's perceived moral values, community workers, educators and independent regulators including government bodies, should work with various stakeholders towards boosting the moral values of individuals so that they feel a moral value or responsibility to play a potential role in environmental sustainability by purchasing green energy. Governments can also introduce an ethical and moral education program about green consumption in the Australian education system to encourage an individual's sense of moral norm which can contribute to developing a sustainable environment – considered to be one of the effective policies to uphold green energy consumption responsibility among young generations.

6.7.8. Research implication of green promotion in adoption of green energy

The current research demonstrates that green promotion successfully mediates the relationship between green energy purchase intention and buying behaviour, therefore has significant implications for marketers, policymakers and government. Comparison of competing models revealed that green promotion not only directly affects the buying behaviour of green energy, but also is a critical mediator for the intention-behavioural relationship in purchasing green energy. This understanding facilitates designing specific marketing strategies aimed at converting the intentions into actual buying behaviour. For example, green promotional strategies like green promotional incentives, government incentives, organising social events, education weeks in institutions and workplaces might be motivating to obviate the barriers in green energy buying. These green promotional approaches might focus on eliminating structural or procedural impediments to the performance of a desired behaviour, specifically, by assisting the potential market segment who shows intention to buy. Furthermore, since green energy cannot provide visible or tangible advantages to households, the incentive program towards green energy by retailers could provide a level of strong credibility and thus lower the risk of purchasing an intangible green product and thus will enhance consumer confidence to adopt green energy. Our research outcomes also suggest that governments should endeavour to promote green energy consumption for instance using tax concession or rebates.

6.7.9. Summarising the recommendations

The essence of the results is that Australian urban (i.e., Sydney) consumers are concerned about the existing issues of global warming and climate change and have favourable attitude, social norms, moral norms and intentions to purchase green energy. Therefore, the findings have several implications on fostering sustainable green energy purchases by Australian consumers. These are further highlighted below:

The research strongly suggests that green energy marketing should address young and educated consumers because this group can help the green energy market grow.

Communication and other information interventions should be considered to educate consumers, so they become more familiar with various kinds of green energy. This is particularly important for the household or residential segment of the population.

Retailers, marketers and policymakers should communicate the messages to appeal to Australians in such a way as to improve their engagement with green energy.

The outcomes of this research find a strong intention-behaviour gap in the adoption of green energy. External stimuli and green promotional activities should be used to entice non-green energy users to consider green energy instead. We suggest that the Australian federal government initiate a green energy policy through subsidies and stronger agreements with the states and territories.

6.8. Chapter summary

The chapter discussed the outcomes of the data analysis (Chapter 5) and compared them with other studies' findings to identify how likely the latter are to be relevant to this topic. Also noted was the proposed model to identify and justify its applicability to green energy buying behaviour. The chapter also considered the extent to which the research objectives were achieved, and questions answered. The hypothesised model empirically tested in this research is a comprehensive one, and it can predict consumer intention and buying behaviours regarding green energy.

The hypotheses (H1-H20) described in Chapter 3 were examined, and the outcomes provide important conclusive evidence regarding GPIB in Australia. The hypotheses were tested on eight constructs (attitude, social reference, behavioural control, environmental concern, moral norm, retail service quality, green perceived brand, green promotion) and it revealed that they all influenced Australian consumers' intention to purchase green energy.

The results of this Australian empirical study confirm many other analyses (e.g., Yadav & Pathak, 2015, 2016; Paul et al., 2015; Kinnear et al., 1974; Roberts, 1996; Vicente-Molina et al., 2013; Taufique & Vaithianathan, 2017; Palandino & Pandit, 2019, Ahmed, I et al., 2019b). Most of all the sub-dimensions of green energy consumption motives, namely attitude, social reference, behavioural control, environmental concern, moral norm, retail service quality, green perceived brand and green promotion are all positively linked to consumer involvement with green energy purchasing. Results are significant because they provide important information about Australian consumers' purchase behaviour of green energy, and there are implications for policymakers, retailers and marketers. The findings can especially be used by energy retailers to target the basic triggers of people's green energy consumption patterns. The next and final chapter – Chapter 7 – summarises the key research findings, research limitations, future research directions and concluding remarks on this research.

CHAPTER 7
RESEARCH LIMITATIONS, FUTURE RESEARCH AND CONCLUSION

The chapter states the research limitations and provides directions for future research. In addition, the chapter summarises the key research findings documented in this thesis.

Chapter outline:

- Introduction
- Key findings of the research
- Limitations of the research
- Future research directions
- Conclusions

7.1. Introduction

Presented here are the key research findings, research limitations, future research directions and concluding remarks on this topic. The chapter is structured as follows: first, the key findings of the research summed up in Section 7.2. The findings relating to the research model also presented under Section 7.3. The limitations of the present research and then future research directions are discussed in Sections 7.4 and 7.5, respectively. Finally, the conclusion takes up Section 7.6.

7.2. Key findings of the research

The research examines the factors influencing the consumers' purchase intentions and actual behaviours about green energy. Although consumers show increased interest in green energy, research in this area, to date, is inadequate. This thesis used the theory of planned behaviour (TPB) to understand and examine green energy purchase intention and behaviour related factors. Most of the studies with TPB as the theoretical framework concluded that there is always a gap between purchase intention and actual behaviour. The research addresses this gap, hence the research questions are:

(i) What factors determine green energy purchase intention and behaviour?

(ii) What can reduce the gap between purchase intention and actual behaviour?

A total of 386 responses were collected in Australia (Sydney, NSW) as data input. Data were analysed using a partial least squares-structural equation modelling (PLS-SEM) technique. The key findings of this doctoral research are summarised in the following section.

7.2.1. Research question one

Factors determine green energy purchase intention and buying behaviour

This research aimed to explore the core factors that influence consumers' purchase intention and behaviour regarding green energy in Australian households located in Sydney, NSW. The research question of this study was centred on investigating the factors influencing consumer buying behaviour for purchasing green energy products. To investigate the research question, this thesis more specifically looked at several personal and contextual factors that can encourage or discourage green energy purchasing in Australian setting.

The research model for this study was conceptualised by considering environmental concern, moral norm, green brand perception, retail service quality and green promotion in addition to the core variables of TPB, including attitude, subjective norm, perceived behavioural control, intention, and actual behaviour. Thus, eight determinants of green energy purchase intention and buying behaviour (GPIB), were developed, these being:

(1) Attitude, (2) Subjective norm, (3) Perceived behavioural control, (4) Environmental concern, (5) Perceived green brand, (6) Retailer service quality, (7) Green promotion and (8) Moral norm.

All these factors were hypothesised to be related to green energy purchase intention which in turn affects buying behaviour. Attitude, subjective norm and perceived behaviour control were extracted from the TPB and the remaining five factors were supported from the literature as important determinants of GPIB. Although studies in green energy have dealt with purchase intention, research in green energy purchase behaviour is relatively inadequate when comparing these factors (environmental concern, moral norm, perceived green brand, retail service quality and green promotion) to the empirical findings that used the theory of planned behaviour (TPB, Ajzen 1991). To reflect green energy consumerism, current studies included several personal (attitude, subjective norm, environmental concern, moral norm) and contextual factors (PBC, green brand perceptions, retail service quality and green promotion), and finally, to reflect consumer response, the research considered intention and the actual behaviour measurement towards green energy purchase.

The survey data were collected from 386 Australian households using a structured questionnaire and partial least squares (PLS), an evolving approach to structural equation modelling (SEM). The results provide several useful insights in predicting consumers' green energy purchase intention behaviour (GPIB). From an evaluation of the dataset applying the PLS-SEM technique, out of 20 hypotheses, 12 (including 11 direct effect and one mediation) were confirmed with expected signs of coefficients. The results of the path analysis are summarised in Tables 5.12 and 5.13 (Chapter 5) with the help of coefficients (β) and P values; it was found that most of the hypotheses were accepted at ($p<0.01$ and $p<0.05$).

Among the key determinants (i.e., attitude, subjective norm, perceived behavioural control-PBC, environmental concern, perceived green brand, retailer service quality, green promotion and moral norm) of green energy purchase intention and behaviour (GPIB), the top three important marketing-related psychological factors (PBC, moral norm, subjective norm), were all able to predict consumers' intention to purchase green energy in Australia. In fact, PBC, moral norm, and subjective norm accounted for a large proportion of the variance in intentions to engage in eco-friendly green energy purchases. These intentions together afforded good prediction of self-reported buying behaviour regarding green energy.

PBC appeared as the dominant predictor affecting the purchase intention of green energy and this is noteworthy. Australian households have more control over and ability to purchase green energy and consumers are more likely to act on it. This finding also demonstrates the degree to which an individual may believe that certain actions may create differences in green energy consumption where environmental sustainability is the expected result. As suggested by the TPB model, perceived control plays two distinct roles: first, as a measure of the confidence an individual has regarding whether they can perform the specific behaviour; and second, as a surrogate measure of the actual level of control (Ajzen, 2015). Since an individual's level of PBC will strongly influence their green energy buying behaviour, this study suggests that green energy marketers should now focus on educating consumers to buy green energy products or goods and services.

A consumer's intention to buy green energy was determined by their moral norm which was the second predictor of green energy purchasing. This signals that Australian households have substantial ethical motives and greater moral norms that support green energy consumption. The findings denote the impact of moral norm on green energy purchase intention, where an individual feels the moral norm to purchase green energy so they are more willing to do so. Regarding subjective norm, the study finds social reference is the third predictor exerting a significant impact on Australian green energy purchase intention. The descriptive findings of this research proved that relatives, peers and colleagues and friends with better knowledge of green energy are the best sources for consumers to adopt green energy because they are all unified on the issue of environmental sustainability.

7.2.2. Research question two

Reducing the gap between purchase intention and actual behaviour

Much of the green consumer behaviour literature has drawn on several factors, in a bid to offer a better understanding of how consumers develop purchase intentions and how these transforms into actual buying. Researchers have consistently reported the strong existence of an intention-behaviour gap in green consumption. Yet, the factors that help to reduce this gap and its magnitude have not been systematically investigated up until now. Closing the intention-behaviour gap can be done by conducting an empirical study using a conceptual model for the green energy context. Review of the current literature reveals that no prior researchers looked at any factor that could explain the gap between intention and behaviour in green energy consumption settings. This limitation dissuaded researchers from looking for external stimuli or contextual factors transforming consumers’ intention into actual buying of a green energy product (Ajzen & Fishbein, 2005) and thus led to identification of the stimulus – green promotion as the key factor explaining the intention-behaviour gap underpinning the TPB model.

This research discovers there is an opportunity to close the gap in the literature by examining the role of “green promotion” as a mediator to observe the relationship between intention and behaviour. In the research the mediating role of green promotion reduces the intention-behaviour gap and is the principal predictor of green energy buying behaviour. Examining the role of green promotion for green energy as an intermediate factor explained why and how there is an observed relationship between intention and behaviour. To check the mediating effect of green promotion on these two dimensions (intention-behaviour), the approach recommended by Baron and Kenny (1986) was adopted in this research and discussed in Chapter 5. To elaborate, the magnitude of the direct relationship between the green energy purchase intention and buying behaviour dramatically changes (i.e., $\beta = -0.013$ from 0.080, p value of 0.807 from 0.131) when the mediator is incorporated into the research model (as discussed in Section 5.7.2.2, also see Table 5.33). This result indicates green promotion plays a full mediating role between the intention and behavioural dimensions (Baron & Kenny, 1986). The findings imply that intention to purchase green energy does not directly influence the buying behaviour but is acted through a certain mediator variable (i.e., green promotion), which differs from other analyses (Bang et al., 2000; Claudy et al., 2013; Halder et al., 2013, 2016). More importantly, the recent work of Palandino & Pandit (2019) in Australia reported the negative relationship between intention and buying behaviour regarding green energy. This research verifies that the negative relationship between GPI and GEB regarding green energy is fully mediated by the external stimulus – green promotion. This research does fill in the gaps in the literature regarding the mediation effect of green promotion on the relationship between intention and behaviour to purchase green energy.

7.2.3. Summary of the key findings:

In a nutshell, the research sought to provide a deeper understanding of Australian consumers' green energy buying behaviour based on the extension of environmental concern, moral norm, retail service quality, green perceived brand and green promotion in the TPB model. The empirical results lead to three important concluding findings:

(1) Purchase intention of green energy is directly dependent on psychological factors: attitude, subjective norm, PBC, environmental concern, moral norm, retail service quality and green brand perceptions. The strongest impacts on behavioural intention were perceived behavioural control on intentions followed by moral norm and subjective norm (see Table 7.1). Whilst perceived behavioural control wields a large impact on intention to adopt green energy, environmental concern has the

weakest impact. This study was one of the first of its kind to be studied in a systematic way which investigated factors influencing consumer moral norm, retail service quality, perceived green brand and green promotion on the purchase of green energy in Australia.

(2) The present research shed new light on the intention-behaviour relationship and found that green promotion as a mediator can bridge the relationship between intention and behaviour. “Green promotion” was found to have a significant mediational effect between intention and behaviour, and thus, reducing the gap between purchase intention and actual behaviour, as well. Therefore, the novel theoretical contributions include the predictive ability of the extended TPB model relative to the original, with the same dataset, and an explanation about how “green promotion” can address the intention-behaviour gap. To the best of our knowledge this research is the first to highlight and test a motivating contextual variable (green promotion) that mediates the intention-behaviour relationship in a green energy consumption context.

(3) Evaluation of the model showed that the moral norm was a significant determinant of the behaviour followed by green promotion and PBC towards the purchase of green energy. These results highlight the importance of improving conditions to facilitate the availability of eco-friendly green energy products and removing any potential barriers.

Using the theory of planned behaviour (TPB, Ajzen, 1991) the conceptual model was developed which aimed at shedding light on Australian consumers’ intention towards green energy and providing a better understanding of factors that can lever individual behaviours towards green energy buying. The predictive ability (R^2) of the conceptual model that explains the mechanism behind consumers' purchase of green energy is discussed in the following section.

Table 7.1: Results of the path analysis (direct relationship with intention)

Hypotheses	Result	Coefficients (β)	P value	Level of Significance	Rank of outcome
H1: Consumer's attitude towards the green energy positively influences their intention to purchase green energy.	Positive	0.096	0.041	1% or p<0.05	6th
H2: Subjective norm positively influences the consumer's intention to purchase green energy.	Positive	0.237	0.000	1% or p<0.01	3rd
H3: Consumers' greater behavioral control significantly increases consumer intentions to purchase green energy	Positive	0.358	0.000	1% or p<0.01	1st
H4: Environmental concern positively influences consumer's intention to purchase green energy	Positive	0.060	0.035	1% or p<0.05	7th
H5: Green brand positively influences the consumer's intention to purchase green energy	Positive	0.131	0.003	1% or p<0.01	4th
H6: Service quality of energy retailer influences consumer's intention to purchase green energy.	Positive	0.099	0.023	1% or p<0.05	5th
H7: Moral norm significantly and positively influences consumer's intention toward green energy	Positive	0.278	0.000	1% or p<0.01	2nd

7.3. The outcome of the model predicting the GPIB

One of the important aspects of this research was assessing the complexity of extending the theory of planned behaviour (TPB) and understanding the mechanism behind consumers' green energy choice behaviours in an Australian context. This research adopted, modified, and validated a model originating from the TPB to measure green energy buying behaviour in Australia. The TPB model is the most widely used framework and overshadowed other social psychologists' models developed in the past three decades (Yazdanpanah & Masoumeh, 2015; Ahmed, I et al., 2017). In the context of green energy, researchers have also used the TPB framework to investigate and explain consumers' intentions (Halder et al., 2016). Prior research demonstrated the validity and applicability of TPB in predicting consumers' green behaviours in different cultural contexts. We, therefore, applied the framework to investigate what affects consumers' decisions with respect to purchasing green energy.

Consumers' green energy buying behaviours may depend on various factors, classified as personal and contextual factors (see Chapter 3). An examination of both these factors can clarify an individual's behavioural acts (Yadev & Pathak, 2019). This study expands the TPB model by combining both personal factors and contextual factors. The validated research model in this study combined personal factors (i.e., attitude, social norm, behavioural control, environmental concern, moral norm) with contextual factors (i.e., green perceived brand, retail service quality, green promotion) to better explain consumers' decisions relating to green energy. Together they offer significant insights into green energy adoption with an exclusive focus on behavioural intention, and examination of a mediator (i.e., green promotion) closing the intention-behaviour gap. The structural model (depicted in Fig 7.1) comprising personal and contextual factors underpinning the modified TPB framework aims to investigate the factors predicting consumers' green energy purchase intention (GPI) and green energy buying behaviour (GEB). Theoretically, this study contributed to the literature on green marketing and green energy consumption by investigating the integrative effects of both personal and contextual factors on behavioural intention and buying behaviour.

The following section summarises the validity and predictive ability of the model including the original TPB and extended TPB towards green energy in an Australian context. The model's predictive power was assessed by looking at the coefficient of determination (R^2) values (Hair et al., 2019a) of the dependent (endogenous) variables – GPI and GEB. All the predictors were highly significant predictors of intentions and behaviour.

7.3.1. The role of TPB predicting the GPIB

Using the PLS-SEM approach, this research validated the theory of planned behaviour model (TPB, Ajzen, 1991) in the context of Australian consumers' green energy purchase intention and buying behaviour (GPIB) and found statistically significant results for most of the hypotheses. From an Australian standpoint the core framework of TPB has provided an excellent outcome for conceptualising, measuring and empirically identifying factors that determine the GPIB. In terms of model variance, the results of the original TPB model (see Fig 5.1) reveal that the three antecedent variables included in this model can explain the variance of one's intention to purchase green energy is 42% and 26% of the variance in buying behaviour, respectively (Hair et al., 2019a). The results verify that the components of the TPB model can influence one's intention to consume and purchase green energy as expected. These findings contribute to and extend our understanding of the GPIB, identifying the rationales for purchasing of green energy.

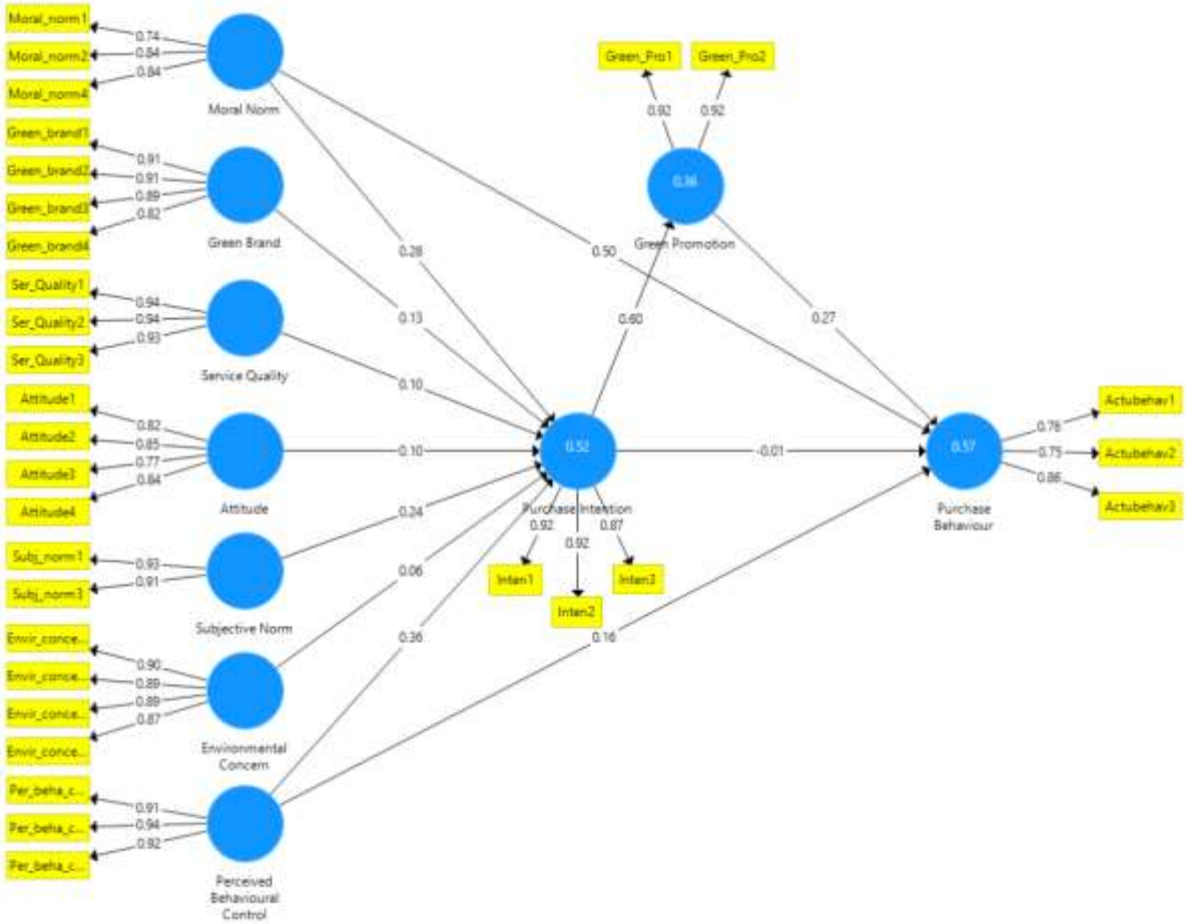


Figure 7.1: Outcome of the research model

7.3.2. The role of extended TPB predicting the GPIB

The results show (see Fig 7.1) that this thesis' extended TPB model has a strong predictive power compared to the original TPB model with the same set of data. The proposed conceptual model revealed a satisfactory amount of total variance to account for why Australian households are motivated in their purchase intentions and buying of green energy. The model was able to explain 52% of the variance in purchase intention and 57% of the variance in the observed behaviour. The study results indicated that the modified TPB model had a satisfactory fit to the data and the inclusion of these constructs significantly enhanced the predictive power of Australian household consumers' intention to buy green energy: $R^2 = 0.521$ from i.e., $R^2 = 0.420$ as well as green energy buying behaviour $R^2 = 0.570$ from i.e., $R^2 = 0.259$, see Table 6.18. This indicates the increased predictive power of the added constructs (environmental concern, moral norm, perceived green brand, moral norm, retail service quality and green promotion) in the modified TPB framework. Established here is the practicality and applicability of the proposed model to generate a decent overall data fit for predicting consumers' purchase intention and behaviour.

In sum, the findings of this doctoral research reveal that the application of behavioural theory can help explain green energy consumers' behaviour and forecast the intent to adopt it. This study is one of the first attempts to incorporate attitude, social norm, behavioural control, environmental concern, moral norm, and green perceived brand, retail service quality and green promotion into the framework of TPB to predict consumers' purchase intention and buying behaviour of green energy. Results from this research are of great importance because they provide important information about Australian consumers' purchase behaviour of green energy and this can assist policymakers and marketers.

7.4. Limitations of the research

The current research is not without its limitations. First, the research was carried out within a non-specific domain of green energy (green energy consumption) in a specific context (a developed country), so it is unwise to generalise the findings more broadly or to specific types of green energy products such as solar energy. It is important to investigate the circumstances under which a consumer is ready to pay a premium price or cost for a specific green energy product and whether the factors such as attitude, norms, brand, trust, service quality, group influence and convenience have any role to play in creating a better price. Scholars reported that consumer behavioural intention differs for a variety of green products, so future research should focus on consumer intention and behaviour towards a specific type of green energy product to understand green energy purchasing in Australia.

Second, this study was based on cross–sectional surveys like most green marketing literature. This limitation can be neutralised by evidence that supports priory theory-based inferences (Hammond et al., 2020). Several studies on green energy consumer behaviour literature were based on cross-sectional surveys (Bang et al., 2000; Tang & Medhaker, 2011; Rowland, 2003; Hobman & Fredrick, 2014; Halder et al., 2016; Palandino & Pandit, 2019), which have been unnecessarily criticised (Sultan & Wong, 2014).

Third, the generalisability of the study is questionable. This research was carried out in a particular state and city in Australia; so, it does not represent the Australian consumer as a whole. The sample residents who live in Sydney may not be representative of the whole population. Therefore, a nationwide survey and study is needed to learn more about consumer behaviour with respect to green energy.

Fourth, the current research focused on the main effects of attitude, social norm, perceived behavioural control, green brand, retail service quality, moral norm with purchase intention which in turn affects the buying behaviour via the mediator green promotion. The interrelationships between the constructs were not examined in this thesis as this was beyond the scope of this PhD thesis. The interrelationships of such constructs could have potential effects on the behaviour, so should be examined in future research.

Despite these limitations, the current research provides some generalisable insights to understanding consumers' purchase intention and behaviour regarding green energy in Australia. Notably, the study is one of the first attempts to use an Australian context for examining a research model that explains the consumer purchase intention and buying behaviour for green energy based on the extension of environmental concern, green perceived brand, retail service quality, green promotion and moral norm in the theory of planned behaviour (TPB). Emphasising these important additional factors determined by the present study can frame the attitude of the consumers and encourage them to consider green energy purchasing, with encouragement to marketers and policymakers to understand consumers' green energy buying behaviours in Australia. Moreover, virtually no study has to date checked the impact of socio-psychological factors on green energy purchase intention and behaviour of consumers in Australia. Therefore, this research can enhance the understanding of green energy purchasing in the Australian context and predict consumer demand for green energy purchasing in Australian market.

7.5. Future research directions

This thesis advances several avenues of future research on the green energy behaviours. These are discussed in more detail below.

First, this thesis develops a comprehensive model of green energy purchase intention and behaviour (GPIB) which suggests there is scope for rigorous research, not only in more Australian household markets but elsewhere in the world. The current research objective was to generate an empirical analysis of "green energy buying behaviour in the Australian context". This research reported the empirical findings from a sample in Australia (Sydney). Based on the findings, it would be beneficial for future research to conduct a similar study elsewhere in Australia, to obtain a true representation of ethnic/socio-economic/racial groups or communities and thus enable an understanding of the evolving nature of Australian households' green energy consumption behaviour.

Furthermore, cross-cultural studies could provide other explanations of the major issues because cultural aspects may reveal interesting findings that differ from behavioural studies (Tan et al., 2017). Applying this parsimonious model in a cross-cultural setting to explain household consumers' GPIB could be help policymakers and researchers who work in environmental psychology. In particular, future research conducted on cross-cultural perspectives could look at differences between developing and developed economies, to reveal the connection between the "TPB framework" and "economic and energy appreciation" in numerical terms. Cross-cultural studies are essential to support the viability of environmental psychology-related theories in a variety of cultures (Halder et al., 2016).

Second, future research could consider younger consumers (e.g., students) and especially their green energy buying behaviours because such consumers are the ones who will bring about the desired changes in society (Joshi & Rahman, 2019). This group of consumers understands the significance of green purchasing and how it is linked to social and environmental issues (Yadav & Pathak, 2016, 2017). Therefore, studying young consumers' attitude, perception, values and behaviours could provide better insights for promoting pro-environmental behaviours in the future. Third, the current research has referred to self-reported data where scale items were adapted from several scholarly publications. Future researchers may collect measures and items through other methods (e.g., direct observation, qualitative findings).

Fourth, the current research focused on factors affecting consumer green energy purchase intention and behaviour (GPIB) shows evidence the direct influence of predictors in adopting green energy and thus helps with an understanding the Australian household consumer norms, perception, values and attitudes that drive green energy choice decisions and help marketers better understanding consumer perceptions towards green energy consumption. Future research may focus on reasons against adopting green energy in the Australian context. Academicians can explore the factors that specifically cause the mismatch between consumer attitudes. Behaviour discrepancy can help with understanding the countervailing influence of reasons against adoption of green energy which could be an important way to enhance adoption of green energy, possibly in the future.

Fifth, although the factors driving the mechanisms of green energy buying behaviour were explored in this thesis, a few questions still remain unanswered. The effects of certain primary determinants on green energy consumption behaviour, specifically how green energy buying behaviours were affected by limited personal and contextual factors could be explored in more depth. Future studies may integrate other important factors like governmental support, green perceived value, green information, price perception, trust, and satisfaction. Furthermore, future research could concentrate on the issue of moderating effects which may reinforce our existing knowledge about the relationship between intentions and buying behaviour.

Sixth, as discussed one of the key focuses of this research was investigating the effect of intention towards green energy buying behaviour, but this study had limited the measure of the intention-behaviour gap, as well as the reasons exploring only one mediating construct “green promotion”. Hence, future studies should focus other mediating factors for an in-depth insight on closing the intention-behaviour gap of green energy consumption among residential households of Australia.

Finally, the methodology for the current research did not employ qualitative findings on the possible beliefs consumers have about green energy. Future studies should explore consumers’ green energy buying behaviour using the qualitative approach for a deeper insight into consumers’ psychological state. In quantitative approach future research may also use Probit and Logit model for the analysis. It would be certainly interesting to see the weather Logit model provide any different result.

7.6. Conclusion

The overarching aim of this doctoral research was to investigate the factors influencing consumers’ intention and purchase behaviour of green energy. It also covered the issue of how to reduce the gap between intention and actual behaviour. Using the theory of planned behaviour (TPB) devised by Ajzen (1991) as the theoretical basis of this research, a conceptual model was developed to shed new light on understanding consumers’ intention to purchase green energy and those factors that make this possible. The research model for this study was conceptualised by considering environmental concern, moral norm, green brand perception, retail service quality and green promotion in addition to the core variables of TPB, including attitude, subjective norm, perceived behavioural control, intention, and actual behaviour. Thus, eight determinants of green energy purchase intention and buying behaviour (GPIB), were developed, these being:

(1) Attitude, (2) Subjective norm, (3) Perceived behavioural control, (4) Environmental concern, (5) Perceived green brand, (6) Retailer service quality, (7) Green promotion and (8) Moral norm.

All these factors were hypothesised to be related to green energy purchase intention which in turn affects buying behaviour. Attitude, subjective norm and perceived behaviour control were extracted from the TPB and the remaining five factors were supported from the literature as important determinants of GPIB. Thus, an extended TPB model was developed for an empirical examination. The focal point of the research was exploring the influence of determinants as hypothesised by the extended theory of planned behaviour (TPB) to interpret the direct and mediating relationships among the factors influence the GPI and GEB. The model examines reciprocal determinism and views several factors as determinants of the green energy purchase intention (i.e., GPI), so that more is known about behaviours involved in purchasing green energy in Australia.

The present research tested the appropriateness of the extended TPB model with the application of the structural equation modelling (SEM) technique and for this purpose, partial least squares (PLS), an evolving approach in SEM technique was applied. The empirical research builds on a survey with a sample of 386 participants from NSW (Sydney), Australia. In a nutshell, the research sought to provide a deeper understanding of Australian consumers' green energy buying behaviour based on the extension of environmental concern, moral norm, retail service quality, green perceived brand and green promotion in the TPB model. The empirical results lead to three important concluding findings:

(1) Purchase intention of green energy is directly dependent on psychological factors: attitude, subjective norm, PBC, environmental concern, moral norm, retail service quality and green brand perceptions. The strongest impacts on behavioural intention were perceived behavioural control on intentions followed by moral norm and subjective norm. Whilst perceived behavioural control wields a large impact on intention to adopt green energy, environmental concern has the weakest impact. This study was one of the first of its kind to be studied in a systematic way which investigated factors influencing consumer moral norm, retail service quality, perceived green brand and green promotion on the purchase of green energy in Australia.

(2) The present research shed new light on the intention-behaviour relationship and found that green promotion as a mediator can bridge the relationship between

intention and behaviour. “Green promotion” was found to have a significant mediational effect between intention and behaviour, and thus, reducing the gap between purchase intention and actual behaviour, as well. Therefore, the novel theoretical contributions include the predictive ability of the extended TPB model relative to the original, with the same dataset, and an explanation about how “green promotion” can address the intention-behaviour gap. To the best of our knowledge this research is the first to highlight and test a motivating contextual variable (green promotion) that mediates the intention-behaviour relationship in a green energy consumption context.

(3) Evaluation of the model showed that the moral norm was a significant determinant of the behaviour followed by green promotion and PBC towards the purchase of green energy. These results highlight the importance of improving conditions to facilitate the availability of eco-friendly green energy products and removing any potential barriers.

Despite the above empirical findings, the result in this research may not be generalised throughout Australia. However, it is assumed that the findings can give a general idea for green energy buying behaviour of individuals. The findings of the present research are novel for five reasons.

First, this research applies the research of attitude, subjective norm, perceive behavioural control, environmental concern, moral norm, perceived green brand, retail service quality, green promotion, purchase intention, and purchase behaviour to the field of green energy marketing. This research has also investigated a set of unexplored important factors, viz moral norm, retail service quality, green brand, green promotion which were tested in the context of green energy buying behaviour for the first time. No relevant studies were found to assess the four factors (i.e., moral norm, retail service quality, green brand perceptions, and green promotion) as the antecedents of green energy choice behaviour directly and/or indirectly based on an ‘intention-behavioural’ model of green consumer behaviour in the literature.

Second, this thesis provides a new theoretical explanation and possible remedies for the concern intention-behaviour gap in the green energy consumption context. Previous scholars (e.g., Godin et al. 2005; Claudy et al., 2013; Hassan et al.2016;

Palandino & Pandit, 2019) noted the gap between a consumer's reported level of purchase intention and buying behaviours. Scholars (e.g., Palandino & Pandit, 2019; Sultan et al.2020; Agag et al.2020) have recommended a deeper theoretical investigation of conditions under which consumers' purchase intention may or may not directly influence their actual behaviour to better understand the discrepancy between them. The current research responds to the call of researchers who stressed the need to investigate the intention-behaviour gap through a mediating mechanism to assess the aforementioned links (i.e., intention-behaviour).

The major contribution of this research is to question the common assumption of the intention-behaviour relationship, seen in much of the empirical green marketing literature. In this research, one core hypothesis was introduced to investigate the mediating effect of green promotion on the relationship between purchase intention towards green energy and actual green energy buying behaviour. The research confirms that the negative relationship between purchase intention and green energy purchasing behaviour is fully mediated by an external stimulus – green promotion. To the best of our knowledge, this research is the first to examine the mediating effects of green promotion on the intention-behaviour gaps in the TPB model.

This outcome highlighted the dilemma of the intention-behaviour gap associated with pro-environmental behaviour and green consumption. This disparity can be partially explained by the negative effects of price, information, and knowledge barriers on consumers' purchase behaviour. Given the potential pitfalls, the current research has broadened our knowledge about green energy purchasing in an advanced market economy; Australia.

Third, this research provides unique findings about the socio-demographic factors that interact with orientations toward green energy purchase intention and buying (GPIB). While there is some marginal support for the psychological determinants affecting the GPIB (e.g., Halder et al. 2016; Palandino & Pandit, 2019), no studies investigated the correlation between demographic variables (gender, income, age, education, energy use and user/nonuser perceptions of green energy) and GPIB. Given that socio-demographic factors are likely to influence the GPIB (Rowland et a.2013), the current study adds to this literature by investigating the socio-demographic factors as an important element. A multiple group analysis (MGA) was applied to investigate and identify the differences in the effects of GPIB and their influencing factors among different groups.

Fourth, empirical assessment of the behaviour in the TPB model has been lacking to date as most of the prior research was concerned with investigating behavioural intention as the final outcome. The present research is one of the first that has attempted to understand GPIB using a TPB framework incorporating both behavioural intention and reported behaviour in Australian context. Most past studies about green energy have been done in the UK, USA, Netherlands, Germany, Canada, Sweden, and other developed economies. This research from the Australian standpoint yields advanced and new findings that add substantially to the current literature. Australia is emerging as a global leader in the privatisation of the energy market as well as a large market in the Oceania region rich in renewable energy resources yet facing challenges in how the green energy market should function.

Finally, most of the research on green products are generic in nature. However, since each green product has its own features, quality, performance, and functional benefits, it is important to investigate the circumstances under which a consumer is willing to purchase a specific green product. In this thesis, exclusive attention is paid to the buying behaviour of an intangible product – ‘green energy’, as currently there is an imbalance between the purchase intention and buying behaviour of green energy and the limited attention paid by researchers to this type of such environmentally friendly green product.

In line with discussion above, this PhD thesis endeavours to enrich the current literature by incorporating important determinants associated with green energy buying behaviour in the context of a developed country, Australia. To the best of our knowledge, there are hardly any studies investigating the impact of personal and contextual factors on green energy purchasing practices of consumers in the marketing literature. In our research the model (i.e.., GPIB) validated claims to be unique in green energy behavioural research. Valuable insights about consumers’ perceptions relevant to green energy use have emerged in this study in terms of buying behaviour. It marks a new area of academic contribution and knowledge relating to the potential of the green energy market’s expansion, especially in Australia. Beneficiaries of this research include various stakeholders (retailers, policymakers, government departments) in Australia and globally such as international green energy associations or institutions.

We conclude that Australian governments should strengthen the marketing of green energy and promote effective communication strategies to improve the environmental value of green energy to consumers. Finally, if the recommended strategic options are incorporated for stimulating green energy consumption, it will offer an important contribution to the wider society and reinforce the great importance of sustainability.

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APPENDICES

Appendix 1 Literature review on green energy buying behaviour – 2000-2019

Studies	Demographic variables	Independent variable	Dependent variable	Theoretical ground	Country/Limitation
1.Bang et al (2000)	income, education, age, gender	Consumer concern for the environment, consumer knowledge and beliefs	Purchase intention	TRA	USA, low sample
2.Roe et al (2001)	income, education, age, gender, occupation	Environmental attributes	Willingness to pay for green energy	NA	Low market segment targeted
3.Rowlands, Scott & Parker (2003)	income, education, age, gender	Perceived consumer effectiveness, liberalism, altruism and ecological concern, community, social network and communication, Knowledge	Potential purchasers of green energy	NA	Canada. Low response rate.
4.Bamberg (2003)	Age, gender, income, education	Environmental concern and TPB elements	Purchase decision	TPB	German

Studies	**Demographic variables**	**Independent variable**	**Dependent variable**	**Theoretical ground**	**Country/Limitation**
5.Arkestaijn & Oerlemans (2005)	Age, gender, income,	Perception of ease of switching and use, probability of power failures and trust in GE suppliers; environmental responsibility, perceived advantage, knowledge, communication network and environmental behaviour; willingness to pay, price and net income.	Adoption of green energy	NA	Netherlands. The study had a small sample size
6.Samela & Varho (2006)	NA	Orientational issues: time, effort, Economic factors;	Barriers in adoption of green energy	NA	Finland/ only qualitative findings
7.Kristina & Patriks (2008)	Age, gender and education	Cost of purchasing green energy, including electricity price and electricity heating; self-image characteristics including perceived consumer effectiveness, personal responsibility and perception of others; perceptions about personal environmental benefits, Social reference	Price premium for green energy	Norm activation theory	UK, Low response rate
8.Hansla et al. (2008)	Age, gender, income, education	Value orientation, awareness-of-consequences beliefs, environmental concern, attitude towards green energy	Willingness to pay for green energy	NA	Sweden
9.Rundle et al. (2008)	Age, gender, income, education	Awareness, knowledge, education	Green energy purchase decision	NA	Limited case analysis

Studies	**Demographic variables**	**Independent variable**	**Dependent variable**	**Theoretical ground**	**Country/Limitation**
10.Gerpott & Mahmudova (2010a)	Age, gender, income, race, income, social group	Social endorsement of green energy, attitudes towards environmental behaviour, price emphasis, differences in EPC offerings, perceived difficulty of switching, knowledge ability concerning EPC and past switching experience.	Adoption of green energy tariffs	Environmental behaviours of consumers	German. Study drew its sample from the customer stock of only one German regional electricity companies. It should generalizability of its findings across the population of German power utilities
11.Gerpott & Mahmudova (2010b)	Age, gender, income, race, income, social group, household size	Towards environmental issues and towards one's current power supplier, and perceptions of the evaluation of green energy by an individual's social reference groups, household size and current electricity bill level	Price tolerance of green energy	consumer psychological theory	German. Small sample size
12.Tang & Medhekar (2011)	Age, gender, income, marital status	Environmentally conscious, ecologically conscious, self-transcendence, conservation behaviour self-enhancement, social reference, perceived consumer effectiveness and consumers' knowledge	Factors affecting consumers' green power electricity	Green energy adoption Behaviours from literature	Australia. The study had a limitation of low response rate
13.Ozaki (2011)	Age, gender, income, race, income, social group	Green values, green beliefs, green norms, access of information, controllability, overall controllability, consequential belief, green expectation, attitudes of being green, self-efficacy, and social influence	Adopt green energy tariffs	Diffusion theory, TPB and TRA, Normative theories and Consumption theories	UK. Sample locations in university cannot portray a persuasive picture of green energy adoption

Studies	Demographic variables	Independent variable	Dependent variable	Theoretical ground	Country/Limitation
14.Oliover (2011)	Age, gender, income, education	Attitudes, environmental concern, previous environmental behaviour, perceived consumer effectiveness, income and resistance to change,	Willingness to pay price premium	Cognitive behavioural literature on green energy	South Africa. Very low response rate
15.Rainey & Ashton (2011)	Age, gender, income, race, income, social group	Perceived consumer effectiveness, ecological concern and knowledge of energy issues and behavioural characteristics, energy consumption behaviour and experience of switching to GE suppliers.	Willingness to pay for green energy	Cognitive behavioural literature on green energy	UK. Preferred contingent valuation approach was not used to ascertain willingness to pay
16.Hansla (2011)	Age, gender, income, race, income, social group	Self-enhancement and self-transcendence value orientation (central panel), altruistic	Willingness to pay for green energy	NA	Sweden
17.Litvine & Rolf (2011)	Age, gender, income, electricity choice	Attitude, perceived personal Benefit, Perceived simplicity, Intention to purchase	Green energy purchasing behaviour	TPB	Low response rate, effect of the information provided to the treatment groups
18. Zoric & Hrovatin (2012)	Age, gender, income, occupation, education	Age, gender, income, occupation, education	Willingness to pay for green energy	Tobit regression model	Low segment target
19.Paladino & Pandit (2012)	Age, gender	Service, branding	Green energy purchase	NA	A quantitative finding

Studies	Demographic variables	Independent variable	Dependent variable	Theoretical ground	Country/Limitation
20.Ivanova (2013)	Age, gender, income, race, income, social group	Attitudinal, perception and knowledge	Willingness to pay for green energy	NA	Australia. Sample size
21.Sardianou & Genoudi (2013)	Age, education, income, married	Age, education, income, married	Determinants of consumers' willingness to pay green energy	NA	Greece. Adoption intention not understood
22.Liu et al (2013)	Age, income, occupation	Income, knowledge and belief about costs of renewable energy use	Purchase intention	TPB	China
23. Claudy et.al (2013)	Age, income, occupation			BRA	Ireland
24. Larsen (2013)	Age, income, occupation	Price, scepticism, sustainability and social responsibility	Attitude toward green energy	NA	Iceland, Norway, Poland, Czech Republic and Estonia. Qualitative findings only
25.. Hobman & Frederiks (2014)	Age, occupation	Financial costs, limited knowledge, negative perceptions, disbelief in climate change, perceived responsibility, existing energy efficiency behaviour and apathy	Barriers to adopt GE	NA	Australia

Studies	Demographic variables	Independent variable	Dependent variable	Theoretical ground	Country/Limitation
26.Yang (2014)	Age, income, education	Perceived relative advantage, perceived complexity, social norm, perceived risk, consumer awareness, perceived consumer effectiveness, moral norms	Willingness to pay for green energy	NA	Denmark.
27.Hast et al. (2015)	Age, gender, income, race, income, social group	Knowledge, price, environment, reference group	Consumer attitude towards green energy	NA	China/ the sample was relatively small, and consists largely of young and educated people only
28.Masoud (2015)	Age, income, occupation, Gender	Perceived benefits, self-efficacy, perceived benefit	Willingness to buy green energy	HBM	Iran/ only student sample size
29.Halder et al., (2016)	Age, income, occupation	Attitude, norm and belief	Purchase intention	TPB	India/ Finland
30.Sangroya & Nayak (2017)	Age, income, education gender, nationality	Social value, functional value, emotional value and conditional value	Green energy buying behaviour	NA	India/ Focused only current existing consumers
31.Mydock et al (2018)	Age, education	Information, advertisement	Green energy purchase decision	NA	Australia/small sample size

Studies	Demographic variables	Independent variable	Dependent variable	Theoretical ground	Country/Limitation
32.Palandino & Pandit (2019)	Age, income, education gender	Attitude, environmental concern, subjective norm, PBC, Price perception	Green energy buying behaviour	TPB and attitude behaviour theory integrated	Australia/small sample size

Appendix 2: The research questionnaire

CONSUMERS' GREEN ENERGY BUYING BEHAVIOUR

SECTION 1: DEMOGRAPHIC INFORMATION

The following section is about the demographic profile of respondents. This information is required for the validation purpose of the questionnaire. In order to analyze and compare responses we need some background information about the participants.

Please, provide a tick *(☐)* mark on the appropriate answer box of each question below:

1. What is your gender? ▫Male ▫Female ▫Other

2. What is your age?

▫18-24 ▫25-31 ▫31-40 ▫40-45 ▫46-52 ▫53-59 ▫60-66 ▫over 67

3. What is your level of formal education?

▫High School Certificate or less ▫Certificate/Trade Certificate

▫Diploma ▫Bachelor degree ▫Postgraduate qualification or more ▫Other -----------------

4. Which of following categories best indicate your annual personal income?

▫AUD $20,000-$30,000
▫AUD $30,000-$60,000
▫AUD $60,000-$80,000
▫AUD $80,000-100,000
▫More than AUD $100,000

5. Location of residence: (a) North Sydney (b) Western Sydney (c) Eastern Sydney (d) Sydney South (e) CBD

6.State: NSW

SECTION 2: ENERGY CONSUMPTION

In this section, it is important you provide appropriate responses that are relevant to your experiences. It must be noted that there are no right or wrong answers in this section.

1.Do you use Green electricity at home?

IF YOUR ANSWER IS **"YES"** PLEASE ANSWER *QUESTIONS* 2, 3, 4 AND SECTION 3.

IF YOUR ANSWER IS "**NO**" PLEASE ANSWER *QUESTIONS:* 2, 3 AND SECTION 3

Please, provide a tick (☐) mark on the appropriate answer: Yes ----- **OR** No -----

2. The name of the electricity provider:

(a) Energy Australia (b) Origin (c) Alinta (d) Delta (e) ATCO (f) Pacific power (g) -----------------

3. The usage of electricity (KWH):

(a) 200-250 (b) 250- 300 (c) 300-400 (d) 400- 500 (e) -------------

4.What motivated you to use green electricity?

(a) Environmental concern (b) Energy savings (c) Cost savings (d) Govt. support/subsidies

(e)Personal preferences (f) More ---------------------------

SECTION 3: DETERMINANTS OF GREEN ELECTRICITY PURCHASE INTENTION

In this section, it is important you provide appropriate responses (FOR GE USER OR NON-USER) that are relevant to your experiences. It must be noted that there are no right or wrong answers in this section.

1.Attitude

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
I have a favourable attitude to purchase green energy	1	2	3	4	5	6	7
If I can choose between eco-friendly and conventional products, I prefer eco-friendly ones such as green energy	1	2	3	4	5	6	7
I am NOT the kind of person who makes efforts to conserve natural resources	1	2	3	4	5	6	7
Science and engineering will solve the environmental problems; therefore, we do not need to change our way of live consuming green energy	1	2	3	4	5	6	7

2. Subjective norm

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
Most people who are important to me think I should protect the environment	1	2	3	4	5	6	7
My friends often recommend environment friendly products to me	1	2	3	4	5	6	7

3. Perceived Behavioral Control

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
It's easy for me to practice green energy consumption	1	2	3	4	5	6	7
I feel that purchasing green energy is not totally within my control	1	2	3	4	5	6	7
I have resources, time and willingness to purchase green energy	1	2	3	4	5	6	7

4. Environmental concern

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
I would describe myself as an environmentally responsible person	1	2	3	4	5	6	7
When I purchase products, I try to make an effort to buy products that are low in pollutants	1	2	3	4	5	6	7
Environmental protection is important to me when making purchases	1	2	3	4	5	6	7
I am very concerned about the environment	1	2	3	4	5	6	7

5. Green brand

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
With Green Brand I have the feeling of contributing to the well-being of humanity and nature	1	2	3	4	5	6	7
With Green Brand, I can demonstrate that I care about environment	1	2	3	4	5	6	7
With Green Brand, I can express my environmental concern	1	2	3	4	5	6	7
The Green brand represents environmental friendliness	1	2	3	4	5	6	7

6. Retail service quality

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
My energy provider offers adequate information about anticipated supply interruptions	1	2	3	4	5	6	7
My energy provider offers adequate consultation about how to save energy, safety of home installations, etc	1	2	3	4	5	6	7
My energy provider offers flexible contracts, adapted to client's specific needs.	1	2	3	4	5	6	7

7. Moral norm
1.

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
I feel a personal obligation to use green energy to prevent climate change	1	2	3	4	5	6	7
My motivation is low, and this would prevent me from adopting green energy	1	2	3	4	5	6	7
I feel a strong personal obligation to use green energy	1	2	3	4	5	6	7

8. Green promotion

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
I would use green energy over conventional energy if offered at a discount or with other promotional incentives	1	2	3	4	5	6	7
I would use green energy over conventional energy if offered at subsidized rate	1	2	3	4	5	6	7

9. Intention

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
I would like to practice green energy consumption	1	2	3	4	5	6	7
I would consider purchasing environmental friendly green energy over conventional energy	1	2	3	4	5	6	7
I intend to engage myself more intensively in green energy issues	1	2	3	4	5	6	7

10. Buying behaviour

ITEMS	Strongly Disagree	Fairly Disagree	Disagree	Neutral	Agree	Fairly Agree	Strongly Agree
I have been buying green energy	1	2	3	4	5	6	7
In the last three months, my household consumed green energy.	1	2	3	4	5	6	7
I always choose green energy when buying it							

Appendix 3: Ethics approval letter

CELEBRATING
25 YEARS

Secretary, Human Research Ethics Committee
Ph: 07 4923 2603
Fax: 07 4923 2600
Email: ethics@cqu.edu.au

Dr Parves Sultan and
Mr Al Sadat Ahmed
School of Business and Law
CQUniversity

4 December 2017

Dear Dr Sultan and Mr Ahmed

HUMAN RESEARCH ETHICS COMMITTEE ETHICAL APPROVAL PROJECT: H16/11-291 CONSUMERS' PURCHASE INTENTIONS OF GREEN ELECTRICITY IN NSW, AUSTRALIA: AN EXAMINATION AND EXTENSION OF THE THEORY OF PLANNED BEHAVIOUR

The Human Research Ethics Committee is an approved institutional ethics committee constituted in accord with guidelines formulated by the National Health and Medical Research Council (NHMRC) and governed by policies and procedures consistent with principles as contained in publications such as the joint Universities Australia and NHMRC *Australian Code for the Responsible Conduct of Research.* This is available at http://www.nhmrc.gov.au/publications/synopses/_files/r39.pdf.

On 1 December 2017, the Chair of the Human Research Ethics Committee considered your application under the Low Risk Review Process. This letter confirms that your project has been granted approval under this process, pending ratification by the full committee at its January 2018 meeting.

The period of ethics approval will be from 1 December 2017 to 1 July 2018. The approval number is H16/11-291; please quote this number in all dealings with the Committee. HREC wishes you well with the undertaking of the project and looks forward to receiving the final report.

The standard conditions of approval for this research project are that:

(a) you conduct the research project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments required to be made to the proposal by the Human Research Ethics Committee;

(b) you advise the Human Research Ethics Committee (email ethics@cqu.edu.au) immediately if any complaints are made, or expressions of concern are raised, or any other issue in relation to the project which may warrant review of ethics approval of the project. *(A written report detailing the adverse occurrence or unforeseen event must be submitted to the Committee Chair within one working day after the event.)*

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(c) you make submission to the Human Research Ethics Committee for approval of any proposed variations or modifications to the approved project before making any such changes;

(d) you provide the Human Research Ethics Committee with a written "Annual Report" on each anniversary date of approval (for projects of greater than 12 months) and "Final Report" by no later than one (1) month after the approval expiry date; *(Forms may be downloaded from the Office of Research Moodle site - http://moodle.cqu.edu.au/mod/book/view.php?id=334905&chapterid=17791.)*

(e) you accept that the Human Research Ethics Committee reserves the right to conduct scheduled or random inspections to confirm that the project is being conducted in accordance to its approval. Inspections may include asking questions of the research team, inspecting all consent documents and records and being guided through any physical experiments associated with the project

(f) if the research project is discontinued, you advise the Committee in writing within five (5) working days of the discontinuation;

(g) A copy of the Statement of Findings is provided to the Human Research Ethics Committee when it is forwarded to participants.

Please note that failure to comply with the conditions of approval and the *National Statement on Ethical Conduct in Human Research* may result in withdrawal of approval for the project.

You are required to advise the Secretary in writing within five (5) working days if this project does not proceed for any reason. In the event that you require an extension of ethics approval for this project, please make written application in advance of the end-date of this approval. The research cannot continue beyond the end date of approval unless the Committee has granted an extension of ethics approval. Extensions of approval cannot be granted retrospectively. Should you need an extension but not apply for this before the end-date of the approval then a full new application for approval must be submitted to the Secretary for the Committee to consider.

The Human Research Ethics Committee wishes to support researchers in achieving positive research outcomes. If you have issues where the Human Research Ethics Committee may be of assistance or have any queries in relation to this approval please do not hesitate to contact the Secretary, Sue Evans or myself.

Yours sincerely,

A/Prof Tania Signal
Chair, Human Research Ethics Committee

Cc: Dr Galina Williams (co-supervisor) Project file
Approved