

**Energy and Water Demand Management in the Tourism
Accommodation Industry:
Evidence from South Africa**

by

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Declaration

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Love Ahuevbonmwan Odion Idahosa Date:
December 2017

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Dedication

This thesis is dedicated to all those who have been told that they can't.

You might have been told that you aren't good enough, smart enough, strong enough, healthy enough, white enough, male enough, skinny enough, or big enough; it might have been decided that what you are is too little/inadequate for the dream you are pursuing. The completion of this thesis in the entirety of its content, and within the stipulated time, once seemed an impossible dream. However, today, this thesis document is testimony to the truth that with courage, hope, hard work, faith, determination, persistence, perseverance, and prayer, the earth will move and be moved to help achieve the dream placed in your heart.

"Here's to the crazy ones. The misfits. The rebels. The trouble-makers. The round pegs in the square holes. The ones who see things differently. They're not fond of rules, and they have no respect for the status-quo. You can quote them, disagree with them, glorify, or vilify them. But the only thing you can't do is ignore them. Because they change things. They push the human race forward. And while some may see them as the crazy ones, we see genius. Because the people who are crazy enough to think they can change the world, are the ones who do."- The Apple Inc. Team

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English Abstract

The thesis explores the issue of Resource Management (RM) within the context of Environmental Sustainability (ES) in the Tourism Accommodation Industry (TAI) in South Africa. Focusing on demand side management of energy and water resources, it aims to understand the context of resource use in the TAI with the aim of influencing consumption towards more sustainable levels. The South African focus is motivated by the energy and water crisis in the country combined with growth in the tourism sector and international tourist arrivals, and the implications of this growth for the already strained energy and water resources in the country.

The thesis document is composed of five separate but thematically connected papers which focus on understanding and addressing resource consumption issues in South Africa's TAI. Each paper employs its own framework, data, and method to arrive at conclusions that support the objective of the thesis. The first paper demonstrates, using qualitative content analysis of semi-structured interviews, that the operators of Tourism Accommodation Establishments (TAEs) have an adequate understanding of the meaning and applicability of the ES concept to their industry. Although they were correctly able to associate ES to RM for their industry context, findings reveal that the adoption of RM initiatives were low, and at best basic.

The next two papers, employing the same method as the first, investigate this low adoption rate by evaluating the motivation for, and barriers to, adopting ES practices in the industry. Paper two (Chapter 3) finds that TAE operators are motivated by the potential to improve their comparative advantage, and a desire to preserve the environment. Paper three (Chapter 4) however reveals that they are deterred from doing all they can by the high initial capital outlay and running cost of most ES initiatives, which these businesses cannot immediately afford despite the potential cost saving the initiatives offer. It also reveals that the service nature of the industry, which prioritises guests' comfort over environmental concerns, was the most debilitating challenge to implementing ES in the establishments.

The fourth paper (Chapter 5) makes use of quantitative data to investigate the key drivers of energy consumption in establishments in the industry. The findings of this paper suggest that establishments' characteristics (such as size) and facilities offered (e.g. restaurant) drive energy consumption up in the industry. Combined with the findings from previous papers and extant studies, it shows that Heating, Ventilation, and Air Conditioning (HVAC) is most likely the largest direct driver of energy consumption in TAEs.

Building on the findings of the previous papers, the final paper (Chapter 6) demonstrates, within the framework of a randomised control trial, that thermal comfort is largely socially constructed, by evaluating the effectiveness of social normative messages in influencing the thermostat setting

behaviour of hotel guests towards more sustainable levels. This finding is significant for TAEs who struggle with balancing guests' comfort with the current unsustainable trend in HVAC consumption. This thesis hence provides new context and information on the South African TAI, and proffers and tests a solution to one of the most debilitating challenges faced in ES adoption in the industry. These findings are relevant for academic instruction in the field of Sustainable Tourism, for practitioners and decision makers within the industry, as well as for policy makers in the public sphere.

The bottom up approach adopted (which focuses first on understanding the industry's context before proffering solutions) has generated empirical evidence that challenge both conventional wisdom and existing theories in terms of Demand Side Management of Energy and Water Resources, and the position of the private sector, especially in the tourism accommodation industry, on their role in the sustainability movement. This method is also applicable to other private sector scenarios, and if adopted would provide valuable insights that could stimulate the private sector engagement in socio-environmental issues.

Key Words: Energy, Water, Demand Side Management, Tourism Accommodation, South Africa, Randomised Control Trial.

Afrikaanse Opsomming

Die tesis ondersoek die kwessie van Hulpbron Bestuur (HB) binne die konteks van Omgewingsvolhoubaarheid (OV) in die Toerisme Akkomodasie Bedryf (TAB) in Suid Afrika. Dit streef daartoe om die konteks te verstaan van die gebruik van hulpbronne in die TAB met die doel om gebruik te beïnvloed in die rigting van meer volhoubare vlakke deur te fokus op aanvraag bestuur van energie- en waterbronne. Die Suid Afrikaanse fokus word gemotiveer deur die energie en water krisis in die land in kombinasie met die groei in die toerisme sektor sowel as in die aankoms van internasionale toeriste en die implikasies van hierdie groei op die reeds ooreiste energie- en waterbronne in die land.

Die tesis bestaan uit vyf aparte maar tematies verbinte dokumente wat fokus op die verstaan en die aanspraak tot bronbenuttingskwessies in Suid Afrika se TAB. Elke dokument het sy eie raamwerk, data en metodiek wat lei tot gevolgtrekkinge wat die doelwit van die tesis ondersteun. Die eerste dokument gebruik kwantitatiewe analise van die inhoud van semi-gestruktureerde onderhoude om te demonstreer dat die ondernemers van Toeriste Akkomodasie Vesting (TAVs) 'n genoegsame insig het tot die betekenis en aanpassing van die OV konsep sover dit hulle industrie betref. Alhoewel hulle OV korrek assosieer met HB binne die konteks van hul industrie, het bevindings bewys dat die opname van HB inisiatiewe laag was en wel op sy beste basies.

Die volgende 2 dokumente wat dieselfde metode gebruik as die eerste, ondersoek dan hierdie lae opname deur die evaluasie van die motivering en die belemmering van die opname van OV praktyke in die industrie. Dokument 2 (Hoofstuk 3) vind dat TAV ondernemers gemotiveer word deur die potensiaal om hulle komparatiewe voordeel te verbeter sowel as deur 'n begeerte om hul omgewing te bewaar. Dokument drie (Hoofstuk 4) dui egter daarop dat hulle weerhou word daarvan om soveel as moontlik te doen ten opsigte van laasgenoemde deur die hoë aanvanklike kapitaal uitgawes, so wel as die lopende kostes geassosieer met die meerderheid OV inisiatiewe. Hierdie besighede kan nie onmiddelik sulke uitgawes bekostig nie ten spite van die potensiële besparings gekoppel aan sulke inisiatiewe. Daar word ook getoon dat die klem op diens in die industrie, wat gaste se gemak bo omgewingsbesorgdheid stel, die grootste ondermynende uitdaging was tot die implimentering van OV in die ondernemings.

Die vierde dokument (Hoofstuk 5) maak gebruik van kwantitatiewe data om die sleutel aanwysers van energieverbruik in ondernemings in die industrie te ondersoek. Die bevindinge van hierdie dokument dui daarop dat ondernemings se kenmerke (soos groote) en fasiliteite aangebied (soos 'n restaurant) bydra tot energie verbruik in die industrie. As gesien word in kombinasie met die bevindinge van die vorige dokumente en bestaande studies, wys dit daarop dat Verhitting, Ventilasië en Lugreeling (VVL) klaarblyklik die grootste direkte aanwyser van energie verbruik in TAVs is.

Gebaseer op die bevindinge van die vorige dokumente demonstreer die finale dokument (Hoofstuk 6) dat, binne die raamwerk van 'n gerandomiseerde beheerproef, termiese gemak hoofsaaklik sosiaal gedryf word deur die effektiwiteit van sosiale normatiewe boodskappe te evalueer wat dan 'n invloed het op die termostaatinstelling van hotelgaste tot meer volhoubare vlakke. Hierdie bevinding is betekenisvol vir TAVs wat sukkel om gaste se gemak op te weeg teen die huidige onvolhoubare trant in VVL verbruik. Hierdie tesis voorsien dus 'n nuwe konteks en informasie oor die Suid Afrikaanse TAB en bied aan en toets 'n oplossing vir een van die mees ondermynende uitdagings wat die opname van OV in die industrie aanbetref. Hierdie bevindinge is relevant vir akademiese onderrig op die gebied van Volhoubare Toerisme, vir praktisyns en besluitnemers binne die bedryf, sowel as vir beleidsmakers in die openbare sfeer. Die bottom-up benadering wat aangewend word (wat eerste fokus op die begrip van die bedryf se konteks voor professionele oplossings) het empiriese bewyse gegenereer wat beide konvensionele wysheid en bestaande teorieë uitgedaag het in terme van die vraagbestuur van energie en waterhulpbronne en die posisie van die private sektor, veral in die toerisme-akkommodasiebedryf, oor hul rol in die volhoubaarheidsbeweging. Hierdie metode is ook van toepassing op ander privaatsektor-scenario's. As dit aangeneem word, bied dit waardevolle insigte wat die betrokkenheid van die private sektor in sosio-omgewingsvraagstukke kan stimuleer.

KERNWOORDE: Energie, Water, Vrakantbestuur, Toerisme Akkomodasie, Suid Afrika, Gerandomiseerde Beheerproef

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List of Acronyms and Abbreviations

AMG	Augmented Mean Group
AR(1)	First Order Auto Regressive
ARDL	Autoregressive Distributed Lag
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ATE	Average Treatment Effect
BnB	Bed and Breakfast
CCEMG	Common Correlated Effects Mean Group
CSR	Corporate Social Responsibility
DN	Descriptive Norm
DSM	Demand Side Management
EA	Environmental Appeal
E&WDM	Energy and water demand management
ES	Environmental Sustainability
FE	Fixed Effects
GFA	Gross Floor Area
GHG	Green House Gas
HVAC	Heating, Ventilation and Air Conditioning
IT	Information Technology
LED	Light Emitting Diode
NTC	Noticing, Collecting and Tagging
NTSS	National Tourism Sector Strategy
OMOs	Owners, Managers, and Operators
POLS	Pooled Ordinary Least Squares
QCA	Qualitative Content Analysis
RCT	Randomised Control Trial
RE	Random Effects

RM	Resource Management
SSM	Supply Side Management
TAEs	Tourism Accommodation Establishments
TAI	Tourism Accommodation Industry
TDL	Temperature Data Logger
TGCSA	Tourism Grading Council of South Africa
TOU	Time-of-Use

CHAPTER 1 :

Introduction

1.0 PREFACE

This chapter sets the context for the objectives, approaches and methods employed throughout this thesis. It starts off by providing the study background, followed by a statement of the key problem and macro research objective addressed in the thesis. It then details the scope of the study, its contribution to the existing body of the literature, the study limitations, and structure of the entire thesis.

1.1 BACKGROUND TO THE STUDY

Within the context of the broader challenge of balancing the economic, social and environmental imperatives of sustainable development, the proposed research is aimed at an enhanced understanding of energy and water demand management (E&WDM) and options to facilitate behavioural change in E&WDM utilisation among clients of the tourism accommodation industry in South Africa.

In recent decades, growth in the tourism sector has accentuated its importance as a major driver of socio-economic progress in many developing economies (Binns & Nel, 2002; Muchapondwa & Stage, 2013); and the sector has specifically been identified as an engine of growth, job creation and driver of socio-economic development (Chunyun, 2003; Liedholm, McPherson & Chuta, 1994). In the sustainable development movement, the sector moved into the limelight when tourist activities in major tourist destinations began generating negative externalities such as eco-system disruptions and imbalances, increased pressure on limited resources in already pressured tourist locations, and in some cases, cultural disruptions and upheaval in historically conservative locations (Buckley & Pannell, 1990; Gössling, 2002). The sector is also a major consumer of both energy and water resources, having to meet the demand of both local communities and tourists (Lehmann, 2009; Gössling, Peeters, Hall, Ceron, Dubois, Lehmann & Scott, 2012). Tourists have also been found to consume more energy and water resources than the local population. It has been estimated that tourists' water use in developing countries exceeds that of locals by a factor ranging between 4.9 and 8.5, with water use per guest night ranging from 84ℓ to 1 802ℓ (Becken, 2014). Similarly, the average energy consumption per guest night for accommodation alone was 272 MJ (and 3575 MJ per trip – including accommodation, transportation, and other activities)

(Gössling & Peeters, 2015) in 2008 compared to the 2008 global world average of 209.71MJ¹ (World Bank, 2014). Worse still, these figures are forecast to more than double in the next 25 years (Gössling & Peeters, 2015). The sustainability of the positive socio-economic benefits of tourism depends – in the long run – on managing its environmental footprint and improving resource efficiency.

South Africa is one of the many developing economies with a fast growing tourism industry (National Department of Tourism, 2011). Over the past decade, the country has experienced a significant increase in touristic activities, with tourism placed as one of six pillars in the country's economic framework, the New Growth Path, and is regarded as a key sector to further advance the economic upliftment of the nation (Binns & Nel, 2002; Rogerson & Visser, 2006; Rogerson, 2013; Saayman & Saayman, 2008). Energy and water stress in the country however pose a major constraint to the success of economic activities within its borders. South Africa falls in the semi-arid region and possesses abundant minerals and natural resources, but limited water availability. As at 2013, South Africa's average annual rainfall was between 450–500mm, compared to the world average of 860mm, with less than 22% of the nation receiving less than 200mm of rain per year. Most of its ground is hard rock, hence the nation possesses limited underground aquifers, and thus the ground water contribution to bulk water supply is only 13%. Surface water runoffs are estimated at an annual average of 49 billion m³ of which only 29% (14 200 billion m³) can be relied upon to be available for use both domestically and commercially (National Treasury, 2011; Water Research Commission, 2013).

Similarly, South Africa has been fraught with challenges with its energy supply recently, both in terms of its climate change implications and its ability to meet growing demand. The nation's energy generation is highly fossil-fuel based (Pegels, 2010), and as one of the most industrialised nations on the continent, energy represents an important cornerstone of the economy. The energy production and distribution mechanism in the country is sophisticated and fossil-fuel energy intensive (Winkler, 2007; Ziramba, 2009). However, given the implication for greenhouse gas emissions, consciousness for environmental friendliness and safety, as well as the need to ensure sustainability, the dependence on fossil fuels has attracted increased attention over the decades. This has necessitated the need to find alternative, sustainable and/or renewable energy sources, and as such, the nation has been seeking ways to improve its energy sourcing, production, distribution and efficiency so as to foster sustainability (Hedden, Moyer & Rettig, 2013; Menyah & Wolde-Rufael, 2010; Pegels, 2010; Sebitosi, 2008).

¹ Calculated based on the World Bank's average of 1 828.218 kg of oil equivalent per capita per year (365 days) (World Bank, 2014), using a conversion rate of 1kg oil equivalent = 11.63 kwh = 41.87 MJ.

In addition to the environmental concern of South Africa's energy supply, the nation has also faced daunting challenges with meeting its demand for energy. Not long after a major crisis in 2008, the nation is currently in the middle of a severe energy crisis which has generated widespread attention as its electricity public utility (ESKOM) struggles to meet the energy demand of South Africa's population (Inglesi, 2010; Inglesi & Pouris, 2010; Longmann, 2015; Nicolson, 2014; SAnews.gov, 2015; The Times Editorial, 2015). As a solution, Eskom resorted to load-shedding, as was done in 2008, with some emphasis on alternative energy sources (Longmann, 2015), and a great deal of emphasis on demand side management with the government and ESKOM pleading with individuals and businesses to reduce their energy consumption (Jeremy, 2015; SAnews.gov, 2015; The Times Editorial, 2015). The amount of energy produced and exported has in recent times decreased, while energy imported increased (1% decline in production; 2% increase in export; 74.9% increase in import)² (StatsSA, 2014). This critical level of water and energy resource constraint presents a severe problem for economic activities in the country, and especially for the tourism sector, given its resource-intensive nature and hence contribution to the existing resource burden. The sustained development of this sector in such a water- and energy-stressed region necessitates renewed focus on managing its contribution to resource depletion by increasing its efficiency.

In addressing energy and water resource management for environmental sustainability, two approaches exist: the demand side approach and the supply side approach. Demand side management (DSM) of energy and water resources involves an approach to management targeted at the point of consumption (Gumbo, 2004), while supply side management (SSM) of water resources focuses on expanding existing water supply options, finding alternative water sources, and improvement in water sources extraction and delivery mechanism; while for energy resources, SSM centres around the shift to renewable energy sources, containing emissions from non-renewable sources, and increasing access to environmentally friendly energy sources. Globally, SSM was the active trend in development of states in the water-scarce and coal-dependent region until it became apparent that the demand side also had to be addressed (Turton, 1999).

With the historical challenges with water and energy resource availability in South Africa, both SSM and DSM options have been explored to find a lasting solution to these resource constraint challenges. Historically, the key emphasis for meeting the increasing demand for energy and water resources by South Africa's rapidly growing population has been through SSM, such as the development of new and often expensive water transfer schemes and the shift to renewable energy sources. The SSM approach seemed to work for a while until its inadequacies were exposed and all that was left to show were the engineering achievements they represented, which

² Figures indicate percentage change between January 2013 and February 2014.

in their own right where quite remarkable (Gumbo, 2004; Mckenzie & Wegelin, 2009; Turton, 1999). This necessitated a shift in paradigm focus to DSM of the energy and water resources in South Africa, in addition to the supply side focus (Rankin & Rousseau, 2008).

1.2 PROBLEM STATEMENT

In a bid to balance the important economic and social contribution of tourism, and specifically the accommodation sub-sector, with the need to limit the water and energy footprint of touristic activities, the need for demand side management is highlighted. The key challenge is to balance the three dimensions of sustainable development – social, economic and environmental – and not to slow down tourism growth given its positive economic contributions. Hence there exists a knowledge gap for solutions to decouple its impact on the environment (with specific focus on resource consumption) from growth in tourism-related activities (specifically increased energy utilisation, and water consumption), with specific emphasis on more efficient resource use. This necessitates an in-depth understanding of the perceptions and preferences of the decision-making stakeholders in the tourism accommodation industry, especially as regards resource consumption and environmental sustainability as a whole; the motivations for, and barriers associated with, the implementation of resource consumption management within industry establishments; as well as the drivers of their resource consumption. This understanding will provide the necessary background for developing and testing effective and relevant strategies (such social norms) to steer behaviour in the direction of sustainable energy and water utilisation.

1.3 RESEARCH OBJECTIVE

The primary objective of the research is to better understand resource (energy and water) consumption in the tourism accommodation industry, and on the basis of that improved understanding, to propose and test ways of promoting sustainable consumption of resources in the industry. Of paramount importance towards achieving this aim is gaining an understanding of how tourism accommodation owners, managers and operators perceive and think about issues of environmental sustainability and resource consumption within the industry (addressed in Chapter 2); the barriers and motivating factors faced in implementing resource management (addressed in Chapter 3 and 4 respectively), especially as it relates to their energy and water consumption; and identifying the specific drivers of their resource consumption (addressed in Chapter 5). The thesis argues that this information provides the necessary contextual background for making informed policy and practice recommendations. Hence, based on this understanding, one of the already established tools of behaviour modification applied in related fields of study is proposed and its effectiveness within the industry evaluated (addressed in Chapter 6). Based on preliminary findings, the approach of behaviour modification aimed at inducing sustainability is primarily

targeted at the guests/clientele in the industry, and their potential for contributing to environmental sustainability. At the core of this approach is ensuring that practices and methods implemented do not compromise the comfort levels and satisfaction experience of these guests and is as such applicable industry-wide.

1.4 SCOPE OF THE STUDY

This thesis focuses particularly on energy and water demand management in the TAI in South Africa. Energy and water demand management are sub-sets of the broader field of environmental sustainability (ES), which is one of the three main themes of sustainable development. The most popular definition of sustainable development in the literature is that by the Brundtland report which defines it as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987:16). This definition expands on the traditional view of development, which focused on economic growth to meet human needs and eradicate poverty, with total disregard for the environment except when and how it could be exploited to make economic gain, by combining environmental issues with social and economic issues, within the frame work of development (Hopwood, Mellor & O’Brien, 2005). The need for this expansion in definition was driven by mounting environmental problems amidst concerns for perpetuating a healthy human existence; as well as the increased understanding of the interrelatedness between environmental actions and social and economic issues of poverty and inequality (Hopwood et al., 2005; IISD, 2013; WCED, 1987). Although there exists controversy on the actual interpretation of the concept and the authenticity of those who make use of the term, especially in politics and business promotion (Hopwood *et al.*, 2005; Lélé, 1991), this study adopts the definition by the Brundtland report and focuses on environmental sustainability as a sub-field of sustainable development.

The idea of environmental sustainability encompasses issues relating to efficient resource use, waste control, reduction and recycling, sustainable construction, manufacturing and production, alternative energy sourcing, renewable energy development, to name but a few. At its core is the need to mitigate resource depletion. This not only concerns reducing emissions or the management of waste and harmful by-products, but also encompasses the more efficient utilisation of existing resources, both natural and man-made (Goodland, 1995). This study hence, is situated within the literature on resource management for environmental sustainability, and focuses on the Tourism Accommodation Industry.

Tourism, as a sector, is very vast and dynamic and can be sub-divided into different major, but broad, industries, including accommodation (e.g. hotels and campsites), food and beverages (e.g. restaurants and bars), recreation facilities (e.g. golf courses and ski resorts), culture/entertainment (e.g. museums and zoos), retail (e.g. gift and souvenir shops and luggage), travel services (e.g.

travel agents and tour operators) and transportation (e.g. air passenger and sightseeing buses) (Smith, 1989: 34,35), each with its own dynamics. The categorisation of the sector into industries or sub-sectors however varies by author and definition: see (Carter, Whiley & Knight, 2004: 50; Perch-Nielsen, Sesartic & Stucki, 2010: 136) for alternative categorisations. The industry turnover/revenue, contribution to greenhouse gas emissions and intensity of energy and water consumption of each of the industries within this sector varies widely.

The accommodation sub-sector is a vital component of the overall tourism sector and of the overall tourism experience (Davidson, 1993: 68; Sharpley, 2000: 2), one of the largest sub-sectors in the entire tourism spectrum globally (Cooper, Fletcher, Gilbert, Shepherd & Wanhill, 1998: 313; Goss-Turner, 1996; Sharpley, 2000) as cited by Sharpley (2000); and is also a major contributor to the overall environmental impact of the tourism sector, accounting for a large proportion of land, energy, and water use. The accommodation industry is responsible for majority of the land-alterations associated with tourism (Gössling, 2002), and is the second largest contributor to greenhouse gas emission and energy uses associated with leisure activities, after the transportation industry (Gössling, 2002; Perch-Nielsen *et al.*, 2010; UNWTO-UNEP, 2008). Accommodation is also a major contributor to the overall water consumption footprint of the tourism sector: it has the highest water footprint associated with direct water consumption, followed by tourism activities (e.g. golf³ and skiing), and the second highest water footprint associated with indirect consumption in the sector, second to food production and consumption (Gössling *et al.*, 2012).

Despite the crucial role accommodation plays in tourism, both economically, and especially environmentally, studies on energy and water demand management in this industry are sparse. In the DSM literature, a plethora of studies exists on household-related energy and water demand management (see Kenney, Goemans, Klein, Lowrey & Reidy, 2008) as well as the application of behavioural economics methods to induce sustainability (DellaVigna, 2007; Ferraro, 2014; Ferraro, Miranda & Price, 2011; Ferraro & Price, 2013; Ivens, 2006; Kurz, Donaghue & Walker, 2005; see Meneguzzi & Luck, 2009; Shang, Basil & Wymer, 2010). Various studies also exist on sustainability in the tourism sector as a whole (Deale, 2013; Erkuş-Öztürk & Eraydın, 2010; Fortanier & van Wijk, 2010; Jaafar & Maideen, 2012), but few studies however focus on the tourism accommodation industry. This is not satisfactory given that this industry is key within the broader sector as a whole; a sector which is a major contributor to economic growth and development of many countries. The tourism sector as a whole, and the accommodation industry in particular, is fraught with peculiar challenges as increases in tourism activities which are vital to

³ Golf activity has been identified as most likely the most water-intensive “activity” in tourism (Gössling, 2015).

their growth and development pose a constraint to the same growth and development (Brohman, 1996; Buultjens & Gale, 2013; Jenkins, 2008; Muchapondwa & Stage, 2013).

This study hence investigates options for efficient resource use, focusing on energy and water demand management and options for behavioural change within the broader context of environmental sustainability as it pertains to these tourist accommodation providers. The applicability of Environmental sustainability in the functions of the TAI has different dimensions, including energy consumption management, water conservation, waste water management, waste emissions control, and green purchasing (Heung & Pun, 2013; Tsai, Wu & Wang, 2014). Each dimension has its unique characteristics, but there are often areas of overlap within the industry's context. For example: green purchasing influences, and is used as a tool, in waste emissions control; and water and energy consumption and conservation are often inter-linked (Heung & Pun, 2013). The focus on energy and water in this study, and not on other aspects of environmental sustainability, is driven by the strong interlinking relationship between energy and water consumption in the tourism industry as a whole, as avidly captured by (Gössling *et al.*, 2012: 8):

Energy and water use are interlinked, as water is needed for energy production (e.g. thermoelectric cooling, hydropower, minerals extraction and mining, fuel production, emission controls). Energy is also used for water production (pumping, transport, treatment, desalination). In particular fuel production is water-intense, with the World Watch Institute (2004) reporting that it takes 18 L of water to produce 1 L of gasoline. As air travel entails an average energy consumption of 4.1 L of fuel per passenger for every 100 km of flight distance (UNWTO, UNEP, WMO 2008), the average international air-based tourist trip over 7600 km (return distance) would consequently lead to embodied, "virtual" water use of 5600 L. This would be equivalent of the direct water use associated with a stay in a higher standard resort hotel over a 14-day period (at 400 L per tourist per day).

Also, in the some key activities in the accommodation establishments like water heating and the ventilation of accommodation establishments using Heating, Ventilation, and Air Conditioning (HVAC) systems (like Chillers, Boilers); combine both energy and water use in almost proportionate intensities (Deng, 2003; Hotel Energy Solutions, 2011a). Hence, within the framework of environmental sustainability, this study, focus on the demand side management of both energy and water resources in tourism accommodation establishments.

This study adopts a bottom-up approach, consisting of five independent but thematically connected essays, each with specific objectives, research questions and motivations. While the first three essays focus on both energy and water issues, the last two essays are restricted to energy issues due to data and resource limitations. The next section details the contribution of this study to the body of existing literature.

1.5 LITERATURE GAP AND CONTRIBUTION OF STUDY

This study contributes to the literature on energy and water demand management, but where in the past most research have focused on households, this study focuses on firms in the tourism accommodation industry. A plethora of studies, in economics-related and other adjacent research fields, exist on the tourism industry as a whole (see Avci, Madanoglu & Okumus, 2011; Badulescu, 2011; Briggs, Sutherland & Drummond, 2007; Dwyer, Edwards, Mistilis, Roman & Scott, 2009; Song, Dwyer, Li & Cao, 2012; Williams & Shaw, 2011; to list a few), with a large number of these looking into sustainability within and between the various sectors in the industry (see Deale, 2013; Dwyer et al., 2009; Fortanier & van Wijk, 2010; to list a few). While these studies focus on various concerns related to the tourism sector (Brown & Kaewkitipong, 2009; to list a few; see Buhalis, 1993, 1999; Buhalis & Cooper, 1998; Getz & Carlsen, 2005; Getz & Petersen, 2005; Reichel & Haber, 2005; Wanhill, 2000), research and perusal of international literature and research data bases reveal limited developing country studies that focus on the E&WDM aspect of environmental sustainability in the tourism accommodation industry. The present study hence attempts to fill this research gap by combining the tool of a randomised control trial for evaluating guests' behaviour modification testing, secondary insights from a qualitative investigation into the resource consumption practices of tourist accommodation establishments in South Africa, and a quantitative analysis of a newly available unique dataset on daily energy consumption in hotels.

The availability of, and access, to the unique real-time energy consumption panel data for hotels presented a rare opportunity to get some form of industry-wide perspective on energy consumption in this sector. Analysis of such a dataset within an academic context thus provides information relevant for the design of policies, concepts, and techniques, as well as technology which incorporates the nitty-gritty of the industry and as such is better suited for effective application within the industry. The study therefore contributes to a better understanding of the tourism accommodation industry, especially with regard to their energy and water resource usage and attitudes.

Furthermore, the majority of tourism studies investigating demand-side sustainability issues are focused primarily on what the owners, managers and operators can do to be more environmentally friendly. In areas where practices, policies or technological devices to engender "green behaviour" are recommended, many of these do not take into consideration the perceptions of the key players in the industry (i.e. those who provide the hospitality service, and those who purchase the service). As such, owners, managers and operators are sceptical about embracing some of these recommendations. A key reason for this is that due to the nature of business (i.e. the tourism accommodation industry is a hospitality-based industry), success is highly dependent on customer satisfaction. Although a lot of focus is put on the water, energy and cost saving potential of these

sustainability recommendations, success still remains primarily dependent on customer satisfaction in addition to cost management and operations efficiency.

This study hence employs a bottom-up approach in that it first begins by exploring the understanding, perceptions, and preferences of key decision makers in the tourism accommodation industry with regard to resource management and environmental sustainability. The result of this inquiry provides a better, more informed background for “green behaviour” recommendations. Based on this, the study tests the effectiveness of one of these recommendations, taking into consideration the findings from the exploratory section of the study.

1.6 STRUCTURE OF THE THESIS

The entire thesis is approached from five separate, but thematically connected and interdependent essays, structured as individual chapters. Each essay utilises its own methodology to meet the stated objectives and answer its research questions. A mixed methods approach which combines both qualitative and quantitative methods is employed. The use of the mixed methods approach is indicative of the specificity of the objectives and research questions pertaining to each essay, and the consequent data requirements and analysis methodology.

The first three essays (Chapters 2 to 4) make use of data from semi-structured interviews to meet the exploratory nature of their objectives. The data analysed in each of the three essays is based on different sections of one interview questionnaire. Consequently, all three essays make use of the same sample. The questionnaire used for the interview was constructed using information from three different sources: 1) similar questionnaires previously developed in both the academic and non-academic literature for inquiry into ES in the private sector, tourism sector and TAI (see Bohdanowicz, 2003; Carbon Disclosure Project (CDP) Worldwide, 2015; European Automotive Working Group on Supply Chain Sustainability, 2014; Green Forum Initiative, 2008; Northern Ireland Environment Agency (NIEA), 2012; University Leaders for a Sustainable Future (ULSF), 2009; Whitmarsh, 2003); 2) survey of existing literature, especially their findings; and 3) from preliminary chats with industry stakeholders at managerial levels in their establishments. The fourth essay (Chapter 5) employs panel data methods to test its hypothesis, while the final paper (Chapter 6) uses Ordinary Least Square Regressions within the context of a Randomised Control Trial. The essay-specific details are discussed within each chapter. The final chapter (Chapter 7) concludes the thesis.

CHAPTER 2 :

Stakeholder Perceptions of Resource Management and Environmental Sustainability in the South African Tourism Accommodation Industry: A Qualitative Investigation⁴

2.0 PREFACE

With the success of the first “Responsible Tourism conference” and the “World Summit on Sustainable Tourism” in South Africa in 2002, awareness of ES in the South African TAI has increased. However, research into the applicability of ES in the industry is at its infancy, with only two academic studies identified in the literature, both of which suggest low levels of adoption of ES by the industry. To address this challenge of low adoption, the appropriate starting point is to explore the awareness and understanding of ES issues by decision makers within the industry. Consequently, this paper explores the perspectives of Owners, Managers and Operators (OMOs) of TAI establishments on ES issues. It evaluates their understanding of what ES is, how they think it applies to the industry, and their opinion on who should be responsible for implementing ES within the industry. Semi-structured interviews were conducted with willing OMOs and analysed using thematic analysis.

The findings show that there is a high level of awareness of ES among OMOs in the industry, and suggest that their understanding of the concept is centred around the resource management and environmental preservation definition of ES. This understanding shapes their perspective of the applicability of ES to the TAI, as well as the activities implemented within their establishments. With regard to the responsibility for implementing ES in the industry, respondents indicated that management is responsible for introducing and enforcing ES initiatives in the establishment, the staff are responsible for executing these initiatives and driving the sustainable culture, and the responsibility of the guests is behaviour modification in line with sustainable initiatives and the patronage of sustainable establishments. These findings provide the necessary background to correctly conceptualise the challenges and motivations for ES adoption in the industry, so as to proffer solutions to improve uptake of ES practices.

⁴ A paper based on this chapter has been accepted for publication by the Journal of Economics and Behavioural Studies (JEBS), a DHET 2017 accredited journal.

2.1 INTRODUCTION

This paper presents the findings of an exploratory study to evaluate stakeholders' (OMOs) conceptualisation of, and attitudes towards, ES. The study also evaluates these stakeholders' views on the applicability of ES to the TAI in South Africa. Specifically, it assesses their understanding of what ES is and how they think it applies to the industry, as well as their opinion on responsibility for implementing ES in the industry. Given that the resource (water, energy, and water) intensive nature of the TAI puts RM at the core of ES focus in the industry (Becken, 2013; Bohdanowicz, 2006a; Kirk, 1995), throughout this study, the focus is on RM within the context of ES. The outcome of this inquiry provides the necessary background to correctly conceptualise the challenges and motivations for ES adoption in the industry, so as to proffer solutions to improve uptake of ES practices.

2.2 BACKGROUND

The need to appropriately capture the perceptions of, and attitudes to ES by the OMOs of South Africa's TAI is motivated by the following factors: (1) the environmental impact of the industry's activities due to its high resource consumption, as recognised globally; (2) the importance of tourism to South Africa because of its contribution to the economy; (3) the need to bridge the gap between South Africa's commitment to ES and actual uptake levels in the sector. These motivations are further discussed below.

Globally, the resource intensive nature of the TAI has received increased attention, especially within the ES movement. The focus on resource consumption in the industry is as a result of the high levels of energy and water use by industry establishments, with concomitant high waste and Green House Gas (GHG) emissions. Resource consumption levels within the TAI are driven by the operating characteristics of TAEs, as well as the specificity of the hospitality functions and services they provide (Becken, 2013; Bohdanowicz, 2006b; Erdogan & Baris, 2007). Research has found that the resource consumption characteristics of TAEs imply that RM in industry has potential not only for environmental benefit, but also for economic advantages (Becken, 2013; Rogerson & Sims, 2012). This should provide added incentives for embracing ES within these establishments, however, evidence from the literature indicates low levels of both energy and water efficiency practices in many parts of the world, and in South Africa (Becken, 2013; Frey & George, 2010; van der Merwe & Wöcke, 2007).

In South Africa, the tourism sector is a key contributor to the economy of the nation. It has been identified as having the highest potential for addressing the country's high levels of unemployment, with significant contributions to the gross domestic product (GDP) (Frey & George, 2010). The government has also recognised the sector's distinctive dependence on the beauty and

hospitality of the host environment for its success, and has consequently categorised it as one of the sectors of the economy that is most contributory and vulnerable to climate change activities (Republic of South Africa, 2010). In the light of this concern, significant national commitments were made to address the environmental concerns of the sector in order to sustain its contributions to the economy. Various policy documents (such as the Development and Promotion of Tourism white paper released in 1996) and guideline documents (such as the National Responsible Tourism Development Guidelines and the Responsible Tourism Manual for South Africa) were developed to provide a road map for the implementation of ES in the industry (Department of Environmental Affairs and Tourism, 2002a,b).

These documents emphasised responsible/sustainable tourism practices as an imperative for the nation and set out strategies for achieving them. In addition, South Africa has been in the forefront of facilitating the global discourse on responsible and sustainable tourism, hosting the World Summit on Sustainable Tourism and the first Responsible Tourism Conference, both in 2002. The World Summit on Sustainable Tourism birthed the “Cape Town Declaration” of 2002 which defined and explained the scope and focus of responsible tourism (Frey & George, 2010: 621). The commitment to improving the sustainability of the sector was further demonstrated with the establishment of a dedicated National Department of Tourism in 2009. This department was responsible for the development of the National Tourism Sector Strategy (NTSS) of 2011. The NTSS set out the key policy agenda of the new department which was to encourage the sustainability of the nation’s tourism sector by actively encouraging carbon emission reduction (National Department of Tourism, 2011).

Over time, the academic community has responded to the government’s commitment and initiatives with increasing research into responsible and sustainable tourism in the tourism sector as a whole in the country⁵. Findings from the literature however indicate that the uptake of responsible and sustainable practices in the South African Tourism sector is limited, despite increased awareness of the need for more responsible and sustainable habits amongst stakeholders in the industry (Frey & George, 2010; van der Merwe & Wöcke, 2007; Rogerson & Sims, 2012). Given the identified global environmental impact of TAEs globally, South Africa’s dependence on the industry and its parent sector for economic viability, and its displayed commitment to incorporate sustainable practices into the tourism sector, the limited uptake of ES initiatives in the tourism sector is unsatisfactory.

A review of the literature has revealed that very few researches have been conducted into ES issues and practices in the TAI in the country, with only two studies being identified (see van der

⁵ Frey and George (2010: 622) provide a detailed review of responsible tourism research in South Africa up to the year 2010.

Merwe & Wöcke, 2007; Rogerson & Sims, 2012). This pattern has also been recognised in the global literature which has generated numerous articles on the potential and applicability of ES in the global tourism sector, but very few focusing on the TAI. Given that research into the TAI context in SA is still emerging, with no literature defining the context in detail, this essay aims to redress this gap by asking fundamental questions which establish a baseline and provide an introduction to how ES is conceptualised and approached within the industry. The essay is hence an exploratory study which provides the necessary starting point for developing solutions to match governmental commitments to actual practices, and integrating these ideas at the much needed higher level of engagement.

The existing global literature on ES within the TAI has often focused on the level of awareness of ES in the industry, and the challenges and enabling factors that influence the adoption of ES activities, as well as the ES activities and practices that have been adopted in the industry. A detailed review of the literature indicates that studies that investigate the attitudes and conceptualisation of ES in the South African TAI are lacking. This essay fills this critical gap by investigating industry operators' conceptualisation of ES-related issues in the industry. Specifically, the essay aims to answer questions which clarify the industry's thinking of ES: are they aware of ES? If yes, how are they thinking about it? Do they understand its applicability to them and their industry? What role do they see themselves playing in achieving it? And what they have done so far to integrate ES in the industry?

In Sections 2.3 and 2.4, the objective of this paper is contextualised within the framework of existing literature on RM and ES in accommodation establishments. The data and method used to answer the research questions posed are elucidated in Section 2.5, and the findings of the study are outlined and discussed in Sections 2.6 and 2.7.

2.3 RESOURCE MANAGEMENT AND ENVIRONMENTAL SUSTAINABILITY IN ACCOMMODATION ESTABLISHMENTS

A review of the existing literature indicates that academic research into RM and ES practices in the TAI is limited. The existing literature has been approached from various angles. While some studies have approached their inquiry via the scope of Corporate Social Responsibility (CSR) (see Bohdanowicz & Zientara, 2008; Garay & Font, 2012), others have approached it via the less broad scope of Responsible Tourism (see De Young, 2000; Frey & George, 2010; van der Merwe & Wöcke, 2007), while the majority of studies have used the more nuanced term of Greening/ Environmental Sustainability (see Chan, 2008; Chan & Hawkins, 2012; McNamara & Gibson, 2008; Rahman, Reynolds, & Svaren, 2012)). Within the tourism sector, the terms responsible tourism, environmental sustainability, sustainable tourism, and eco-tourism are often used interchangeably when referring to the environmental component of tourism. Responsible Tourism

is in most cases viewed as a sub-set of CSR when the discourse shifts to tourism establishments and their practice (Rogerson & Sims, 2012). Frey and George (2010) provide definitions of the most of these terminologies as they have been used in literature. This study takes the variations in terminology in the literature into consideration in the review provided. It hence adopts the use of the terms Responsible Tourism, Sustainable Tourism, and Eco-Tourism to connote Environmental Sustainability as it relates to the tourism industry.

With regard to the TAI, enquiry into ES practices has been densely concentrated in Europe and the developed world with focus on the developing world context being very sparse (El Dief & Font, 2010a; Kasim, 2007a; Rogerson & Sims, 2012). It has however been highlighted that the economic and institutional peculiarities of developing countries has significant influence on the adoption implementation of environmental practices and regulations in the tourism sector, making it more complex than in developed economies (El Dief & Font, 2010a). While Chan and Wong (2004) and Rogerson and Sims (2012) provide an exhaustive review of international research and debate on sustainability-related discourse in the global hotel sector, this study focuses on the developing country literature to provide a more relevant and closer-to-home context for the study.

A detailed survey of the literature revealed sixteen twenty-first century, peer-reviewed, developing country studies, published in English, which focus on ES related issues in the TAI. [Table 2.1](#) provides a summary of the authors, the research method adopted, and the overall focus of these studies. These studies span seven years and six countries, are mostly quantitative in nature, hotel-centred, and focus on understanding the determinants of ES adoption or resource consumption in TAEs. Only one study, by Kasim (2009), focuses on hotel managers' conceptualisation of, and attitudes to, ES in the TAI. The study focus is on small hotels in Kuala Lumpur, Malaysia. It employs a quantitative Likert scale with open-ended questions to elicit the managers' responses to questions regarding their understanding of environmental management, its applicability to their industry, and their practice of it in their establishments. The study found that the managers in the industry demonstrated a positive attitude to environmental management, its relevance to their industry and operations, and their role in it. It established a wide gap between these attitudes and the actual practice of environmental management in the establishments – a finding not inconsistent with other developing country studies. Based on limited responses to open-ended questions aimed at capturing an understanding of environmental management, the author contends that this gap is driven by poor knowledge and understanding of the concept by the managers. The study hence attributes the positive attitude picked up by the Likert scale to the managers' need "to appear politically correct in the matter" and recommends that the managers of tourism accommodation establishments "must first understand the meaning of environmental management before they can effectively become part of it" (Kasim, 2009: 721).

Table 2.1: Developing country studies for ES in accommodation establishments

<u>AUTHOR (Date)</u>	<u>LOCATION</u>	<u>METHOD</u>	<u>FOCUS OF PAPER</u>
Ali et al. (2008)	Jordan	Quantitative	Provides detailed breakdown of energy consumption drivers in Jordan Hotels, and recommendations for reducing consumption.
Chan (2008)	Hong Kong	Quantitative	Evaluates the barriers to adopting EMS and ISO 14001 in 83 Hong-Kong hotels.
Chan & Hawkins (2010)	Hong Kong	Qualitative	Evaluates the impact of EMS adoption on employees in one of Hong Kong's international hotels.
Chan & Hawkins (2012)	Hong Kong	Qualitative	Evaluates the factors that influence the various stages of adoption of EMS, using the case study of an international hotel.
Chan & Wong (2004)	Hong Kong	Quantitative	Makes use of exploratory factor analysis to predict motivation factors for the adoption of ISO 14001 in Hong Kong hotels.
El Dief & Font (2010a)	Red Sea-Egypt	Quantitative	Evaluates the impact of personal and organisational values, amongst other characteristics, as drivers of environmental management in Red Sea hotels.
Ismail & Rogerson (2016)	Gauteng, South Africa	Qualitative.	Focuses on the ES adoption in the Protea Hotel Chain in Gauteng.
KamalulAriffin et al. (2013)	Malaysia	Quantitative	Develops and tests hypothesis on the determinants of the adoption of environmental practices in Malaysian hotels using factor analysis.
Kasim (2007)	Penang, Malaysia	Qualitative	Focuses on determinants (barriers and drivers) of ES adoption.
Kasim (2009)	Kuala Lumpur, Malaysia	Quantitative	Focuses on small and medium hotel managers' awareness, attitudes, and solutions for improvement.
Le et al. (2006)	Vietnam	Quantitative	Makes use of Diffusion of Innovation Theory to identify drivers of ES adoption.
Mensah (2006)	Accra, Ghana	Quantitative	Investigates the practice of environmental management in Accra hotels.
Rogerson & Sims (2012)	Gauteng, South Africa	Qualitative	Focuses on the awareness, practice, and major drivers of ES in larger hotels.
Tang et al. (2014)	Malaysia	Quantitative	Uses stakeholder theory to identify drivers of ES adoption.
Trung & Kumar (2005)	Vietnam	Quantitative	Evaluates resource use and waste management practices of hotels.
van der Merwe & Wöcke (2007)	South Africa	Quantitative	Identifies motivation and barriers to the adoption of responsible tourism practices in hotels using a quantitative study sample.

Apart from this study by Kasim (2009), no other developing country study has been identified which explores the perceptions and attitudes towards ES in the industry. This single study also highlights the need to explore this topic area within the framework of a qualitative study, an approach it was unable to fully explore. Hence, the current study adopts the recommendation in Kasim's study, and explores the understanding of ES by the OMOs of TAEs in South Africa within a qualitative framework. It expounds on the focus of Kasim's (2009) study by investigating the perceptions of, and attitudes towards, ES in the industry. It hence contributes to the limited research in this part of the world. The next section further explores the challenge of low adoption of ES activities in the industry by identifying and profiling the ES practices primarily adopted by TAEs in developing countries.

2.4 RESOURCE MANAGEMENT PRACTICES IN ACCOMMODATION ESTABLISHMENTS

This section sets out to identify the ES practices most commonly associated with developing country TAEs as identified in the literature, and given the RM focus of this study, compiles a list of only energy and water saving practices identified in these studies – see [Table 2.2](#). Akin to the preceding section, developing country-focused research detailing the sustainable practices of the TAI is sparse as opposed to the rest of the developed world. The pioneering developing country study identified from review of the literature was carried out by Trung and Kumar (2005), who provide a list of energy, water and waste efficient and inefficient management practices amongst hotels in Vietnam using quantitative survey techniques. Van der Merwe and Wöcke (2007) carried out empirical analysis to evaluate the understanding and practice of responsible tourism initiatives amongst South African hotels, detailing what these practices are. Another South African study is provided by Rogerson and Sims (2012), who carried out semi-structured interviews with both the regulatory authorities (for building construction and business certification) and the representatives of top-of-the-range leading hotel brands in the hotel industry in the Gauteng area of South Africa, and investigated the regulatory environment and detail the ES initiatives adopted in the industry. Ismail and Rogerson (2016) also carried out a study on retrofitting in the Protea hotel group in the Gauteng region, and as part of their study, investigated the retrofitting initiatives of 10 hotels in this chain, and investigated a wide range of pro-environmental initiatives implemented by the individual hotels.

The single most common sustainable practice identified across all four studies for energy saving is the use of energy-efficient light bulbs (e.g. Light Emitting Diode (LED) and compact fluorescents), while for water the installation of water saving and water-efficient showerheads. The popularity of energy efficient lighting is consistent with findings from international studies (Becken, 2013) and can be related to the low-cost, flexibility, and ease of implementation of this practice. These activities also have the characteristic of being cost-reducing, and can be argued to be more

economically motivated than environmentally driven. This further highlights the need to understand how industry operators perceive ES as a concept, as well as its applicability to their industry. Such investigation will provide a more precise lens for evaluating the activities and challenges with regard to ES implementation.

Table 2.2: Environmental practices in accommodation establishments

DEVELOPING COUNTRY STUDIES: PRACTICES				
NAME OF PAPER	Rogerson and Sims (2012)	Trung and Kumar (2005)	Mensah (2006)	Ismail and Rogerson (2016)
LOCATION and ACCOMMODATION TYPE	Gauteng, South Africa / Hotels	Vietnam/ Hotels	Accra-Ghana/ Hotels	Gauteng, South Africa / Hotel Chain
RESEARCH METHOD	Qualitative	Quantitative Questionnaire	Quantitative	Qualitative and Quantitative
ENERGY SAVING ACTIVITIES				
Gas-powered appliances	✓	✓		
Heat pumps	✓			
Solar panels	✓			
Smart energy monitoring technologies	✓			
Towel-reuse programs	✓		✓	✓
Energy efficient light bulbs	✓	✓	✓	✓
Downlighters	✓			
Guest room motion-sensor lighting	✓			
Solar water heating			✓	
Not using air-conditioners			✓	
Use energy-efficient appliances		✓	✓	
Guest room temperature monitoring		✓		
Energy saving laundry system		✓		
Regular energy consumption monitoring		✓		
Key-card system for guest rooms		✓		
WATER SAVING PRACTICES				
Water saving and water-efficient showerheads	✓	✓	✓	✓
Flow restrictors and aerators in taps		✓	✓	✓
Use of grey-water	✓			
Dual-flush toilet system		✓	✓	✓
Fixing leakages		✓		
Garden watering in morning and evening		✓		

The next section discusses the approach employed to carry out this investigation, as well as the data used, and the method of analysis.

2.5 RESEARCH METHOD

To evaluate perceptions of ES and RM, as is the objective of this study, a qualitative approach is best suited, because it gives the research the opportunity to obtain detailed knowledge of a concept, and to capture the reality of these concepts in context and the behaviour of participants within such context (Anderson, 2010). The qualitative interview approach was hence adopted for the fieldwork for this study. A semi-structured questionnaire was used during the interview process. The advantage of these questionnaires is that it provides a guided approach to data collection which helps to define the subjects to be discussed, while allowing the opportunity for detailed answers and also permitting both interviewer and interviewee the opportunity to digress where necessary (Gill, Stewart, Treasure & Chadwick, 2008; Turner III, 2010). They allow for consistency in the questions asked across participants, but also permit flexibility as the ordering and phrasing of questions can be adapted to suit the participant and the context of the interview, and allow for new ideas and concepts to emerge and be pursued (Dearnley, 2005; Gill *et al.*, 2008; Turner III, 2010).

The questionnaire used for the interview was constructed using information from three different sources: 1) similar questionnaires previously developed in both the academic and non-academic literature for inquiry into ES in the private sector, tourism sector and TAI; 2) survey of existing literature, especially their findings; and 3) from preliminary chats with industry stakeholders at managerial levels in their establishments.

The persons of interest for this study were the management (i.e. owners, managers, and operators (e.g. maintenance engineers and sustainability directors)) of TAEs in the greater Cape Town region of South Africa. The management focus of the study stems from the fact that managers are in the best position to provide information on resource consumption as they are involved in the day-to-day running of the establishment, and hence possess a broader knowledge of resource consumption, as opposed to the service staff (e.g. housekeeping, kitchen, or garden staff) and guests (El Dief & Font, 2010a). The focus on management is consistent with the wider literature (see Bohdanowicz, 2006b; Céspedes-Lorente, de Burgos-Jiménez & Álvarez-Gil, 2003; El Dief & Font, 2010b; Kasim, 2007a; Kirk, 1998; Le, Hollenhorst, Harris, McLaughlin & Shook, 2006; Rogerson & Sims, 2012; Tang, Amran & Goh, 2014).

The target population was TAEs in the Stellenbosch and Cape Town municipalities in South Africa. These municipalities have a high concentration of TAEs due to the large tourist volumes they attract yearly. All TAEs in these municipalities were targeted for this study irrespective of their size or type. The sampling frame of establishments in these municipalities was constructed by manually compiling the names of establishments registered with the tourism grading council and the municipal tourism bureau in 2014. Establishments on the list were then contacted telephonically

and asked if they were willing to participate in the study by granting an interview. To avoid bias towards registered establishments, non-registered establishments in the vicinity of those where interviews were conducted were also approached to participate in the study. Interviewees were also asked for referrals to associates who might or might not have been on the list. Establishments were contacted irrespective of their type or star-grading. The final study hence consists of no star to five star BnBs, guest houses, backpackers and hotels.

To identify participants, the targeted-convenience and purposive sampling technique, a non-probabilistic method for sample selection in which participation in the sample is dependent on ease of access, was used (Anderson, 2010; Marshall, 1996) was used to select participants. This sampling technique was preferred due to the in-depth nature of the data required and the data collection tool which necessitated that all participants be interviewed face-to-face. The resource requirement of such a study would be very high if a more probabilistic sample were to be employed. Given the resource constraints in terms of manpower, time and funds for this study, probabilistic sampling was not feasible. Also, the qualitative nature of the study implies that representativity of sample (a goal of probability sampling) is not required, as opposed to quantitative studies (Anderson, 2010).

A total of 34 interviews were conducted with 33 establishments⁶. The majority of these interviews were conducted between March and September 2015. Four of the 34 interviews were not usable due to incompleteness (two interviews), the non-management position of the interviewee, and response non-coherence due to language barrier. Each interview was about an hour long and was transcribed verbatim before analysis. The Thematic Analysis approach was employed for coding and analysing the transcribed data: this approach was chosen due to its characteristics of being flexible, and theory and epistemology independent, which allows it to provide exhaustive thorough interpretation of the data (Braun & Clarke, 2006). This is appropriate for this study which is pioneering and exploratory in nature, and not dependent on extant literature.

2.6 RESULTS AND DISCUSSION OF FINDINGS

In this section, the profile of responding establishments and individuals are first presented. The research findings are then elucidated in line with the objectives of the study. Under the finding, participants' understanding of the concept of ES is first reported, followed by their perceptions of how the concept is applied within the industry. Opinions on the responsibility and burden for ES both within and outside the industry are then reported, and finally, the RM activities implemented in the industry as mentioned by participants are discussed.

⁶ The Sustainability Director and Chief Engineer were both interviewed individually at one of the establishments.

The knowledge gained from these findings provides a comprehensive and in-depth understanding of the perspectives of accommodation managers with regard to issues of ES within the industry and in establishments. This provides an indication of what the focus of policy should be to encourage the adoption of ES practices by these managers in their establishments.

2.6.1 Data descriptives

The characteristics of the establishments that participated in this study, as well as the individuals interviewed, are presented in [Table 2.3](#).

Table 2.3: Characteristics of participating establishments and individuals

		n	%	Total n	Total %
Establishment Characteristics					
Ownership Structure	Board of directors	2	6.7	30	100
	Business/Hotel group	8	26.7		
	Family	9	30.0		
	Partnership	4	13.3		
	Single owner	7	23.3		
Duration in Business/Business Age	0 to 5 years	5	16.7	30	100
	6 to 10 years	6	20.0		
	11 to 20 years	7	23.3		
	21 to 30 years	7	23.3		
	31 to 100 years	1	3.3		
	More than 100 years	3	10.0		
	Unknown	1	3.3		
Star Grading	No Star	6	20.0	30	100
	Two Star	1	3.3		
	Three Star	10	33.3		
	Four Star	12	40.0		
	Five Star	1	3.3		
Accommodation Type	Backpacker	4	13.3	30	100
	BnB	4	13.3		
	Guest House	8	26.7		
	Hotel	14	46.7		
Number of Rooms in Establishment	1 to 10 rooms	8	26.7	30	100
	11 to 20 rooms	7	23.3		
	21 to 50 rooms	5	16.7		
	51 to 100 rooms	1	3.3		
	100 to 200 rooms	7	23.3		
	More than 200 rooms	2	6.7		
Participant's Characteristics					
Participant's Designation	Administrative	12	40.0	30	100
	Technical	2	6.7		
	Both	16	53.3		
Participant's Duration in Hospitality Industry	0 to 5 years	10	33.3	30	100
	6 to 10 years	3	10.0		
	11 to 20 years	11	36.7		
	More than 20 years	6	20.0		
Participant's Gender	Female	14	46.7	30	100
	Male	16	53.3		

Source: Data analysis from fieldwork, 2015

The table indicates that most of the participating establishments were either owned by a business/hotel group, a family, or a single individual. It also indicates that more than 80% of

participating establishments have been in existence for more than half a decade, indicating that they are relatively established, would have a good grip on the running of the business, and would hence be able to provide adequately reflective responses that reflect the conditions of the general industry.

Over 70% of establishments belong to the three and four star grading category, and all establishments are relatively evenly split between hotels and other accommodation types. The characteristics of the participants also show a relative gender balance gender, and suggest that respondents in over 50% of the establishments combined both administrative and technical roles. This is important for the study in that it gives authority and credibility to the responses provided by the participants. This, combined with the fact that over 65% of respondents report being in the industry for more than five years, makes the findings distilled from the responses reliable and dependable in reflecting the perceptions in the industry as a whole.

2.6.2 Understanding of the concept of ES

To assess the understanding of ES, participants were first asked if they were familiar with the concept of ES, to which almost all the participants answered in the affirmative. They were then asked to explain their understanding of the concept, with the question being rephrased when necessary if the participant indicated that they did not understand. The emerging themes from the analysis of the responses is captured in quadrant A of Figure 2.1⁷.

Based on the responses obtained, two dominant themes relating to the understanding of ES emerged: resource management and environmental protection. To further explore participants' attitudes to ES, and assess how well their understanding of the concept was applied to their context, they were asked how they thought ES applied to the TAI. The emerging themes from analysis of the responses to this inquiry are captured in quadrant B of Figure 1.1. As can be seen in quadrant B, the two dominant reasons for the applicability of ES to the TAI are the resource-intensive nature of the industry, and that it is a business imperative. Each of the two dominant themes on the understanding of ES and its applicability to the TAI, respectively, are further discussed in the next two sections.

⁷The first number in brackets indicates the frequency of occurrence of quotes with that theme, and the second number indicates how many other codes it is linked to in the software analysis tool . For example, {32-3} means that across all interviews, 32 quotations were coded with the theme "Resource (Energy/Water/Waste) Management" and that this theme has 3 links to other codes in the software analysis.

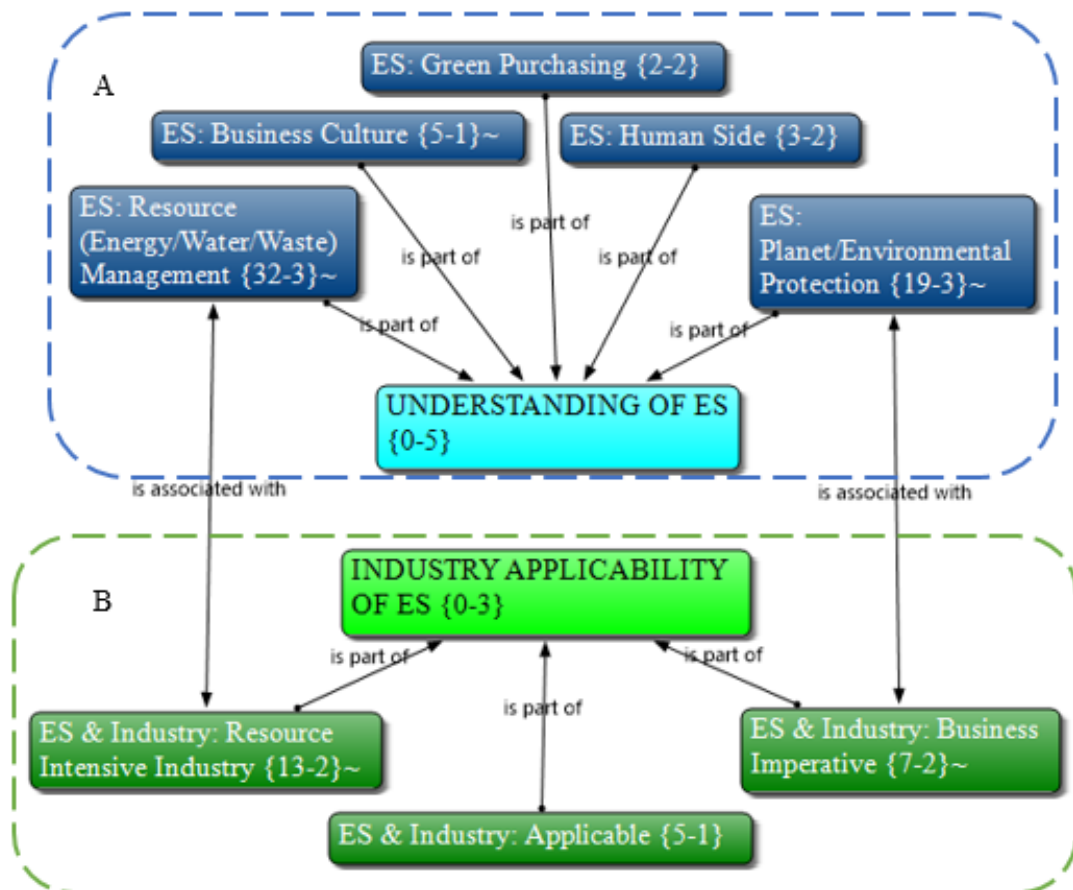


Figure 2.1: Participants' understanding of ES and its applicability to the TAI

Source: Data analysis from fieldwork, 2015

2.6.2.1 ES as resource (energy, water and waste) management

The majority of participants in the study associated ES with energy, water, or waste management. Some participants had a wholesome approach to their understanding and mentioned all three aspects in their conceptualisation of the term, with one participant's response being:

to have the least impact on the environment the way that we use water or resources so to speak, and that doesn't go just for water and electricity which is the obvious thing, but everything from packaging to materials, reusing furniture or repurposing them instead of throwing them away and buying new ones and if we do decide to change and we get rid of equipment and furniture or fittings that we try and make sure that that stuff that we get rid of gets reused and not just dumped. (17:9)

This theme emphasises the RM component of ES, and indicates that it is one of the most crucial aspects of ES in the industry. Some participants who associated ES with RM however focused on the recycling aspect, indicating an almost skewed perspective. The responses given by participant 8 below capture this focus.

To structure your deliveries in specific time, keep your wastage down. Em ... in fact, when we talk about wastages, it's all the consumables in a guesthouse rooms, it's the

consumables in the kitchen, separate the foods from the plastics and non-essentials and yah, have it delivered or picked up. (8:9)

This RM perspective is consistent with the literature where RM has been identified to be the cornerstone of ES in the TAI (Becken, 2013). This theme indicates a somewhat accurate understanding of ES within the industry's context. It also sets the expectation that one will expect to see more establishments implementing practices targeted towards their resource consumption.

Second to resource management, many participants indicated that their understanding of ES related to the preservation of the environment. This theme is further explored below.

2.6.2.2 ES as planet/environmental protection

Some participants described their understanding of ES by referring to the need to preserve the environment. Preservation of the environment largely revolved around the impact of resource use on the environment, and the need to mitigate the negative impact of such use on the environment.

I would say environmental sustainability is to use the resources in a way that it does the least harm to the environment, that they are renewable, that they don't ... that we basically don't finish them up, that they are not dangerous, like nuclear power and that it is guaranteed that the next generations will also have enough power without doing damage to the planet earth I would say. (12:9)

The theme also emphasised that ES applies both to general living as well as how business is conducted. Referring to ES as a part of how business is conducted, one participant stated that:

Well, I think environmental sustainability is managing the ... managing your business in such a way that you, like, enforce, um, the people you work with, the people you do business with, the people you buy from, the people you sell to, um, and basically enforcing, um, environmental needs, um, environmental sustainability, um, and, and um, environmental shortcomings, basically what it comes down to. And, and, and, and recognising that in every way of your, in every part of your business, that's how I understand it. (5:6)

Ultimately, participants' conceptualisation of ES as an environmental protection agenda indicates a consciousness of the impact of human activities, as well as industry activities, on the environment, and the need to ensure that these activities are carried out in recognition of their potential negative effects.

The two dominant concepts emerging with respect to the understanding of ES in the industry suggest that the participants have a good grasp of the concept, and link the concept to their own individual activities in the industry. To clarify this, the study sought to find out the participant's perception of the applicability of ES to their industry. The emerging themes are discussed in the section below.

2.6.3 The applicability of ES to the TAI

Participants were asked if they thought the concept of ES was applicable to the TAI, to which all participants replied in the affirmative. They were then asked to explain their perception of how the

concept applied to the industry. Two major themes emerged from analysis of the responses are depicted in quadrant A of Figure 1 and are discussed in detail below.

2.6.3.1 *It is a business imperative to ensure the future sustainability of the industry*

The literature argues that the tourism establishments consider the future sustainability of the industry as an integral part of their business motivation, similar to profitability (van der Merwe & Wöcke, 2007). Participants were of the view that the success of the hospitality and tourism industry as a whole rested on the sustainability of the environment.

So, the more we do to reduce that impact, the better. Otherwise there is not going to be an environment ongoingly that is going to encourage guests to come here. I mean the tourism in Cape Town is based on the natural beauty of Cape Town, so if that had to be impacted on and destroyed, why would guests come here, there's other places in the world they could rather go to. (18:39).

This theme captured both the short-term perspective of profitability, where participants argued that revenue is highly dependent on patronage by foreign clientele who are often ES conscious, as well as the long-term perspective, consistent with the findings of van der Merwe and Wöcke (2007).

So, it's a business imperative, without a doubt, it's a business imperative. If we don't have a long term view of the context in which we operate and how we can play a positive role going forward, and the more positive that contribution is, the greater the offering can be to people who come and visit. (10:30)

The business imperative view of the applicability of ES to the TAI indicates that participants are conscious of their direct relationship to the environment as the primary source of business success. This is associated with their understanding of ES as environmental protection as is indicated in Figure 1.1. In this sense, preserving the environment is crucial to the long-term viability of the industry.

2.6.3.2 *The industry is highly resource intensive*

In response to the applicability of environmental sustainability, many participants emphasised that the resource intensive nature of the industry had a huge impact on the environment and hence necessitated the adoption of sustainable practices. Participants posit that a lot of resources are constantly consumed throughout the entire stay of the guest and that this is integral to the hospitality process. As such, the sustainability of the industry requires that both the amount and the nature of the resources used be adequately evaluated to ensure that they do not harm the environment.

Listen ... each and every time when guest walks into a property, there is emm ... they use something in the room, there is always consumables being used. If it is a shower cap which is wrapped in a plastic, there is pen, there is paper, there is this little shampoo bottles, there is everything. So for us, we as hospitality managers ... it's try and move to a certain direction to use biodegradable (products) in our rooms. (8:14)

This resource-intensive nature of the industry is hence associated with the RM understanding of ES as is demonstrated in Figure 1.1. Furthermore, participants posit that the rapid growth in South Africa's tourism industry further compels the need for sustainability in the industry as the impact of resource consumption on the environment will worsen in the absence of intervention, which will ultimately be detrimental to the success of the local industry.

Well, as I mentioned earlier, hospitality as an industry is extremely ... it uses too much resources and as a result of that it damages the environment. And tourism is a big part of our economy in South Africa and most probably will grow and is growing quite substantially, I think it's somewhere around between 7 and 10% a year. So, that impact is only going to get bigger. So, the more we do to reduce that impact, the better.
(18:15)

The high resource consumption levels in the industry hence need to be checked and moderated, and less harmful alternatives sought if the industry is going to thrive. ES hence offers a wholesome space to address the resource consumption hazard of the industry.

These themes indicate that industry operators possess a good grasp of the concept of ES and its applicability to the TAI. This study sought to investigate if this is indicative of a successful awareness/education program. Given that the South African government has shown significant commitment to the incorporation of sustainability in its tourism sector (Department of Environmental Affairs and Tourism, 2002a,b), this study sought to verify if this awareness and these consciousness levels might be indicative of the success of the government's initiatives. To do this, participants were asked if they were aware of the "Responsible Tourism Handbook", a manual for incorporating sustainability into tourism in South Africa, developed by the Department of Tourism. About 45% of participants who responded to the question answered in the affirmative, but they indicated that they were yet to read it. Furthermore, only 30% of respondents indicated an awareness of any responsible tourism standards in the industry. This strongly suggests that the government needs to do more to improve the reach of its programs in the industry.

2.6.4 The burden for environmental sustainability in the TAI

To further understand the applicability of ES to the industry, and to identify specific actionable areas for intervention, participants were asked who they thought should be responsible for ES. Emphasis was placed on the role of the management, staff and guests in implementing sustainable practices within establishments in the industry. More than half of participants were of the view that all stakeholders were responsible for the success of most ES initiatives. The themes identified for individual stakeholders are depicted in Figure 2.2. This figure indicates that management is expected to play more of an initiatory and regulatory role.



Figure 2.2: Responsibility for ES within TAEs

Staff are responsible for implementing adopted initiatives throughout establishments, while guests are expected to cooperate with the management and staff with regard to the initiatives implemented, and to encourage establishments which implement these ES initiatives by patronising them. These roles are further discussed below.

2.6.4.1 Management responsibilities

Participants were of the view that management's role revolved around (a) initiating the ES process and (b) regulation and enforcement. These roles are further discussed below:

(a) The Role of Management as the ES Initiator: According to participants, management was responsible for initiating the RM & ES process. As initiators, management is responsible for charting the course and giving out the directive of the way to go. This involves making the financial and capital investments necessary for implementing ES practices in the establishment, and ensuring that the necessary infrastructure is available.

They are also responsible for rallying the staff body toward achieving whatever sustainability goal is initiated.

From a management perspective, it's the setting of goals and the setting direction and taking the team with on the journey of what that team wants to achieve, and that the team never lacks understanding of the contribution that they make individually, so really understanding what it's important to do what we're doing. (10:52)

Rallying the staff body necessitates that the details of the process be communicated with the staff so that they understand the necessity of the ES practices being implemented. A participant emphasised that the training of staff is not a once-off process, but needs to be ongoing as the staff

might be prone to forget. In qualifying effective training as an ongoing process, participant 8 stated that:

It's training ... it's how you need to train people. It's a constant daily thing, of "remember this, remember that", "this is how we're doing it, remember not to do this".
(8:29)

For the process to be the most effective, it needs to go beyond teaching, to ensuring that staff understand the importance of their role and the actions they take with regard to the process. These responses by participants advocate the need for a fully cooperative and informed management and staff team for the success of most sustainable endeavours. While it was not disregarded that some projects (such as the installation of renewable energy) might not involve the direct involvement of the staff, the success of many activities require their buy-in.

(b) The Regulatory Role of Management: Participants proposed that another role of management is also to ensure that the process initiated is being implemented and that staff adhere to their training. A participant stated that

I'm responsible for it and I must make sure that the staffs actually, carry it through.
(4:21)

This necessitates that management not only follow up on implementation of guidelines, but also lead by example:

Well, I think in everything you do people watch you so, management has to act in the same way as you would like your staff to be. So, if you are throwing your rubbish wherever you like, everybody else will be doing that as well, because they look up to you as the manager and see what you're doing ... So, as management you have to be on the ball and you have to ... if you want people to be like that, you have to be like that. (13:41)

The regulatory and role model function go together and need to be carried out simultaneously if they are to be effective.

2.6.4.2 Staff responsibilities

In implementing ES practices in accommodation establishments, participants interviewed suggested that the role of staff is closely tied to their roles of hands-on implementation and as "boundary spanners" (Kim, Murrmann & Lee, 2009: 612), being the physical embodiment of the establishment to the guests (Kim *et al.*, 2009; Kim, Shin & Umbreit, 2007; Lewis & McCann, 2004). These roles are detailed below.

(a) Staff as implementers of ES initiatives: Given the role of staff as hands-on implementers of management decisions to ensure the smooth running of the firm, their role in ES directly feeds off this. The staff in an organisation are responsible for carrying out the initiatives implemented by the management.

Um, the, I wouldn't say on it, they, they come in as people that will effect it. You know, they won't actually make the decision about it, but they would be ... they are a vital role of making sure that it runs. So, that's, that you decide to bring in a policy of whatever, and then they are there, the ones that are actually going to physically do it. So, that's where their role is. They are important for that side. And as I said before, the buy-in from them, when you decide to do this is important. (7:48)

This emphasises that although the staff are not responsible for the decision-making process, the success of any ES initiative is largely dependent on their buy-in and dexterity.

(b) Staffs' role in explaining to guests: In their role as the physical embodiment of the organisation, the staff in an accommodation establishment represent the management to the clients. Within this role, they are hence responsible for communicating the details of any practice to the guests.

Once you check a guest in, you will explain to them – that's why he's going down with him to check them in. Just explain to them the process, explain to them that hot water will only go on at certain times, so that we can save energy. (8:28)

This role of the staff is crucial to gaining the buy-in of the guests, especially for practices or activities that require guests' participation.

So, just put, and I know that information brochures are the least successful thing, so somehow you must do it on check in or when you room a guest that you tell them that it's an environmentally aware property or something like that and will ask you to ... ask their participation in the program. (17:49)

This also highlights the need for getting the buy-in of the guests for ES initiatives to be successful, as suggested in the literature. Chan and Hawkins (2010: 642) state that "to improve the chance of success of environmental protection activities, employee involvement is vital, and should include teamwork, cooperation and individual employee initiatives".

2.6.4.3 Guest responsibility

Participants indicated that the responsibility of the guests in implementing ES is to cooperate with the management and staff within the establishment, especially with regard to ES initiatives implemented, and to patronise environmentally conscious establishments.

(a) Cooperation: More than 65% of participants indicated that the biggest role the guests can play is to cooperate with the initiatives the management and staff have implemented by adjusting their expectations on luxury in one way or the other. This expectation of adjustment often involved industry activities associated with resource wastage within the guest rooms, and includes: having linen and towels changed daily, leaving taps running and unused lights turned on, switching on the air conditioning and television set when not in rooms or when the weather is amiable, and switching on air conditioning with windows open. Some establishments indicated that some systems had been put in place to check these activities, but that it was up to the guests to cooperate by accepting and working with those systems:

So ... and also not to try and be divisive and work against the system. So, if we've implemented a certain process to try and reduce our impact then to actually try and embrace that system and work with it ... There's only so much we can do and then it's up to their impact and what their demands are, and their demands are more than what we would like to give them, we're going to either have to lose the guest or we're going to have to give them what they want and that is the challenge. (18:69)

These participants indicated that the activities of the management and staff are only effective up to a certain level, and that fully maximising ES initiatives in the TAI is highly dependent on the cooperation of guests. Participant 24 below explained this using an example of LED light installation:

Oh yes. They've got the biggest role to play. You know what, you can implement as many devices as you like, till it's running out of your ears, but if they don't make use of it properly, it's pointless. You can maybe drop your load on the system, but the demand can still be high. It's like installing 3 watt LEDs...to reduce the demand on the system ... to be a bit more cautious and sustainable. But, if you leave the lights on for 24 hours, how does that help? It really doesn't. You've reduced the demand, but you're still misusing what you've got. (24:21)

Some participants mentioned that they had employed technology such as the key card system which switches off the electricity supply to the rooms when it is pulled out on departure from the rooms, but that guests have found ways to cheat the system. They also place advisory notes in the rooms encouraging guests to reduce wastage in various forms, but find this is completely subject to the discretion of each guest. This indicates the need for a means of encouraging guests' cooperation during the duration of their stay.

(b) Green patronage: Some participants were of the opinion that another role guests could play is to choose to patronise establishments that practice ES. This is emphasised where these establishments charge a premium for being more sustainable than their counterparts.

I don't think it's always about the obvious-offsets or getting involved in community projects ... some of the obvious spaces; the obvious is "come and stay here", because by supporting us financially, you support the whole circle of everything else. So when you come and stay here, and you eat in the restaurant, then all of these waiters have a job because you're enjoying the experience. (10:54)

One participant indicated that the patronage choices made by the guests go back to influence the ES decisions made by the management, and also have the potential to stimulate the adoption of these practices by more establishments in the industry.

These guests' roles of cooperation and green patronage suggests that to influence environmental policy, stimulating the awareness of the public and potential TAI client base can be a tool to motivate the adoption of more ES behaviour among TAEs. If they know that their clients will demand it, they might be more likely to embrace it.

2.6.5 Resource management practices in the industry

Participants in the study were asked to provide a list of the activities they implement to be more sustainable. Consistent with their resource management understanding of the ES concept and its resource intensive applicability to the industry, most of the activities revolved around energy and water conservation and waste management. The list provided was entirely subject to the participant's ability to recall, which was more difficult for establishments who had incorporated a lot of these activities. More specifically, participants were asked to detail the activities implemented to save energy and water resources. The activities mentioned by the participants during the course of the interview in response to other questions were also coded and are reported. The RM practices most frequently implemented by the establishments, as reported by the participants, are grouped into energy saving activities and water saving activities and are listed in [Table 2.4](#).

These occurrence of energy efficient lighting and water-efficient showerheads/taps is consistent with the findings of RM practices adopted in developing countries in other studies (see [Table 2.2](#)). These, as well as the other top two activities identified and adopted for energy and water saving by the majority of establishments, can be argued to be minimalist in nature in that they are low cost and relatively easy to implement. This could also suggest an economic motive of adoption as opposed to, or as well as, an environmental motive. To verify this, participants were asked to clarify what they thought were the low cost and high cost opportunities for implementing RM in the industry.

Table 2.4: Resource management practices in study sample

<u>Energy Saving Activities</u>	<u>Frequency</u>	<u>Water Saving Activities</u>	<u>Frequency</u>
Energy efficient lighting	21	Water-efficient showerheads/taps	13
Guest linen re-use notice	15	Water efficient toilets/urinals	8
Energy efficient appliances	6	Grey water recycling	3

Source: Data analysis from fieldwork, 2015

Energy-efficient/LED lighting and use of water-efficient showerheads were identified as low cost options for energy and water saving respectively. Other low cost opportunities for energy and water saving mentioned include behaviour change, use of hot water bottles for heating in winter, natural ventilation, and water-efficient showerheads. The high cost opportunities identified include appliance replacement, grey water system, heat pumps, energy monitoring/measurement system, rainwater harvesting, and use of renewable energy.

The categorisation of the more popular initiatives as low cost opportunities could suggest that the most popular energy and water saving initiatives adopted by establishments in the study are not entirely economically driven to save costs: industry operators are aware of their environmental merits and implement them as efforts to be environmentally conscious. Their popularity in the

industry is however driven by their low cost and the budget constraints of TAEs. These show that there are numerous options for establishments willing to implement ES initiatives but with constrained budgets.

2.6.6 General Discussion

The findings of this study suggest that managers in the accommodation industry in the study area have a good grasp of the concept of environmental sustainability. The majority of participants indicated that they understand the concept, and their conceptualisation of it indicates that it is regarded as a crucial and integral part of the industry. Their responses also indicate a consciousness of the impact of the industry's activities on the environment, and the need to ensure that these activities are carried out in recognition of their potential negative effects.

With regard to the understanding of ES in the industry, two main themes emerged from analysis of responses: resource management and environmental protection. Both themes suggest that the participants are able to internalise ES to their individual activities in the industry. To further investigate their internalisation of the concept, the study solicited the participants' perceptions of the applicability of ES to their industry. Responses indicated that participants were of the view that, as a result of the high resource consumption nature of the industry, ES is needed to ensure the future sustainability of the industry by mitigating the harmful impact of its consumption levels. These responses confirm that the participants do indeed understand ES, and view it as crucial to the survival of their individual establishments, as well as the industry as a whole. Furthermore, the responses highlight the significance of the RM component of ES as it relates to TAEs. The business imperative view of the applicability of ES to the industry also embodies the direct dependence of tourism as a whole on the environment to meet the basic business obligation of profitability and survival.

Study participants indicated that this ES concern, and its applicability in the TAI, is all the more crucial in the South African context where the economy relies heavily on the success of the industry, which is in turn reliant on the environment. According to participants, the rapid growth in South Africa's tourism compels the need for ES in the industry. They contended that the impact of resource consumption on the environment will worsen in the absence of an intervention, and that this will ultimately be detrimental to the success of the local industry. They also argued that high resource consumption levels in the industry need to be checked and moderated, and less harmful alternatives sought if the industry is going to thrive, and that ES offers a wholesome space to address this resource consumption hazard.

Participants also showed their commitment to implementing ES within TAEs by suggesting that the management, staff and guests all have key roles to play in the implementation process. Their suggestions of the roles indicate that the management is expected to initiate and regulate the

processes. The staff are responsible for implementing adopted initiatives throughout establishments, while guests are expected to cooperate with the management and staff with regard to the initiatives implemented, and encourage establishments which implement these ES initiatives by patronising them. Consistent with the literature, the role of the staff in the implementation of ES practices is also emphasised in this study. Responses by participants advocate the need for a fully cooperative and informed staff team for the success of most sustainable endeavours. While some projects, such as the installation of renewable energy, might not involve the direct involvement of the staff, the majority of activities require buy-in from staff. However, participants highlight that the success of the actions of the management and staff is highly dependent on the cooperation of guests. This indicates the need for a means of encouraging guests' cooperation during the duration of their stay.

The low level of awareness of the government's responsible/sustainable tourism initiatives or other responsible tourism initiatives in the industry implies that the programs implemented by the government for the industry needs to be improved. Overall, this study provides evidence of the understanding and willingness of the private sector, particularly in the TAI, to engage in the sustainability movement. It also provides information on the peculiarities of their context, hence providing baseline information, for academic and policy makers, for designing a private sector engagement strategy for accommodation establishments.

2.7 CONCLUSION AND RECOMMENDATION

This paper is based on the premise that an important starting point in the analysis and understanding of ES issues and challenges, is the contextualisation of the industry's take on the concept. Hence, the paper sought to understand the perception of ES by managing stakeholders (i.e. owners, managers and operators of accommodation establishments) in the industry, their understanding of the applicability of ES to the TAI, who they think should be responsible for ES in the industry, and the activities they have implemented to conserve energy and water resources. Using thematic analysis of 30 semi-structured interviews, the findings of the paper indicate that the participants are very aware of ES and its specific applicability to the TAI. Emerging themes revealed that the industry operators mostly viewed ES in line with energy, water, and waste management and preservation of the environment. They indicated that the applicability of ES to the industry is driven by the resource intensive nature of TAIs, and the need to preserve the planet for future generations.

These themes indicate a proficient understanding of ES and its specific applicability to their industry, and provides new evidence on the willingness of the private sector to engage in the sustainability movement, especially for the TAI. Participants also indicated that the responsibility for ES in TAEs falls on all establishment stakeholders –management, staff and guests, with each

having unique but overlapping roles. However, despite the adept level of understanding, the acceptability of the concept's relevance to the industry, and the acceptance of ES responsibility show that the level of take-up of RM activities in the industry is still very low, and at best basic. This low level of adoption is consistent with the findings of other studies on developing countries' TAEs. It is hence recommended that the reason for this low adoption rate be further investigated for the South African context. Examining the determinants of adoption and motivation for adopting ES in the industry, as well as the barriers to adoption, will provide more insight to the issues driving low adoption, as well as key intervention areas to boost take-up of ES in the industry.

CHAPTER 3 :

Motivation for Adopting Resource Management and Environmental Sustainability in the South African Tourism Accommodation Industry: Evidence from the Greater Cape Town Region

3.0 PREFACE

The findings of Chapter 2 indicate that, not only are the establishments in the TAI in the study region largely aware and conscious of the meaning of ES and its applicability to their industry, they are also aware of their role in implementing these practices, the distribution of the responsibilities amongst other establishment stakeholders, and even provide tips on how to begin implementing these initiatives. However, it finds that this level of awareness and responsibility does not translate to high adoption of RM and ES practices in these establishments. To begin to understand the reasons for this low adoption rate, this chapter explores the motivations for implementing RM and ES initiatives in the TAI. Using the same dataset as that employed in Chapter 2, and Qualitative Content Analysis method, this chapter finds that the desire to improve competitive advantage via cost cutting and revenue generation, and the environmental consciousness on the part of the industry decision makers, are two of the key motivating factors for ES adoption in the industry. The chapter provides information for policy makers and action plans for stakeholders and academics by asking respondents to provide tips to establishments who were intending to take up sustainability initiatives in their establishments. These findings contribute to building a holistic framework for addressing the low ES adoption rate in the TAI.

3.1 INTRODUCTION

The reasons for the adoption of ES practices in TAEs varies from the positive economic benefits associated with adoption to the need to protect and preserve the environment (Chan & Hawkins, 2010). In TAES, the specifics of ES focuses on the management of energy, water, and waste resources. The implementation of these resource management initiatives requires the investment of financial, time, and manpower resources, and its success is dependent on the commitment of both the management, the staffs, and the guests in each establishment, as it often requires attitudinal and behavioural changes (Chan & Hawkins, 2010).

Various factors have been identified in the literature as responsible for motivating this commitment to attitude and behavioural changes. Some opine that ES is viewed by some as the morally right course of action, and that their moral obligation is the motivating factor in behavioural change. For others, the concern for the environment is driven by a survival concern that is motivated by their

recognition of their dependence on the environment for sustenance and continued existence. Others have become aware of the economic benefits of adopting ES initiatives and hence implement them to accrue such benefits (Rahman et al., 2012; Chan & Wong, 2004). Regardless of the awareness and popularity of these beliefs and motives, society still struggles to bridge the gap between sustainable behaviour and popular behaviour (Agarwal, Gneiting & Mhlanga, 2017; Institute for Human Rights, 2015; United Nations, 2013). This is especially so for developing countries where other political, economic and social challenges (such as access to stable electricity and clean water) take precedence over addressing environmental sustainability concerns. Such concern and behaviour lag is consistent across economic sectors, including the TAI, in spite of the increased awareness of citizens and industry practitioners (Becken, 2013; Frey & George, 2010; Rogerson & Sims, 2012). Some establishments have however demonstrated varying levels of commitment to implementing ES activities in their establishments, in spite of the harrowing circumstances. The level of adoption in the TAEs is, however, still low and stimulating increased uptake requires understanding the factors that encourage uptake in establishments.

While literature in the past has attempted to identify the determinants of adoption of RM and ES activities amongst TAEs (see Álvarez-Gil, Burgos-Jiménez & Céspedes-Lorente, 2001; Hobson & Essex, 2001; Chan & Wong, 2004; Bohdanowicz, 2006b; Kasim, 2007), such literature is scarce for developing countries (Kasim, 2007a; Rogerson & Sims, 2012). This is especially so for South Africa, where no formal academic inquiry into the determinants of the adoption of ES activities in the TAI has been identified from a survey of the literature. Furthermore, given that the determinants of the adoption of RM and ES initiatives in the TAI in various parts of the world are complex – often not being entirely environmentally centred and varying widely, with both economic, social, and political factors playing a role (Rahman et al., 2012; Chan & Wong, 2004) – an understanding of these determinants in South Africa's TAI is necessary to identify key solution areas for policy intervention to improve the adoption of these initiatives in the industry.

This chapter contributes to the sparse literature on the determinants of the adoption of RM initiatives in developing economies, especially within the context of environmental sustainability. It investigates the motivations for adopting resource management practices within the scope of environmental sustainability, as well as industry operators' suggestions on the guidelines for adoption, and possible pitfalls to avoid in implementing an environmental programme in TAEs in Greater Cape Town area of South Africa. Two key specific objectives are hence pursued in this chapter. The first is to identify the motivations of Tourism Accommodation owners, managers and operators (i.e. management) for embracing resource management practices, and the role of environmental sustainability in these motivations; and the second is to elucidate the suggestions/tips by these stakeholders, for those intending to venture into ES in their establishments.

The rest of this chapter is structured as follows. A review of the literature on the motivations for adopting sustainability practices in TAEs in developing countries is provided in Section 3.2. This review provides context for the discussion of the findings of this paper. The details of the data and method of analysis employed in this investigation are provided in Section 3.3, and the findings from the analysis of the data are presented in Section 3.4. Section 3.5 then provides a discussion of these findings, with the key conclusion and policy implications of the findings, as well as recommendations for future studies.

3.2 MOTIVATIONS FOR ADOPTING SUSTAINABILITY PRACTICES IN TAES – LITERATURE CONTEXT

Based on studies from around the world, there is a general consensus that the uptake of ES amongst lodging establishments is low (Cherapanukorn & Focken, 2014; Frey & George, 2010; McNamara & Gibson, 2008). South African lodging establishments are no exception despite the country's pioneering role in the sustainable and responsible tourism movement in the world (Frey & George, 2010; van der Merwe & Wöcke, 2007; Rogerson & Sims, 2012). The reasons for this low adoption rate has been researched in the literature, with extensive articles being published on studies in developed country. A review of the existing literature, however, revealed that studies which focus on developing countries are limited (Kasim, 2007a).

A detailed review of existing literature revealed ten twenty-first century developing country studies (Chan & Hawkins, 2012; Chan & Wong, 2004; El Dief & Font, 2010a; Heung & Pun, 2013; KamalulAriffin *et al.*, 2013; Kasim, 2007a; Le *et al.*, 2006; van der Merwe & Wöcke, 2007; Rogerson & Sims, 2012; Tang *et al.*, 2014), which have been peer-reviewed and published in English, and at varying levels, investigate the determinants of ES adoption amongst TAEs in developing countries. These studies span five countries in Asia and Africa, with the majority (7/10) of studies focusing on Asian countries (Malaysia, Vietnam, and Hong Kong-China), and only three (3) focusing on African countries (South Africa and Egypt). The objective of this study restricts determinants considered within these studies to the positive sphere (i.e. motivations for adoption). A summary of these studies and some of their findings with regard to motivation is provided in [Table 3.1](#) below. For a summary of the factors that influence adoption as historically presented in the literature on a global scale, see Álvarez-Gil *et al.* (2001).

The determinants of adoption identified from the review of the literature were often evaluated using various theories of firms' environmental behaviour (El Dief & Font, 2010a; Le *et al.*, 2006; Tang *et al.*, 2014) and within the framework of *drivers* of adoption, which takes into consideration both the *factors paradigm* (which refers to factors such as manager experience, establishment size and quality, etc.) that drive adoption, as well the *motives paradigm* (which focuses on elements deliberately considered in the ES decision-making process).

Table 3.1: Motivation for adopting RM and ES in TAEs in developing countries

<u>Author</u>	<u>Location/ Type</u>	<u>Research Method</u>	<u>Motivation: Factors that have been identified as positively influencing the adoption/practice of environmentally friendly practices</u>
Chan & Hawkins (2012)	Hong Kong /Hotels	Qualitative	1. Corporate governance (influence of head office) 2. Piloting activities 3. Initial gap analysis 4. Partnership with external consultants
Chan & Wong (2004)	Hong Kong / Hotels	Quantitative	1. Corporate governance (i.e. hotel group/chain affiliation) 2. Legislation (the lack of strict legislation played a role in the low level of adoption of ISO 14001 in Hong Kong)
El Dief & Font (2010a)	Red Sea- Egypt/ Hotels	Quantitative	1. Chain affiliation 2. Profitability orientation: (e.g. cost saving) 3. Organisational altruism: i.e. the right thing to do.– more common among hotel chains 4. Manager's personal values/environmental paradigm
Heung & Pun (2013)	Hong Kong	Qualitative	1. Lowering costs 2. Improve competitiveness
Ismail & Rogerson (2016)	South Africa/ Hotels	Qualitative and Quantitative	1. Reduce Carbon footprint. 2. Reduce cost 3. Enhance brand image
KamalulAriffin et al. (2013)	Malaysia/ Hotels	Quantitative	1. Regulation/government 2. Customer demand 3. Level of competition
Kasim (2007)	Pengan- Malaysia/ Hotels	Qualitative interviews	1. Top-down instruction from international management (driven by image and reputation marketing, and cost-cutting motives) 2. Potential government regulation 3. Cost cutting motives 4. Marketing (image and reputation)
Le et al. (2006)	Vietnam/ Hotel	Quantitative	1. Innovation characteristics: complexity (level of difficulty), compatibility (consistency with existing values), observability (visibility of outcome), relative advantage (cost saving, increase in sales and firm's reputation) 2. Environmental characteristics: perceived competition, level of perceived industry rivalry, perceived customer certainty (i.e. understanding of customer demand)
Van der Merwe & Wöcke (2007)	South Africa/ Hotels	Quantitative	1. Future sustainability of industry 2. Improves relationship with community 3. Protects the environment 4. Ethical/right thing to do
Rogerson & Sims (2012)	Gauteng, South Africa/ Hotels	Qualitative interviews	1. Competitiveness: competitive advantage in terms of cost saving 2. Legitimation: government regulation 3. Ecological responsibility: the right thing to do 4. Marketing: improving brand image and marketing to firms
Tang et al. (2014)	Malaysia/ Hotels	Quantitative	1. Government regulation 2. Pressure from environmental activists 3. Influence of top management

The factors paradigm includes the various characteristics of the establishment which can influence its adoption decision directly or indirectly, while the motives paradigm focuses on direct considerations an establishment might consider in its decision-making process. The objective of this study, as well as its qualitative and exploratory nature, bounds the focus to the motives paradigm, as it explores perceptions of tourism accommodation operators on the motivations for the adoption of sustainability practices. An advantage of this paradigm is that the determinants

identified are more generalisable issues which can be directly addressed irrespective of establishment characteristics and are more suited to a qualitative study, as opposed to the factors paradigm, which highlights idiosyncratic factors better suited for quantitative investigations. These determinants identified in the review of these studies are discussed as the context for the findings of this study. This is consistent with the approach of KamalulAriffin *et al.* (2013) and El Dief and Font (2010a) where their frameworks are based on the findings of existing studies. This approach is in contrast to, and preferred over, the use of firm environmental theories which are often contested and yield inconclusive findings (El Dief & Font, 2010a).

From [Table 3.1](#) above, the key factors that have influenced the adoption of environmentally sustainable practices in accommodation establishments in various developing countries are identified. The factors identified in the individual studies are grouped based on similarity, and discussed as the potential motives for adopting these practices in various accommodation industries in the countries of study. The motives are identified in the following subsections.

3.2.1 To improve competitive advantage

This motive is termed 'competitiveness' by Rogerson and Sims (2012: 395) and is largely targeted towards profitability enhancement and includes motives of cost-saving, improved firm reputation, marketing to attract certain customers, and improved brand image. It alludes to the establishment as an economic agent (Tang *et al.*, 2014), seeking to maximise profitability both by reducing its cost and increasing its revenue. The cost reduction motive will see the firm adopting practices that will reduce its expense on resources, and the increasing revenue motive will see the firm pursuing practices that will attract more customers (or at least not cause a decrease in their current customer base) as guests are their primary source of revenue. Six of the Eight studies find evidence of this motive in the countries evaluated (i.e. South Africa, Vietnam, Malaysia, Hong Kong, and Egypt). Van der Merwe and Wöcke (2007) suggest that this 'business rationale' of maximising competitive advantage also has a long-term dimension in that businesses consider the sustainability of the environment as requisite for the industry to thrive. As such, they adopt these sustainable practices in consideration of their long-term survival.

3.2.2 Ethical drive

This motive suggests a form of ethical responsibility by the TAEs in these developing countries, which goes beyond their profit-making objective. This motive, termed "ecological responsibility" by Rogerson and Sims (2012: 395), the need to 'protect the environment' by van der Merwe and Wöcke (2007: 13), "organisational altruism" by El Dief and Font (2010a: 1), and "Greenness at the organisational level" by KamalulAriffin *et al.* (2013: 110), is driven by the firms' desire to do what is right and ethically acceptable, and not because they aim to derive any direct or indirect benefits (El Dief & Font, 2010b; Rogerson & Sims, 2012). Rogerson and Sims (2012: 395) however state that

this motive is often “the outcome of the ethical concerns of owner-managers about the natural environment” (citing Choe et al., 2011) in smaller establishments.

3.2.3 To keep up with government or industry regulations

This motive, termed ‘legitimation’ by Rogerson and Sims (2012: 395), presupposes that establishments adopt sustainable practices in keeping with the legal requirements of the operating locations (Tang *et al.*, 2014). This motive not only includes compliance with existing regulations but, as found in Kasim (2007a), extends to proactive actions carried out in anticipation of government regulation. Céspedes-Lorente et al. (2003) describe this motive as invariably driven not only by the need to avoid the financial consequences of sanctions stemming from non-compliance (e.g. fines and temporary/permanent closure of operations), but also by the need to avoid ‘intangible’ consequences such as loss of customer-confidence in their management abilities. This indicates that this motive affects, and is affected by, the motive of preserving competitive advantage in response to pressure from environmental actors.

Kasim (2007) however also indicates that regulation could also serve to promote just minimalist compliance, while voluntary initiatives would be better in stimulating enthusiasm amongst industry players. They thus recommend that to improve the success of any regulation, the industry should be sensitised to the importance of the practices via educational campaigns prior to the implementation of the regulation.

3.2.4 Pressure from external stakeholders

This motive sees firms adopting sustainable practices in response to pressures from stakeholders in the business environment. For South Africa, van der Merwe & Wöcke (2007) found that TAEs in the study indicated that they adopted these practices because it improves the relationship they have with their immediate community (van der Merwe & Wöcke, 2007). For Malaysian hotels, KamalulAriffin *et al.* (2013) found the customers’ demand of responsible and sustainable tourism practices was a motivator for adoption. This is related to the competitive advantage motive as these establishments realise that not adhering to this demand will lead to loss in revenue from these customers (KamalulAriffin *et al.*, 2013). In addition to the pressure from customers, Tang *et al.* (2014) found that the Malaysian public sphere has environmental activists who promoted sustainable practices and that this had a positive impact on the adoption of responsible tourism practices in the TAI in the country (Tang *et al.*, 2014).

3.2.5 Top-down management driven

This is mostly a secondary driver, influenced by any of the other motives at the top management level, and mostly affecting establishments with chain affiliations. In this case, the establishment mostly adopts sustainable practices because it comes as a directive from the top management (El

Dief & Font, 2010a; Tang *et al.*, 2014). Kasim (2007a) argues that this is one of the strongest drivers of adoption because it is often accompanied by the supply of resources and more demand for responsibility. She also argues that this motive has other primary motives (such as improving competitive advantage through cost cutting and marketing) embedded in it

The motives of 'improved comparative advantage' and 'ethical drive' are *endogenous* in nature, emanating from within a given establishment, while the motives of 'keeping up with government/industry regulations', and 'pressure from external stakeholders' are *exogenous* in nature, driven by factors existing in the establishment's external environment Kasim (2007: 681). The rest of this paper explores the applicability of these factors in the South African TAI. The method for accomplishing this is detailed in the following section.

3.3 RESEARCH METHOD

Opinions and perceptions of industry stakeholders at the management level were collected using semi-structured interviews. Thirty respondents were interviewed, consisting of owners, managers, and operators (e.g. maintenance engineers and sustainability directors of tourism accommodation establishments in two major municipalities in the Western Cape region of South Africa, Stellenbosch Municipality and Cape Town municipality (see Figure 3.1).



Figure 3.1: Western Cape Tourism areas

Source: Portfolio (2015)

The questionnaire used for the interview was developed from similar questionnaires used in the literature – both academic and non-academic; from a survey of existing literature – especially their findings, and from preliminary chats with industry stakeholders at managerial levels in their establishments. The 30 interviews resulted in 32 hours 36 mins and 28 secs of recording, with the shortest interview lasting 28 minutes and 50 seconds, and the longest⁸ lasting 2 hours, 18 minutes and 59 seconds. On average, each interview lasted 65 minutes and 13 seconds.

3.3.1 Sampling

A sampling frame was developed via manual compilation of registered establishments from the tourism grading council website, as well as the Stellenbosch 360 website in 2014. A targeted convenience sampling technique was used to identify respondents. The financial, time, and human resource requirement of conducting such face-to-face interviews necessitated the use of this non-probabilistic convenience sampling techniques which minimised resource cost (Etikan, Musa & Alkassim, 2016). Based on the list compiled, calls were made to the various establishments, and their willingness to grant an interview was requested. The process continued until the proposed sample size was reached. The non-probabilistic approach to sample generation was as a result of the in-depth nature of the data collection tool which necessitated that participants be interviewed face to face.

To avoid excluding establishments not registered with either of these organisations, establishments that were in the vicinity of registered hotels that were visited but were not on the list were approached and asked if they will be willing to participate in the study. Also during interviews, referrals to other establishments were requested and such establishments contacted to elicit their willingness to participate in the study.

The majority of interviews took place between March and September 2015. A total of 34 interviews were conducted across 33 establishments but only 30 were usable: those that were non-usable were due to the high level of incompleteness of the interview, the non-management designation of the interviewee, the unwillingness of respondent to continue with being recorded after a few minutes, and the non-coherence of answers given due to language barrier, respectively.

3.3.2 Data analysis

All 30 interviews were transcribed verbatim and coded using Friese's (2014) Noticing, Collecting, and Tagging (NCT) framework and analysed using the Qualitative Content Analysis (QCA) method in Atlas.ti computer assisted data analysis software. Cole (1988) defines Content Analysis as "a method of analysing written, verbal or visual communication messages". This method allows for distilling words and texts into related categories such that when classified they share the same

⁸ This interview took place twice, on two different days.

meaning. It also allows phenomena to be described in a conceptual form (Elo & Kyngäs, 2008) and is hence ideal for eliciting information on an already existing concept and the research questions are specific and have been developed *a priori* (Schreier, 2012).

The choice of the QCA method for data coding and analysis was hence deemed appropriate for this study, given firstly that the objective of the research, which had to do with eliciting information on an already existing concept, was already defined, and secondly, because the research questions were specific and developed *a priori*. Codes were developed from the transcribed textual documents based on the themes in the research question and questionnaire, with the finding from the literature review being incorporated in ascribing themes where they applied. To ensure that the research complied with guidelines for conducting human research, clearance was sought and obtained from the University of Stellenbosch's Ethics Review Board prior to the commencement of the study, and stipulated guidelines adhered to throughout the study.

3.4 RESEARCH FINDINGS

In this section, the research findings based on analysis of the collected data are presented in line with the study's objectives. Respondents' conceptualisation of the positive determinants (motivations) of adopting sustainable practices in the industry are reported. Finally, tips for intending ES adopters, as suggested by the study participants, are briefly discussed.

3.4.1 Motivation for the adoption of sustainability practices

The review of literature identified four main reasons why accommodation establishment in developing countries adopt ES practices. These reasons were (1) To improve competitive advantage, (2) To keep up with government/industry regulations (3) Ethical Drive, and (4) Top-down management decision. Participants in the study were grouped into adopters and non-adopters, and for each group, they were asked the reasons why they adopted sustainable practices or the biggest advantage they aimed to achieve by adopting these practices. Analysis of the responses revealed that the competitive advantage, ethical drive, and management-decision motivations are consistent in the South African context. The motive of future industry sustainability was identified more as an integral characteristic of ES in the industry and less as a motive for adopting ES practices, and is further detailed in section 4.1.1. The motive of keeping up with regulation did not come up amongst respondents as a reason for their adoption of ES in their establishments, and this is because while there are guidelines, there are not laws regarding ES in the South African tourism industry (Rogerson & Sims, 2012). The anticipation of regulation was however indicated as a potential third-party motivation for other firms. The other emerging motivations from the data analysis are: Contributing to National Survival, Guest/Employee Welfare, Country Energy and Water Dilemma, and Future Sustainability of Industry.

Table 3.2: Motivations for the adoption and implementation of RM and ES practices

	<u>Motivation</u>	<u>No. of Respondents</u>		
A	Improved competitive advantage	Cost saving	13	18
		Increased revenue/ customer attraction	5	
B	Ethical drive	Environmental preservation	12	18
		Personal satisfaction	6	
C	Top-down management decision			4
D	Business culture			4

Source: Data analysis from fieldwork, 2015

3.4.1.1 *Improved competitive advantage*

This motive alludes to the firm as an economic agent (Tang *et al.*, 2014) seeking to maximise profit by reducing cost and increasing revenue, and encompasses motives of cost-saving, improved firm reputation, marketing to attract certain customers, and improved brand image. These motives are found from analysing the data and can largely be grouped into Cost Saving and Increased Revenue motives. These are detailed below.

Cost Saving: Many respondents indicated the cost-saving advantage of ES practices as their motivation for embracing the practices.

It saves you money, it saves you money. It's, it's, it's profitable to do that. (5:37)

I think at the end of the day ... (the advantage of the business) ... in any business, is to, to strengthen, um, its revenue. And I mean, the more you save, the more you can invest in new ideas, it's, it's another 360 plan that has to continue to get to, to, to a central point. (6:49)

This motive is further heightened by the high cost of resources as described by many respondents.

I mean water / electricity is the main thing (cost component) for Hotels ... to be able to save it; because you save money then as well. (2:25)

This suggests that firms in this industry will more readily incorporate practices that are shown to reduce their overhead costs, whether these practices involve reducing consumption or finding more cost-effective alternatives. This ultimately gives the adopting firm competitive advantage over non-adopters. Firms pursue this advantage further by implementing ES as a tool to increase revenue.

Increase Revenue/Customer Attraction: Embedded in cost saving is the need to increase revenue. Many respondents in the study posit that they adopt sustainability measures as a means of increasing patronage, which ultimately increases revenue.

It benefits us as well in that we do attract clients, customers that are attracted to this kind of behaviour, so there is a market that we can get that we might not normally get, and it also benefits us financially as well in cost savings. (15:31)

Increasing revenue by adopting ES practices is also realised via strategic positioning. This is driven by the firms' realisation that there is a market niche of tourism customers who are seeking to minimise their environmental impact, hence these firms position themselves to attract such customers. This niche is driven by the international community's demand with little or no participation from the local South African community.

I think there is an expectation from a sector, the European sector's more concerned about it. Is this environmental friendly, is it, you know, that. Um, so the European market pushes, they will ask. Um, some South Africans will ask which is also ... but a lot of people don't ... no they won't actually pick it up and see if it is. (For us) It is one of our selling points. We put it on: This business is eco-friendly blah, blah, blah, and we've got all the certificates and things, so it does work with that. So, ja, so, a lot of our clients will look at it as ... some of them will look at it as a, as an important thing, but I don't think, a lot of the tourism clients are actually looking at cost. It's a big thing. (7:37)

One respondent indicated that firms purposely advertise their ES practices and affiliation to attract this group of clientele, knowing that they often place a higher consideration on such practices than on costs.

There is also the suggestion that this market niche with guests who will only patronise businesses with evidence of sustainability are rigorous in selecting their choice of accommodation as the establishments are asked what it is they do to be environmentally friendly, indicating that customers are trying to avoid the 'green wash' establishments.

Well, for us is that you are, you've got a ... all that is that it is environmentally friendly, so, that helps a lot of, um, um ... some businesses will ask What are you doing? You know that, and then you can say – This is so ... this is there. (7:41)

Tourism accommodation establishments hence pursue ES for the purpose of meeting the business bottom-line prerogative of profit maximisation by attracting revenue inflow from a select market niche, and even positioning themselves as such to appeal to this niche. This is consistent with the findings of Rogerson and Sims (2012) for hotels in the Gauteng area of South Africa, El Dief & Font (2010a) for Red Sea Hotels, and Kasim (2007) for Malaysian hotels.

3.4.1.2 Ethical drive

The literature suggests that accommodation establishments in developing countries possess some form of ethical responsibility beyond their profit making objective and that their adoption of ES practices is driven by their desire to do what is right and ethically acceptable, and not because they aim to derive any direct or indirect benefits (El Dief & Font, 2010b; Rogerson & Sims, 2012). The ethical drive is referred to as including the personal values and environmental paradigm of the managers by El Dief and Font (2010a). Analysis of the responses of interviewees in this study reveals that this motive shows up in two forms: the need to preserve the environment, and the need to gratify some personal moral/ethical end.

Environmental preservation: Many respondents alluded to the more general space of adopting sustainable practices to be ethical in their interaction with planet earth. This response was often the answer to the question of the biggest advantage the respondents hoped to gain from adopting ES practices.

The biggest (advantage) ...that we have a better environment ... we leave the planet in a better state. (13:34)

Well, I mean I think the, the biggest advantage as a hotel is obviously to, to, to, to contribute to saving the environment or prolonging the environment's and the world's resources. (6:48)

While this indicates an intrinsic value for the environment as an entity, the ethical motive of environmental preservation not only referred to interaction with the physical planet, but also the interactions with the people and entities on the planet.

And so, we've never, from the inception of this business, ever been in a space where custodianship – environmental sustainability, social sustainability ... all those terms, heritage ... eerm, all of these have been core to who we are as a business from the time that we started ...and in that space, we're looking at various elements of our responsibilities – environmental, social, internal with our own people, you know, thinking *about the local, national, and global context in which we operate*. (10:91)

This suggests that the motivation for ES incorporates the social aspects of sustainability and extends beyond the local to global interactions. The ultimate goal in this regard is not to completely disregard the economic imperative of the business, but to pursue this imperative cognisant of the physical and community aspects of the environment. This environmentally ethical imperative inclination seems to be driven by a consciousness and consideration of the needs of future generations, both personal generations, as well as for the world at large.

Through all of this, I hope that in the year 20... in the year 3000 that my generations ahead will still be here and that there will still be a beautiful world. That's all. It's really just, that's all. (16:59)

Environmental preservation as an ethical motive for the adoption of ES practices in these accommodation establishments hence refers to firms' pursuit of sustainability for the sole reason of environmental and social harmony, with no consideration for the immediate benefits. This is consistent with the findings of Céspedes-Lorente *et al.* (2003) for the Spanish hotel sector where it was found that the adoption of ES practices was potentially a result of a genuine concern for environmental issues. The responses analysed in this study strongly indicates that the consideration for the needs of future generations is however the major element of this motive. This indicates that alluding to the environmental ethos of accommodation managers by appealing to their consideration of the welfare of future generations can be a viable incentive to encourage the adoption of sustainable practices.

Personal Satisfaction: The ethical motivation for adopting sustainable practices for some respondents simply had to do with the personal satisfaction derived from being sustainable, or the disquiet avoided by implementing these practices.

I think it's that you're ... you know you're doing something you have to ... you're doing something good. I think that is your biggest advantage. (7:40)

And then just to have a clear conscious for goodness sake, you know, just to be aware. (6:28)

The evidence suggests that in some cases this motive can be appealed to via the media, and hence provides evidence of the effectiveness of the media in stimulation ES adoption in the public.

But at the same time I also have the feeling gosh, if you put on the Television at night and follow the news, you'd be interrupted by an Eskom advertisement saying that everything is critical, it's going to fall apart, it's going to shut down and I feel a responsibility that OK, make a contribution somewhere, not only your own pocket, but also national. Not that I think it really makes a difference, but just to put me at ease. (11:33)

Respondent 11 above indicates that he implements these sustainable practices regardless of whether or not it makes a difference, indicating that some industry managers might place the ethical consideration over the efficiency consideration in the presence of slight non-regulatory pressure focused on the critical state of the environment.

For managers who are part of a group or chain of tourism accommodation establishments, these motivations may not directly drive their ES actions, but are embedded in the directives received from the top management. Top-down management decision was however indicated as a motivation for the adoption of ES practices by some managers and is discussed below.

3.4.1.3 Top-down management decision

El Fief and Font (2010a) and Kasim (2007a) suggest that for accommodation establishments that are members of international business chains, they might have no choice as to the decision to incorporate ES in their businesses as it is a requirement from the top management of such chains. Kasim however further clarifies that this motive is secondary, and at the centre of such directives by the top management are other primary motives such as improved competitive advantage and ethical considerations. In this study, it was emphasised that this motive – having to comply with directives specified by top management, and their affiliates – applied in the establishments affiliated with a chain or a group.

As part of a company that has a corporate policy that each hotel has to comply with and Earth Check is head office, but Earth Check is mandatory for all the hotels to comply with. I think it's ... they wouldn't ... it's to a big cost to the hotel, to the group, so I don't think it's something they take lightly. It shows that they do take it very seriously. (17:22)

Kasim's (2007a) argument that the directives are driven by some other primary objective is supported by Participant 2's statement below, where the participant indicates that the directive from the top management has at its core the motive of marketing to increase revenue.

No pressure, No pressure. So, I think ja, it's just to ... because it's a big group, they just want the world to see that OK, we're trying from our side. (2:62)

3.4.1.4 Business culture

Another reason not identified in the literature but which was indicated as a reason for adopting ES practices by both big hotels and small backpackers is that ES is an integral part of the business and how things are run in general.

As a business unit even separate from what we have to do for head office, everything we do we try and, it's just the way of doing business. You have to try and do everything more efficient, better every single time you do it. It's like every day you come to work, you try and be better than the day before and that's just automatically how we do business. (17:23)

This also applies to establishments that commence business with ES as a positioning strategy, and hence run all activities in line with sustainable tenets as an integral part of their objectives.

You know, it's part of our identity being X Backpacker. It's been since the place started, um, about sustainable tourism, so it's partly that it's in our DNA. (15:29)

It can be argued that this motive is really a long-run by-product of pursuing ES for the other various reasons mentioned. For an organisation that actively pursues ES to save cost and increase its revenue, or to satisfy some ethical penchant, continually expanding ES to all parts of the business practices to foster the maximisation of these motives would inherently lead to its becoming engrained as a business culture, inseparable from the other objectives of the business.

A key deduction from the analysis of participants' responses is that the motivations for adopting sustainable practices by establishments often overlaps. For example, cost saving often co-occurs with other motivations such as personal satisfaction and environmental protection. For Participant 6 below, the ethical drive of environmental protection and cost saving go together.

Well, I mean I think the, the biggest advantage as a hotel is obviously to, to, to, to contribute to saving the environment or prolonging the environment's and the world's resources ... I think at the end of the day is to in any business, is to, to strengthen, um, its revenue. And I mean, the more you save, the more you can invest in new ideas, it's, it's another 360 plan that has to continue to get to, to, to a central point. (6:49)

For Participant 15, the ethical drive of personal satisfaction also goes hand-in-hand with the motive of cost-saving for improved competitive advantage, although the impact of the latter is more stressed.

I would say one could be very basic about it. At the end of the month our municipal account, I think, it's about R12 000.00 to R15 000.00 for water and electricity. Obviously it's to keep that as low as possible here in the business, every ... where you can cut on expenses, obviously that is the aim. But at the same time I also have the

feeling gosh, if you put on the Television at night and follow the news, you'd be interrupted by an Eskom advertisement saying that everything is critical, it's going to fall apart, it's going to shut down and I feel a responsibility that OK, make a contribution somewhere, not only your own pocket, but also national. Not that I think it really makes a difference, but just to put me at ease. (11:32)

For participant 15, the motive of cost saving is combined with the 'business culture' motivation for adopting such practices.

You know, it's part of our identity being X Backpacker. It's been since the place started, um, about sustainable tourism, so it's partly that it's in our DNA and then also there's a very big bottom line consideration, if we can reduce our energy consumption by a third it would have a big effect in terms of our cost and that. And that's, you know, it's a very marginal business, every cent counts in this business. It's budget accommodation. (15:30)

Participant 16 indicates that a combination of three motives (personal satisfaction, environment preservation and cost saving) drives the adoption of sustainable practices at their establishment.

Well, there are two goals. The first thing is I have 2 grandchildren and I would like to leave a nice planet for them. One day when I'm gone, I hope my great great grandchildren won't live on a horrible earth, I hope they'll live in an earth that is beautiful like it is now. That's the one side. The other side is that if one doesn't waste and one utilises the things properly then it's less expensive. So, from a savings point of view for us as well ... A stupid example might be if you have a leaky tap, you couldn't be bothered about it. You think it's just a little drip of water, but that's money running down there the whole time, so one tries to do it for those two reasons. And then just to have a clear conscious for goodness sake, you know, just to be aware. (16:27)

These strongly suggest that despite the various motivations for adopting sustainable practices, accommodation establishments are always conscious of the cost implications of any ES activity implemented and that despite the various other advantages of any activity, it is most likely to be adopted if the cost implication is favourable to the establishments.

3.4.2 Third-party perceptions of the motivations for adoption

To capture the general perspective on the motivation for adopting RM and ES in the industry, respondents were asked why they thought those who adopted these practices did so. The objective of this question was that the answers provided by respondents would provide information on the perceived general motivations for adopting RM and ES practices in the industry as a whole, where the initial questions had captured this information for each particular respondent. The third party motivations identified from analysis of respondent's answers are presented in [Table 3.3](#) below and further discussed.

3.4.2.1 Environmental preservation/positive impact

The majority of respondents were of the opinion that if an accommodation establishment was involved in ES activities, it was because they were conscious of the impact of their activities on the environment and wanted to make a difference.

I think they are environmentally conscious. I don't think people do it for an economic reason, people do it for being environmentally conscious. (16:49)

This suggests these respondents are aware of the environmental consciousness of other members of the industry.

Table 3.3: Third party perceptions on the motivation for the adoption of RM and ES practices

	<u>Third party perceptions on motivations</u>	<u>Number of Respondents</u>
1.	Environmental preservation/ positive impact	17
2.	Cost saving	15
3.	Marketing strategy	9
4.	Anticipating law	1

Source: Data analysis from fieldwork (2015)

This signals that this industry is truly environmentally conscious, and interested in making a difference. The appropriate push in the right direction will hence potentially bring about a multiplier effect in the adoption of RM and ES practices in the industry.

3.4.2.2 Cost saving

Fifty percent of respondents suggested the cost-cutting motive as the reason why other members of the industry adopt ES activities in their establishments. Some respondents indicated that the high cost of energy incentivises the establishments to embrace the energy-saving opportunities presented by RM and ES practices

First reason I think, if you cut down on energy that you need, you cut down on cost. It's still a business. (12:42)

This emphasises the industry's knowledge of the advantages of RM and ES practices in terms of cost reduction, and hence the use of such to gain competitive advantage as advocated by Rogerson and Sims (2012).

3.4.2.3 Marketing strategy

Some respondents were of the opinion that other members of the industry adopt RM and ES policies and practices as a means of gaining competitive advantage via marketing:

It's actually a, a marketing and a selling point for Hotels these days. (2:24)

The respondents revealed that there is a certain group of customers who only patronise establishments that have ES policies and practices in place:

There (are) people that will only do business with you if you participate in these programs and in our case it is like that. (17:59)

The respondents indicated that these customers are mostly foreign, and are very detailed in their inquiry, wanting to know exactly what the local establishments are involved in in terms of ES practices.

You know, nowadays when you deal with agents from Europe or, and sometimes America and that, they will actually say: What are you doing? List your environmental policies and whatever you are doing to save, you know, conserve electricity and water and that sort of thing. (7:62)

This suggests that customer pressure plays a major role in driving the adoption of ES initiatives in the study sample, and that the majority of these customers were from the more developed nations. As such, to be able to compete favourably in the industry and attract this group of guests, establishments are forced to adopt RM and ES initiatives.

Many respondents opined that the motivation for other establishments adopting the practices was a mixture of all three factors identified, and not just one.

I would say definitely a cost saving thing, definitely a marketing tool, like I say, people are getting picky, and definitely, you know, they want to play a role ... they want to be a part of having a positive impact, you know on climate change and that discussion. (2:44).

This suggests that the industry as a whole is environmentally conscious and is also out to make use of the ES strategy as a tool to acquire competitive advantage where possible.

3.4.3 Tips for intending adopters

Respondents were asked to provide tips to establishments who were intending to take up sustainability initiatives in their establishments. The purpose of this question was to get an industry perspective on guidelines for adoption and possible pitfalls to avoid in implementing an environmental program. The overall intention was that these responses would provide information for policy recommendations and action plans for stakeholders and academics.

The three main recommendations for those proposing to adopt ES and RM measures in their establishments are as follows:

3.4.3.1 Build green

Six of the respondents suggested that it is easier for new TAEs to incorporate ES and RM practices and advised that the prerogative of such start-up establishments should be to build green, factoring RM and ES plans and initiatives into the planning phase of building construction.

I think it's easier for a new venture or new building to you know, put in place lots of things which will be energy efficient, for instance, double glazing, that kind of thing; like the heat pump system which we have ... all these things that can be implemented into a building when it's first made can make a huge difference to energy saving. (25:47)

These respondents argued that it is more cost effective to incorporate these initiatives at the beginning because at this point, the sunk costs are being incurred anyway. Also they argue that although building green might be more expensive than the conventional route, it will be cheaper than having to retrofit, which will involve the loss of already sunk costs, in addition to the capital cost of retrofitting. Building green will hence involve designing the electrical wiring, plumbing and

ventilation system of the building to ensure that ES and RM initiatives are easily implementable and can be automated where necessary.

3.4.3.2 Have a goal and do research

Participants advised that to adopt ES and RM activities, the organisation (regardless of whether it is new or existing) needs to first set a clear goal as to what it wants to achieve.

I think, with anything you need to have a goal. What is it you want to achieve. If a person, if a person says *OK, ja, I want to go, I want to green my company or green my business*, then you know, what is the outcome you want? Is it that you want to save electricity, because of the Eskom thing, then by all means ... that's going to be a goal for you, you know, you want to save the world, well, then you're going to have to look at the recycling, you're going to have to look at the, you know, the bulbs that you're using, you have to look at your electronics, you're going to have to look at you know, do you use recyclable benches, blah, blah, blah. I mean they need to have a goal, what is it that they want to achieve and what is the outcome they want. And then ja, I mean ask questions and research, that's what it comes down to. It's lots of research. (2:32)

Some argued that setting a goal will ensure that the organisation is not just doing it to join the bandwagon, and also foster commitment for the long term. The respondents further advised that the organisation would then have to carry out research to ascertain what approach, method and initiatives would be most suited given their establishment context, as well as the goals they intend to achieve. This research could be personal, or involve consultations with similar organisations that have adopted such initiatives, or even professional consultants.

3.4.3.3 Start with the small things

For existing establishments where funding is a constraint, some respondents advised that such establishments could start small and expand gradually:

Well in hotels as a whole I think there one has got to remember ... I think, if it is an existing hotel, start small and do 1 thing at a time and get make it a habit. If you take the simple stuff, like recycling of cans, glass, paper, you know, start with the small stuff, get that happening, make it efficient and then build it on there and build on that. (30:30)

A respondent advised that the savings from initiatives that require small capital expenditure could be accumulated to fund initiatives requiring larger funds in the long run.

In addition to the three tips mentioned above, respondents also indicated that it is important for the organisation to first start by measuring their current resource use, rethink their current attitudes and identify opportunities for improvement, take the members of staff along, and be committed for the long road. One respondent argued strongly that the most important first step before adopting any ES and RM initiative is to measure:

I think the most important thing to start off with is measurement. You've got to measure everything. So, you've got to measure all your energy usage, measure your electricity usage every month, measure your gas usage, measure your water usage, so that's the

first thing, because you can't manage something unless you can measure it, so you've got to have your starting point. (15:45)

Measurement of resource use provides clarity on what the goal should be and also helps with identifying problem areas:

My first advice is to measure your usage and then you can start targeting, you might see some obvious things like a fridge that is using excessive electricity, um, that would be a good start and then you can start setting targets in place about what your goals are with your water, your gas and your electricity usage.(15:47)

This argument for measurement is highly recommended as it not only helps with goal setting, but also provides valuable information for informed research, helps with prioritising problem areas, and will help with monitoring progress over time.

3.5 DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

The objective of this paper has been to investigate the motivations for adopting resource management practices within the scope of environmental sustainability, as well as industry operators' suggestions on the guidelines for adoption, and possible pitfalls to avoid in implementing an environmental programme in the tourism accommodation establishments in the Greater Cape Town area of South Africa. Based on the analysis of interviews with thirty industry operators, economic and environmental considerations are identified as the leading motivation for the adoption of RM and ES initiatives in TAEs in the study sample.

The economic consideration focuses on improving competitive advantage via reducing the cost associated with resource use, and increasing revenue associated with increased guest patronage (see Figure 3.2 below). This motive highlights the cost-saving potential of ES activities as identified in the literature (Becken, 2013), as well as the growth in the demand for sustainable TAEs by tourists. Responses however indicate that this growth in demand is driven by the European clientele base with little or no contribution by the South African TAE clients. The responses to the third party perceptions of motivation factors emphasise this economic consideration as an industry-wide situation (as demonstrated in Figure 3.2), not restricted only to the study sample. These responses indicate that industry players think that their competitors are saving costs and attracting customers by implementing RM and ES initiatives. It is therefore argued that to survive, these businesses, now or in the nearest future, will need to adopt RM and ES initiatives, even if it is at basic/elementary levels.

The environmental consideration indicates that respondents have some level of environmental consciousness and ethical responsibility that affects the way they conduct business, and they believe that other competitors in the industry do too. This consciousness is incorporated in the way they conduct the economic aspects of their businesses, and in some cases goes beyond the economic prerogatives of the business.

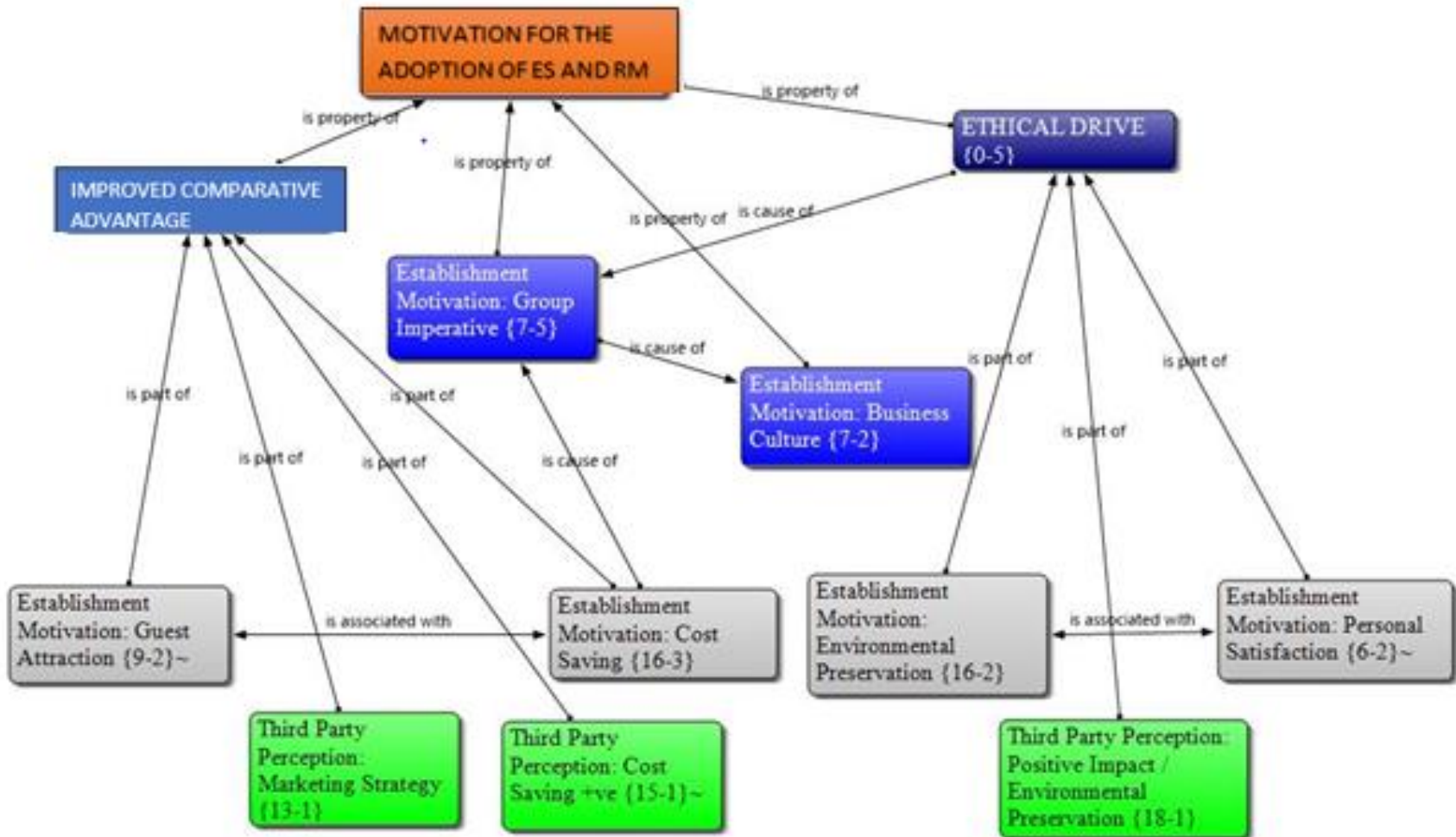


Figure 3.2: Network view of the motivations for adopting ES and RM practices among respondents

Source: Data analysis from fieldwork, 2015

For such establishments, they are willing to incur additional costs to be environmentally responsible, even when these costs do not result in any direct financial benefits or rewards. The findings further suggest that these organisations, to some extent, derive some non-monetary satisfaction from fulfilling this responsibility. The results from an analysis of third party perceptions indicate that this sense of environmental consciousness and responsibility is an industry-wide phenomenon, and not unique to the study sample only. This finding is further confirmed by the existing literature (El Dief & Font, 2010a; Rogerson & Sims, 2012). This finding also highlights the willingness of the private sector, specifically in TAI, to participate in pro-environmental initiatives for reasons that transcend their profit-making or other economic imperatives.

A key finding of this study is, also, that the motivation for adopting ES and RM practices in some organisations is the identification and enforcing of such initiatives by top management who identify and enforce such initiatives. Evidence from the study also corroborates the literature where it is suggested that such directives from top management are influenced by a variety of other primary motivations. Such a move by the management could influence the way business is practised to the extent that such initiatives become a cultural orientation of the business, and engender an environment where more initiatives are adopted, not for any direct reason, but because it has become a culture. Another key finding from this study is that the motivations for adopting sustainable practices by establishments often overlap. For example, cost saving often co-occurs with other motivations such as personal satisfaction and environmental protection.

The responses provided as suggestions to those in the industry who were intending to adopt ES and RM initiatives in their establishments, indicates that the most important first step was to set a clear goal and carry our research in line with the goals and context of the establishment. It was highlighted that to set accurate goals and identify key areas of investigation to support research, it is important to first measure resource consumption patterns. Such measurements will be relevant for monitoring performances after initiatives have been implemented. Another key suggestion was that in cases where an establishment was starting the business from scratch, sustainability initiatives need to be factored in at the point of building design as this will be cheaper in the long run.

These results confirm some of the findings from existing literature with regard to the motivations for the adoption of ES and RM initiatives in TAEs. These results have significant implications for policy to encourage and foster the take up of these initiatives in the industry. The fact that the results not only identify the motivations, but also highlight the drivers of such motivations, provides a thorough contextual understanding of possible intervention areas. The motivations highlighted could, hence, provide the necessary baseline information for developing non-regulatory methods to encourage the adoption of ES in the accommodation industry. One key implication of the findings is that proposed solutions need to focus first on subsidising the cost of implementing these RM and ES

practices. The evidence suggests that the consciousness already exists in the industry and that there is already some demand for sustainable accommodation from the clientele base. Hence, to promote the adoption of actual RM and ES initiatives, and not “greenwashing” (Fliegelman, 2009; Willers & Kulik, 2011) to attract clients, innovative solutions that assist with financing or reducing the costs of implementation would see an increased take up in these initiatives, and lead to the greater sustainability of the industry in the long run. This long-run potential is already hinted at in the findings of this study where some respondents specify that their motivation for adoption was that ES had become a “business culture”. As demonstrated in Figure 3.2, the economic motivations are partially responsible for driving group imperatives dictated by higher order management, which over time become ingrained in the way business decisions are made and activities are conducted. This can be critiqued as a highly ambitious proposition, and will require a standardised experimental setting or panel study to investigate. This is however outside the objective scope of this paper and is recommended for further studies. These findings, and hence recommendations, can also be argued to capture only one end of the determinants spectrum – that is the motivations. A more holistic picture of the determinants of adoption would incorporate the barriers to adoption, so as to capture the constraints and challenges faced which drive the low adoption rate identified in the literature, in spite of the willingness and observed motivations identified in this study. An investigation into the barriers to adoption of ES and RM initiatives in the study context is hence proposed for further study.

CHAPTER 4 :

Barriers to Adopting Resource Management and Environmental Sustainability in the South African Tourism Accommodation Industry: Evidence from the Greater Cape Town Region

4.0 PREFACE

The findings of Chapters 2 and 3 indicate that not only are the establishments in the TAI in the study region largely aware and conscious of the meaning of ES and its applicability to their industry, they are also aware of its many advantages, their role in implementing these practices, and the distribution of the responsibilities amongst other establishment stakeholders, and they even provide tips on how to begin implementing these initiatives. Chapter 2 however, finds that this level of awareness and responsibility does not translate to high adoption of RM and ES practices in these establishments. To understand the reasons for this low adoption rate, this chapter explores the barriers to, and challenges faced, by TAI operators in implementing RM and ES initiatives in the industry. Using the same dataset and analysis method as that employed in Chapter 3, this chapter finds that resource constraints, the service nature of the industry, and staff attitude/buy-in are some of the key challenges faced in RM and ES implementation in the industry. The key problem areas, in terms of consumption drivers, are also investigated, and the policy implications discussed. These findings provide a holistic framework for addressing the low ES adoption rate in the TAI.

4.1 INTRODUCTION

The need for the adoption of RM activities and environmentally sustainable practices in tourism accommodation establishments has been widely discussed in the literature. This need is driven by the desire to attain a sustainable environment that exists and develops cognisant of future generations, as well as increased population growth in third worlds, and declining resources to meet the needs of this growth. This need is more pressing for the tourism and tourism accommodation industry due to their high resource consumption characteristic (Becken, 2013; Bohdanowicz & Martinac, 2007; Erdogan & Baris, 2007).

Findings from Chapter 3, as well as existing literature, suggests that the rate of adoption of RM and ES initiatives is low in TAEs in third world economies. This is true even of areas where awareness of the meaning and need for environmental sustainability is high (Becken, 2013; Frey & George, 2010; van der Merwe & Wöcke, 2007; Rogerson & Sims, 2012). The low level of adoption is puzzling for two reasons. The first is that the resource intensive nature of the industry implies that

RM practices have the potential for both environmental and economic benefits (Becken, 2013; Rogerson & Sims, 2012). The second reason is that environmental standards and guidelines already exist for the practice of ES in industries and business organisations (Chan & Hawkins, 2012). These guidelines prescribe various initiatives that lead to cost saving with minimal cost input, as well as those with substantial initial cost outlay and significant cost reduction in the medium to long term (Chan & Wong, 2004). Although the cost-saving advantage of the practice of ES is secondary, anecdotal expectations will be that the profit-making agenda of businesses would push them to pursue this secondary objective, and ultimately achieve the primary objective of ES. The findings from the literature indicating the low adoption rate hence calls for further investigation.

For South Africa as a third world economy, this low-adoption of ES practices has been found to be characteristic of its TAI despite the country's pioneering role in the sustainability and responsible tourism movement (Frey & George, 2010; van der Merwe & Wöcke, 2007; Rogerson & Sims, 2012). An understanding of the reasons for the low adoption rates is crucial if any solutions geared towards correcting this are to be arrived at. However, as is the case for most developing countries, no record of a formal academic inquiry into the challenges faced, and barriers encountered, in the adoption of ES activities in the South African TAI has been identified from a survey of the literature (Kasim, 2007a; Rogerson & Sims, 2012). This is particularly undesirable in this nation's context, given its energy and water crisis accompanied by significant growth in its international tourist arrivals, and its dependence on the tourism industry for employment and GDP (Pegels, 2010; Rogerson & Visser, 2006; Water Research Commission, 2013).

This chapter hence sets out to identify perceptions of operators in the TAI with regard to the challenges faced in adopting and practising RM in the industry, especially as it relates to ES, and to identify their perception of the drivers of resource consumption (especially of energy and water) in the industry so as to identify problem areas for possible intervention. To contextualise the perceptions of these operators within the existing literature, the next section provides a review of extant literature that identifies the barriers to the adoption of ES in the TAI in developing countries. The specific drivers identified in literature are individually discussed to provide a contextual lens for addressing the objectives of this paper. Following this, the data and research method employed in meeting the stated objectives is detailed. The findings from the analysis of the data are then presented and discussed, and the chapter ends with conclusions and recommendations.

4.2 BARRIERS TO ADOPTING SUSTAINABILITY PRACTICES IN ACCOMMODATION ESTABLISHMENTS – LITERATURE CONTEXT

The reasons for the low adoption rate for sustainable practices in tourist accommodation establishments has generated considerable debate (Rogerson & Sims, 2012), but while this discourse is well established in developed countries, studies which evaluate the existence and

applicability of these reasons in developing countries are still sparse (Kasim, 2007a). A review of extant literature revealed seven studies which, to varying extents, evaluate the barriers to the adoption of ES practices in the TAI in developing countries. Of the seven studies, there are two each for Malaysia and South Africa, and one each for Vietnam, Hong Kong, and Egypt. [Table 4.1](#) below provides a brief summary of the study location, establishment type and research methods employed, as well as the specific barriers to ES adoption identified by each of the seven studies.

Table 4.1: Barriers to adopting ES in TAEs in developing countries

<u>Author</u>	<u>Year</u>	<u>Location/ Type</u>	<u>Research Method</u>	<u>BARRIERS: Factors that can hinder, discourage, or NOT foster the adoption/practice of ES practices.</u>
Chan	2008	Hong Kong / Hotels	Quantitative	1. Resource constraint 2. Lack of expert/professional advice 3. Lack of knowledge or required skill 4. Uncertainty of outcomes
Chan	2011	Hong-Kong/ Hotels	Quantitative	1. High implementation and maintenance cost 2. Lack of Knowledge and skills 3. Lack of Motivation and Professional advice 4. Outcome Uncertainty
Chan & Hawkins	2012	Hong Kong /Hotels	Qualitative	1. High management/executive turnover 2. Lack of new ideas after long period of implementation
El Dief & Font	2010a	Red Sea- Egypt/ Hotels	Quantitative	1. Lack of appropriate frameworks 2. Novelty of concept 3. Lack of knowledge 4. Short tenure of managers (pg. 16)
Heung & Pun	2013	Hong Kong	Qualitative interviews	1. Lack of knowledge or skills 2. High implementation and maintenance cost 3. Inadequate leadership
Kasim	2007a	Penang- Malaysia/ Hotels	Qualitative interviews	1. Unconducive tourism policies. 2. Hotel sector vulnerability (pg. 690): seasonality, economic conditions, diseases, terrorism, recession, macro-environmental factors. 3. Oversupply of hotel rooms. 4. Prioritisation of guest's comfort. 5. Lack of institutional support for industry. 6. Lack of physical infrastructure support: e.g. recycling plants; information and education. 7. Staff attitudinal barriers
van der Merwe & Wöcke	2007	South Africa/ Hotels	Quantitative	1. Lack of ES knowledge. 2. Lack of ES regulation.
Rogerson & Sims	2012	Gauteng, South Africa/ Hotels	Qualitative interviews	1. Staff attitudinal barriers. 2. Age and design of existing structure. 3. Low level of ES awareness among domestic guests. 4. Impact of recessionary climate.
Tang <i>et al.</i>	2014	Malaysia/ Hotels	Quantitative	1. Lack of pressure from proposed stakeholders.

Consistent with the approach by KamalulAriffin *et al.* (2013) and El Dief and Font (2010a), these factors constitute the framework for evaluating and discussing the findings of this paper.

For the purpose of this study, the barriers to the adoption of sustainability practices are defined as factors that prevent, do not encourage, or stand in the way of the adoption of these practices in the accommodation establishments. They also include challenges that might be encountered by those already practising ES, which might pose a threat to their ability to continue. The most detailed studies on the barriers to implementation of RM and ES practices in hotels were carried out by Chan (2008) and Kasim (2007a), while the other studies (Chan & Hawkins, 2012; El Dief & Font, 2010a; Rogerson & Sims, 2012; Tang *et al.*, 2014) discuss these barriers/challenges in passing or as part of a broader objective. From the seven developing country studies that explore factors that hinder the adoption of sustainable practices as identified in [Table 4.1](#), the following barriers were identified.

4.2.1 Resource constraints

This refers to the fact that the resources required for the adoption, implementation and continuation of RM and ES practices are limited. These resources include finance, manpower, and time (Chan, 2008). The initial capital costs of adopting/implementing RM or ES activities are often quite high (Heung & Pun, 2013; Kasim, 2007a), especially where such implementation involves the purchase of new devices (e.g. renewable energy devices, energy and water efficient devices), or the setting up of entirely new systems that are more sustainable (e.g. the installation of new building management systems, or recycling systems) (Chan, 2008). Even where establishments might be able to overlook the high capital outlay, the cost of maintaining and running such systems to ensure effectiveness can also prove daunting, and this challenge is independent of the size of the establishment (Chan, 2011).

Chan (2008, 2011) and Heung & Pun (2013) found that for Hong Kong hotels, the management indicated that they realised that resources such as manpower and time would need to be invested on a continual basis during both the adoption and the implementation phases of any sustainability initiative. Both studies also indicates that the cost of obtaining environmental certification, and implementing the necessary (often high) requirements to obtain such verification and certification discouraged some hotels in their studies from even embarking on any sustainable initiative.

4.2.2 Nature of the tourism accommodation Industry

Some authors have argued that there are certain characteristics specific to the tourism accommodation industry that could inhibit the adoption of RM and ES activities. These characteristics, as discussed below, are: 'soft industry' characteristics, industry vulnerability, service nature of industry, and the short tenure of managers in the industry.

Kasim (2007a,b) argues that the hospitality/ tourism accommodation industry is seen as a 'soft industry', whose waste emissions and impact on the environment cannot be compared to that of the industrial sector that emits toxic and harmful wastes. This 'soft industry' characteristic can

hence function indirectly as a barrier as the pressure and focus placed on the environmental characteristics of other industries does not apply here.

Kasim also highlights the 'vulnerable characteristic' of the industry as a potential barrier to the adoption and practice of environmental activities. She argues that while a key foreign exchange earner, the Malaysian tourism sector as a whole is highly subject to seasonality and local socioeconomic conditions (such as diseases, terrorism, and other safety concerns), as well as foreign socioeconomic conditions such as global economic recessions and instabilities in regions of the world. Rogerson and Sims (2012) indicate that this is also characteristic of domestic customers in the South African TAI, who are generally unaware of ES issues. This challenge is further exacerbated by alternative tourism destinations that are cheaper (Kasim, 2007a). Kasim argues that establishments in the industry will primarily devote resources to survival and other core competencies during hard times. Another characteristic highlighted by Kasim, which worsens this outcome, is the high level of competition due to an oversupply of hotel rooms in the country, with the attendant consequence of reduced profitability. In difficult times, establishments will cut rates to survive and stay competitive, which eventually render the environmental objective redundant. This phenomenon is amplified in smaller establishments (Kasim, 2007a).

Kasim further argues that due to the service nature of the industry, prioritisation of guest comfort and satisfaction will take precedence over environmental activities in the case that these two issues clash. Chan (2008) indicates that some guests at hotels have an apathy for environmental initiatives implemented and sometimes even demand that such initiatives be overridden for their sake. An example of this is when guests request another key-card to keep their air conditioning running when they are outside the room, or when they complain about the water pressure from water-saving shower heads. Given that customers are the main reason for the industry's existence, they are the most important drivers of, as well as barriers to, adoption and hence have the greatest influence of all stakeholders in the business and on environmental decisions of industry managers (Chan, 2008). With environmentally apathetic customers, the resource-saving potential of the industry is greatly reduced, especially with the mindset that resource reduction implies a compromise of comfort.

Another characteristic of the industry as highlighted by El Dief and Font (2010a) for Red Sea hotels and Chan and Hawkins (2012) for Hong Kong hotels, was the short tenure of the managers. These authors argue that this characteristic had impact more on the implementation practices and continuation of already adopted practices than it did on adoption. For Red Sea Hotels, El Dief and Font state that managers' short tenure meant that they could only implement projects that had short-term financially visible savings, resulting in the somewhat shallow approach of the hotels to ES practices. Kasim (2007a: 691) states that "the long term need to get profitable returns on investment, such as from solar power, may discourage some hoteliers". Chan and Hawkins

(2012) argue that the high manager turnover leads to a loose and inconsistent EMS system in the Hong Kong hotel examined.

4.2.3 Lack of enabling environment

For the successful implementation of ES, an enabling regulatory and infrastructural environment is required. This includes environmentally friendly policies and regulations, and infrastructural professional support to facilitate the initiation and maintenance of ES systems. Kasim (2007a) posits that it is possible for the government of a country to pay attention to the development of the tourism sector by creating policies and making commitments to the development of the sector without making the same commitments to its environmental actions and implications. In such a situation, the uptake of RM and ES practices amongst tourism establishments will be expected to be low. In Malaysia, Kasim indicates that while there are strong policies and commitments to the development of tourism, and a strong acknowledgement of its contribution to economic growth, these policies in favour of the economic growth of tourism are lacking in that their implications for the environment are not considered. The author attributes this to the country's slow reaction to environmental issues, and to the fact that "Stringent rules and regulations were not considered favourable to tourism growth for fear that investors would leave" (Kasim, 2007a: 689). This is ultimately linked to the "lack of institutional and other support for the growth of Corporate Environmentalism in ... the hotels" (Kasim, 2007a: 692). According to Kasim, the government does not encourage accommodation establishments with appropriate legislation that fosters voluntary initiatives, resulting in the slow adoption of voluntary initiatives by the establishments.

The argument put forward by Kasim hence is that in the absence of adequate policies and a regulatory environment that encourages and promotes environmental issues in the tourism sector as a whole, the uptake of RM and ES practices will be low. This is valid given that such practices often involve a movement away from the normal way of business operations, and often involve extra financial investments (Chan, 2008; El Dief & Font, 2010a). Consequently, an external nudge in the form of government policies and regulations may be necessary to boost the adoption of these practices, both in Malaysia and in similar developing countries where resource constraints are generally an issue.

In terms of infrastructural environment, Kasim (2007a) and El Dief and Font (2010a) suggest that the non-existence or inadequacy of appropriate infrastructure and support structures that encourage the adoption and implementation of RM and ES practices serve as a deterrent to the those who might want to engage in these practices. This leads to a gap between the environmental friendly intentions of managers and the actions they carry out (El Dief & Font, 2010a). Examples of such infrastructure and support systems include recycling plants and recycle-material pick-up or drop off points (Kasim, 2007a). In Malaysian hotels, Kasim notes that although many hotels have

recycling bins at their establishments, recycling plants are often found far away in the major cities, with high costs to the hoteliers of transporting their waste to these plants. This acts as a barrier, discouraging the establishments from recycling. El Dief and Font (2010a) find that for Red Sea hotels, the non-existence of '*formalised environmental structures*' have frustrated the morale of managers interested in ES activities as it ultimately means higher costs if they are to be pursued. The managers hence suppress their ES beliefs to preserve economic interests.

Another key support system identified is the availability of professional advice and support. Chan (2008) found this to be one of the most significant barriers to adoption of environmentally sustainable services in Hong Kong hotels. The hotel managers in the study indicated that a lack of experienced professionals to help develop an environmental program, as well as limited access to concrete information and explanation of environmental legislation and standards, inhibited the adoption of these ES practices even where the establishments/managers were willing. These authors emphasise the inadequacy of appropriate infrastructures and support systems in the respective developing country contexts, and demonstrate how they serve as a barrier to the adoption of RM and ES practices in the TAI.

4.2.4 Lack of knowledge or required skills

Where the awareness or necessary knowledge of the idea and principles of RM and ES practices is low among decision makers in an establishment, the adoption and implementation of such practices is expected to be low. This lack of knowledge might be specific to awareness of environmental standards, as identified by van der Merwe and Wöcke (2007) for South Africa and Chan (2008) for Hong Kong, or just general lack of education on ES as a whole, as indicated by Kasim (2007a) for Malaysia and Chan (2011) for both large and small Hong Kong hotels. El Dief and Font (2010a) further indicate that managers of hospitality establishments who do not adopt RM and ES practices are often unaware of the of the potential benefits of these practices as it relates to the industry. Education and knowledge development on issues of ES, as well as existing standards and guidelines, is hence a prerequisite to improving adoption and implementation of ES activities in the TAI (Kasim, 2007a).

Also, where doubts exist on the idea or characteristics of RM and ES practices, especially as it relates to the industry, the willingness to accept such practices will be low, especially in environments where it is still voluntary, as is the case of most developing economies. Kasim (2007a) found that some hotel managers in surveyed hotels were aware of environmental management, but were unable to link its benefits to their businesses and so were sceptical about adopting them. This uncertainty of outcomes was also identified by Chan (2008) for the Hong Kong case, especially when the managers evaluated the costs of such activities. Kasim further noted that beyond the adoption phase, establishments who had adopted these practices struggled with

implementation as a result of the scepticism of their staff who found it difficult to justify the implied additional workload with the merits of such initiatives. The need for both awareness education, as well as more formalised/academic education on ES issues, is hence highlighted.

4.3 RESEARCH METHOD

To meet the stated objectives of this study, semi-structured interviews were conducted with the managing level staff of TAEs. These interviews are preferred because they provide a guide that allow for consistency across questions asked in different interviews, but also permit for flexibility in the dialogue emerging from the interview process, thus allowing new themes to emerge and be pursued (DiCicco-Bloom & Crabtree, 2006; Gill *et al.*, 2008). The study participants were owners, managers, and operators of TAEs in the Cape Town and Stellenbosch Municipalities of the Western Cape, South Africa. Individuals in establishments were only qualified to be interviewed if they held a managerial role that made them aware of the resource consumption characteristics in their establishments. Participants hence included General Managers, Assistant/Deputy Managers, Sustainability Directors, Managing Owners and Partners, and Maintenance engineers of TAEs in the two municipalities. The interview questionnaire was developed from a detailed literature review of the different subject areas of ES in the TAI, extant academic and non-academic questionnaires on the subject area, and various pilot visits to industry practitioners in the study area. It consisted of highly structured and semi-structured sections, categorised according to the specific topic being investigated. Each questionnaire took between thirty to sixty minutes to complete, depending on the willingness of the participant to provide detailed information, and the level of awareness of the subject being discussed.

4.3.1 Sampling

Due to the face-to-face requirement of the semi-structured interview approach, and the high time and cost implications of this approach, a convenience sampling technique was employed to select participants (Etikan *et al.*, 2016). The sampling frame was developed by compiling a list of establishments registered with the Tourism Grading Council of South Africa, and the Stellenbosch 360 in 2014, as made available on their respective websites. These municipalities were selected because they are known as popular tourist destinations in the Cape, attracting a high number of tourists each year, hence having a high concentration of TAEs. The target population was tourism accommodation establishments in these areas, regardless of type, size or star-grading. Based on the contact information provided, establishments were contacted telephonically, with specific requests to speak to the person in charge of ES or energy, water and waste issues in the organisation. The details of the study were then explained to these individuals, and their willingness to meet for a face-to-face interview was solicited. To avoid excluding establishments not listed with the Tourism Grading Council or Stellenbosch 360, other establishments in the

vicinity of a participating establishment were approached and asked if they were willing to participate, especially if they did not occur on any of the lists. Participants were also asked to recommend their colleagues in other organisations to be interviewed. The final study sample consisted of thirty-four interviews conducted between March and September 2015. Of these only thirty interviews were usable for analysis.

4.3.2 Data analysis

All the usable data collected was transcribed verbatim and coded and analysed using Atlas.ti, a computer-aided data analysis software. The NCT approach suggested by Susan Friese (2014) was used for coding the transcribed data, which was analysed within the QCA. The QCA framework was deemed ideal for this study because of its characteristic of being flexible and sensitive to the content of the data. It also allows a thick description of the phenomenon under inquiry such that concepts and categories emerge, hence allowing for the development of a conceptual framework based on the data (Elo & Kyngäs, 2008). This allows for comparability of findings with those in the literature. Using the NTC framework, codes were developed in accordance with themes aligned with the research questions, as well as those found in the existing literature. New themes were also allowed to emerge, based on the information provided by participants.

4.4 RESEARCH FINDINGS

In this section, the research findings are discussed in accordance with the proposed chapter objectives. The barriers identified by participants are first presented. The third party perceptions of these participants are then presented to corroborate their first party responses. Finally, their findings on the drivers of consumption are presented.

4.4.1 Barriers to adopting ES practices

Based on the review of the literature, five main factors that could prevent or discourage the adoption of ES practices in accommodation establishments, or pose a challenge for those already implementing such practices, have been identified (see [Table 4.2](#)). To evaluate what such factors were in the study sample, respondents were split into two groups: those who had adopted some form of ES activities (adopters), and those who had not (non-adopters). Adopters were asked to identify the disadvantages they had encountered as a result of the adoption of these practices; and the perceived challenges to implementing and running ES practices in their establishments. Non-adopters of ES practices were asked to provide reasons for not implementing any ES activity; and both groups were asked why they thought other (third-party) establishments who did not practice ES did not do so. The barriers/constraints to the adoption and implementation of sustainable practices as identified by the respondents in the study are presented in [Table 4.2](#) and are then further discussed in detail.

Table 4.2: Barriers to the adoption and implementation of RM and ES practices

	<u>Barrier</u>		<u>No. of Respondents</u>	
A	Resource Constraint	Cost	18	25
		Other Resource	7	
B	Nature of the Industry	Guest Behaviour	12	20
		Guest Satisfaction	6	
		Others	2	
C	Lack of Enabling Environment	Unconducive Policies/Regulation	8	20
		Inadequate Infrastructure/Support	6	
		City Location	4	
		Group Policy/Characteristics	2	
D	Staff education/Buy-in			8
E	Lack of Knowledge or Required Skills			4

Source: Data analysis from fieldwork, 2015

A. Resource constraints

From findings in the literature, resources required for the adoption and implementation of ES practices/activities include finance, manpower, and time (Chan, 2008, 2011; Heung & Pun, 2013). Based on responses from the study, this factor was grouped into two: cost and other resources. The cost implications of implementing sustainable practices/activities was the challenge most frequently mentioned by respondents. This challenge applied both to adopters and non-adopters and was hence a barrier to both starting the adoption process and adopting/implementing more practices and activities. The cost implication was also one of the two major challenges (apart from guest satisfaction) mentioned by respondents. This majorly involved the cost of purchasing the materials required for ES as well as ES products, amenities and technology. According to respondents, this cost is not necessarily the absolute cost, but the cost relative to non ES amenities or devices, as well as the cost of replacing already functioning devices with more sustainable ones.

It's a very expensive little exercise, it is! I mean just to buy the biodegradable products, it's way more expensive. (8:25)⁹

⁹ The first number in brackets indicates the interviewee number, and the second indicates the code occurrence position within the interview. For example, {30:3} means that the preceding quote was from interviewee 30 and is the third coded segment in his/her interview document. N.B. The interviewee numbers are not necessarily in accordance with the order in which the interviews were conducted.

The challenges are financing it, you know, like to put in ... converting our geysers now, maybe extra geysers and converting our geysers to heat pumps is going to cost quite a bit. (15:43)

This is a challenge of ES in general in that sustainable amenities (such as soaps, shampoos, cleaning agents, etc.) as well as devices and technology (such as energy-efficient lights, A-rated appliances, heat pumps, etc.) are still more expensive than conventional ones. Also, alternative renewable energy technology such as solar and wind energy sources are expensive for accommodation establishments, as captured by a respondent who stated that

(being)...eco-friendly, it is ... I think it is only reserved for the rich people. (1:34)

ES is still a more expensive option reserved for those with extra finances. Another major concern associated with cost, as identified by respondents, was that the payback period for sustainable technology and devices was quite high:

So it's not just a quick fix, it's not a quick fix that you goanna put in money right now, and it's not goanna be costing much; it's goanna cost a lot of money to change everything, to get everything in a process. (8:25).

The cost challenge to accommodation establishments is hence not just in the nominal cost of environmentally sustainable devices, amenities and technology but also in their real cost in terms of relative prices and pay-back period.

As the challenge relates to other resources, three major resources identified by respondents as necessary for the adoption and implementation of ES activities were staffing, time, and space.

So, the, the problem is, um, normally to do certain environmentally responsible things, you need space, you need time, you need money, you need manpower. (7:24)

Staffing and time go hand in hand as ES activities require going over and beyond the normal day-to-day activities of the industry:

It's labour intensive. It's labour intensive and you take people away from what they're employed to do. So, it's literally ... the paperwork is so much and the documentation and the management process of it it's hard, hard work. So, you take hours and hours out of ... people's productivity where you can use it in satisfying guests. (5:39).

These are ultimately tied to the cost constraint as

Manpower cost money. Time cost money. So, those are the things that I personally believe are the things that are holding us back from it." (5:56)

hence suggesting that where extra funds are available, staffing and time will not be as much of a constraint.

The challenge with space was associated with recycling, gardening, and with establishments located in urban/city locations.

In order to be able to, um, separate everything, we don't physically have the space ... and then also our hotel is different, because we're in the centre of town, so space is a premium, you know (Laugh) and that is a major problem. So, um, are you going to take out a room to put in that sort of thing, you know, it's, it's a very catch 22 situation. (7:24).

You can do fruit and vegetables gardens. You can do, um ... there's a lot that you can do, but you need the space and the environment and the resources to do it. (5:33).

For an establishment with enough finances, this challenge can be resolved by increasing the pick-up frequency of recyclable materials so as to reduce the amount of space required, or simply rent/purchase additional space for recycling and gardening.

From the responses provided by the study participants, the resource constraint challenge in the study area is primarily cost/finance related to the staffing, time, and space, and this challenge could be resolved with extra finance. It however highlights the high-cost nature of ES practices and activities in the industry.

B. Nature of the industry

From the review of the literature, the following 'soft industry' characteristics of the tourism accommodation industry were identified as barriers to the adoption and implementation of sustainable practices in the industry: industry vulnerability, service nature of industry, and the short tenure of managers in the industry.

For the study area, however, analysis of responses provided by respondents revealed that the primary industry characteristic inhibiting the adoption and practice of ES activities is the service nature of the industry. This characteristic involves the behaviour of guests and the industry's dependence on their satisfaction for survival. Many respondents indicated that the behaviour of some guests, especially as it relates to sustainable initiatives, was negligent and inconsiderate. One respondent attributed this anti-sustainable behaviour to the fact that these guests do not care about what they do when they are away from their homes:

Um, and then it's just basically, a lot of people think because it's not their own homes they can do what they want. They leave lights on, they just don't care. The same with towels, the same with ... I mean, people would go on oh I didn't get clean towels today, and then you, you don't say it in front of them, but you ask yourself do you wash your towels at home every day, every day? Do you change your linen every day? (2:40).

This behaviour is closely tied to the guests' expectation of what to expect and what can be done given that they are paying for the service, which ultimately handicaps the establishments in whatever initiatives they implement, especially those that relate closely to the guests' activities such as switching off the lights and water usage:

The rest of it, we can't really control. Um, guests, if they want to bath and shower and that sort of stuff, there's not much you can do, they pay x amount a night for the room,

you can't say to somebody: Would you mind not having a bath? You know, the people come here to relax, you know, so, on that side and, um, ja, we have ... that's why I'm saying there's not much else we can do. (7:38)

In cases where technology has been implemented to be sustainable, some respondents reported that guests find a way of overriding such technology to the handicap of the establishments:

so firstly guests have in their rooms the ... you put your (energy saving key) card in to turn the lights on and you take it out, which is interesting because often guests put another card in and then they go out for the day and then they come back because they want their room to be cool. You know you can't do anything about that, you can't ... it's a difficult space, it's their decision, they want ... it might not be responsible, but it's their choice. (10:56).

Some respondents also reported that where notices encouraging the guests' cooperation with sustainable initiatives have been put in place in guests' rooms, they are often ignored:

you can't really prescribe to visitors you shouldn't use water or use it sparingly, then they ignore it, notices like that. (11:26).

Some respondents indicated that these attitudes are difficult to correct because of the short duration of stay of the guests (which are often one-time stays). Furthermore, aside from guests' negative attitudes to prescribed sustainable behaviour and the outright overriding of sustainable technology, some respondents indicated that given that success in the industry is dependent on guests' satisfaction, the sphere of initiatives that can be implemented are limited.

I think the big thing though with what you implement is that you can't impact the guest experience; because guests are paying a lot of money to have a really nice night at the hotel, so you know, balancing that water saving shower head with a great shower experience is really important. (10:45)

These respondents emphasised the vetting process that goes into whatever sustainable device or practice is to be implemented in the establishment, especially where they impact the guests. The concern for guests' satisfaction was however more prominent amongst bigger establishments with higher star grading than in backpackers or smaller guest houses with low or no star grading.

Another industry characteristic mentioned by a respondent was the nature of the industry required it to be guest ready at all times, all year round:

And then, like in quiet times now, you have to ... you need everything here so that if somebody walks in, you must be ready. But say they are with me for 5 days, your fridges run, you can't switch off your geysers, you can't switch off your fridge ... but it's Guests, and the structure, I think guests and the structure are the biggest challenge. (27:32)

Other characteristics identified were the short duration of guests' stay, and seasonality in industry patronage. This characteristic implies that hotels and tourism accommodation establishments have to keep the majority of their equipment and devices in a ready state regardless of whether their rooms are fully occupied or empty. Even in cases where guest rooms can be turned off when

empty, other public areas (such as the kitchen, front desk, swimming pool, etc.) would constantly need to be in a ready state, with most electrical appliances on in anticipation of the arrival of guests.

C. *Lack of enabling environment*

Some of the barriers identified by respondents indicated that the environment was not conducive for implementing ES activities. The four major environment-related barriers identified from the analysis of the data are unconducive policies/regulations, inadequate infrastructure/support, the city location of some establishments, and the characteristics of certain hotel group/chain policies.

Unconducive Policies/Regulation refer to the absence of policies supporting the adoption of environmental practices. Kasim (2007a) indicates that this is one of the barriers to adoption in the Malaysian accommodation industry. Based on responses from participants in the current study, government policies also play a role in the adoption of environmental policies but not in the same way as the Malaysian case. Respondents in this study indicated that some of the policies relating to the way in which business is conducted were detrimental to the adoption of environmental practices. These policies include some grading requirements of the Tourism Grading Council of South Africa (TGCSA), some regulations on self-generation of electricity and water, and building regulations on the protection of historic structures. Speaking on the impact of historic structures preservation, one of the respondents indicated that:

Well, we can do a lot to be more sustainable to be quite honest. It is just not very possible for us. (Establishment X) is located in one of the historical buildings in Stellenbosch and this specific building was one of the first buildings built in Stellenbosch, so you are not allowed to make any changes to the building, like any big structural changes, so in order for us to rewire the whole electrical system and all that go green and solar panels, I am not sure if that would be granted for us. (23:11)

This barrier was common to establishments located in the Stellenbosch area but did not come up amongst respondents in the Cape Town area, indicating that it is location specific. The challenge of TGCSA's grading requirements cut across the board and applied to situations such as lighting where the respondents sought to reduce the number of light bulbs in a room but were restricted due to council requirements:

because for grading council there must be a certain amount of lights in your bathroom. (4:25)

Other respondents indicated that there were certain laws on self-generation of electricity (from solar panels for instance) which discouraged the installation of such:

And that is, but at the moment if you do that you get penalised on it. So, it's a, you know, um, I know a friend that put it in their house and he actually has to turn it off. Once he reaches the 80% mark it starts putting more back into the grid, you then are charged for it. So, you turn off your ... your solar, so that you don't actually do that. So,

it's a bit of a joke in a way. You're sitting there monitoring and you say: Oh, I've reached the target, OK, turn it off, but we have a power crisis in South Africa, how can it be penalising people for putting electricity back in the grid when they don't have enough to sell. (7:56)

Another respondent indicated that to get water directly from the water table (using wells or boreholes), the establishment had to apply to the presiding municipality for approval and in many cases it did not get approved.

Another environmental factor that limits adoption is the non-availability of adequate infrastructure/support. Kasim (2007a) and El Dief and Font (2010a) suggest that lack of adequate infrastructure and support structures for the practice of RM and ES activities serve as a deterrent to those who might want to engage in these practices. The two major challenges in this category identified by respondents were the lack of public recycling pick-up or drop-off facilities, and the unreliability of the energy and water utilities. Speaking on the challenges of recycling, one respondent pointed to the lack of support from the government:

I can say our government doesn't help us one little bit. They ... you know, we're talking about expenses and things like that, it's expensive for us to recycle, we have to get another company in that we have to pay to come and collect our waste where as it could happen right here at our front door when they collect our waste. The municipality, the government they don't help you in any way. (13:37)

Given that these facilities are unavailable as public services, establishments who are willing to recycle have to do so at extra cost, which discourages those who are already practising and those who might want to in the future.

The lack of reliability of the energy and water utilities was also highlighted as one of the challenges associated with implementing ES activities. With regard to energy, some respondents indicated that the fluctuation in the voltage level supplied by the energy utility caused the (more expensive) energy-efficient bulbs and appliances that have been installed to become faulty. There is hence a dilemma when replacing such devices, given their high cost relative to conventional ones. The establishments might end up opting for the cheaper, less energy efficient devices, given that their life span is already shortened by the voltage fluctuations.

The city location of some establishments was highlighted as an environmental barrier to adoption in terms of space requirements and consciousness levels. Three respondents suggested that establishments located in non-city locations such as farms and townships tend to be more conscious of managing the environmental impact of their activities, especially with regard to resource management (i.e. energy and water consumption and waste emission). They indicated that this is driven by the fact that city establishments are often not connected to the impact of their activities beyond its supply by the distributing authorities.

You know it's very hard to talk about water scarcity and water quality when you're in a city hotel and you turn on the tap and you have water quality and availability. But if we want to address water scarcity and quality here, we can walk to the river and talk to our team about the quality of the water, and look at the rubbish that's in the river. So connection points are different and ability to connect hearts and minds is very different when you're in a space that experiences in a small way the bigger issues. (10:90)

Other respondents indicated that space is a challenge in city locations, especially as it relates to implementing sustainable waste management initiatives such as composting and waste sorting. This is because landed property is more expensive in these locations, hence space comes at a premium. Farms and townships however have the advantage that population densities in these locations are much lower, hence the demand for and cost of land space is not as high as in the cities.

Another un conducive enabling environment identified is more associated with internal establishment dynamics. Some establishments that belonged to a hotel/business¹⁰ group or a hotel chain pointed to the fact that because their activities are governed by the group/chain's policies, often times, certain decisions had to be approved by and for the whole group before they could be implemented. A respondent speaking about plans for the adoption of ES initiatives in their hotel group said:

Um, ja, you see, if you do that, it will be a group decision. So, ja, you see, everything that we do is a group decision, it's not every hotel decide what they want to do. It's a group decision and all the hotels do the same thing. (4:18)

Another respondent indicated that this challenge was particular to hotel/business groups, when compared to independent hotels:

And I mean, yes there's lots of stuff that we can probably do on our own, but you know, OK, our group might not allow it. Where independent Hotel like (Mr C) in his Hotels ... you know, the sky is the limit with them. He is fortunate that he's got, you know, owners that's very passionate about saving the planet and those kind of things ... He can do so much. You know, with us, a bit more corporate environment, so you kind of have to follow the rules. (2:36)

This respondent does not say that they are incapable of implementing any ES or RM practices. Based on the interview background, the hotel group had already launched a sustainability program to be adopted by the whole group in phases. The respondent's challenge was hence the bureaucracy involved in getting some things done when the establishment is a member of a group, as opposed to independent hotels. Also, the fact that certain initiatives might not be approved because they were a 'selling feature' or part of the 'brand image' of the hotel was a major challenge in this group. For some hotels in the study, their lighting type, bath size, or even shower

¹⁰ Some respondents were part of a business group which had hospitality as part of their core business focus, but were also into other business types.

pressure were selling points which the group would not compromise on for individual hotels as it was one of their brand differentiation and marketing tools.

D. Staff attitudes

Obtaining the buy-in of the staff in order to facilitate effective behaviour modification for environmental sustainability was one of the major challenges identified by respondents in this study. Given that the behaviour changes associated with ES activities fall majorly on the staff's cooperation, getting their buy-in is vital to the success of any program implemented.

I would say it's the people – introducing it. I know from this hotel, we're struggling until ... we're supposed to have a green committee and that's one of the hardest things is to get people to buy in, but we're all already doing our work. It's just to try and get people to understand how this is actually a part of your worth now. It's like another thing that they have to do. (17:40)

Consistent with the findings of Kasim (2007a) for Malaysian hotels, managers in the study indicated that their staff viewed such activity as extra work that they could not justify (see quote 17:40 above). Some respondents suggested that the cause of this challenge is the lack of environmental background of the staff:

Remember you are working with a group of people ... who've never been taught about it ... I mean some people ... (have) never been taught about recycling, have never been taught of wastage and things like that. So we end up in a situation where you have staffs ... and I think that's the greatest problem, is to have your staff have the same initiative that you have. (8:26)

Another possible reason for the lack of buy-in as suggested by a respondent is that the staff are generally lazy, and will always take the easy way out, hence requiring constant supervision:

You have to have the buy in from the staff, because ... your staffs are lazy, they're lazier than you, they will take the easiest road. I don't know if lazy is the correct term, but they'll take the easiest route, the route of less friction ... and also threatening with warnings and that sort of stuff does not always work, because people just don't do it. (7:42)

Many respondents indicated that this challenge is one of the most common that they face because the solution often evades them:

and yeah it's having the right people to run with it, the right mindset, and if you can get that, if you can handle the cost of it and you can get the right people to run with it, then you shouldn't have any problems. (25:51)

Consequently, solving this problem by finding people with the right mindset will make the load of practising ES activities lighter and easier for the management. The practical solution will hence be to constantly train the staff and remind them, as suggested by one of the establishments with a long history of a deeply ingrained sustainable business culture:

I would say it's about training, it's like getting your staff ... you always have to keep on reminding them. (13:38)

Repeated training programs for staff are hence vital to a success of a sustainability program at establishments in this industry. This is however also a time and cost-driven initiative, especially in situations where staff members leave and are replaced with new ones.

E. Lack of knowledge/required skills

The last barrier to the adoption and implementation of RM and ES activities, as identified in this study – the lack of knowledge and required skills on the part of the management – is a challenge associated with the characteristics at the governing/apex level of the establishments. This barrier was associated with non-adopters.

During the course of the study, non-adopters of any RM or ES activities were asked to provide reasons why they had no such policies in place. Responses indicated that the managers were ignorant of the idea of ES, especially as it applied to the industry, and had not given it any thought. Some other respondents indicated that because the owners of the establishment were not concerned about such initiatives, the managers were handicapped to do anything about it. This response however indicated the passivity of such managers to the concept of RM and ES as there were other organisations where the owners were not concerned, but the managers had implemented behavioural modifications, at a very basic level, so as to be sustainable. Some of these managers had even come up with innovative ways to overcome the owner's apathy, such as saving up their operating expenditure allocations and investing in sustainable solutions such as energy-efficient light bulbs.

These findings are consistent with the findings of van der Merwe and Wöcke (2007) for South Africa, Chan (2008) for Hong Kong, and Kasim (2007a) for Malaysia. El Dief and Font (2010a) also highlight that managers of hospitality establishments who do not adopt RM and ES practices are often unaware of the of the potential benefits of these practices as it relates to the industry. Education and knowledge development on issues of ES, as well as existing standards and guidelines, is hence a prerequisite to improving adoption and implementation of ES activities in the TAI (Kasim, 2007a).

4.4.2 Third party perceptions on barriers to adoption

To obtain an industry-wide perspective on the barriers to adoption of RM and ES practices in the accommodation industry, respondents were asked their perception of why those who did not embrace ES initiatives in their establishments did not. The answers provided by respondents provide vital information on general industry challenges as far as the practice of ES is concerned. Third party barriers identified from analysis of responses are presented in [Table 4.3](#).

Table 4.3: Third party perceptions of the motivation for the adoption of RM and ES practices

	<u>Third party perceptions of barriers</u>	<u>Number of Respondents</u>
1.	Lack of education or understanding	11
2.	Cost implications	8
3.	Do not care / easier not to	7
4.	Not regulation yet	3

Source: Data analysis from fieldwork, 2015

A. *Lack of knowledge/understanding*

Respondents opined that some members of the industry were ignorant of the importance and benefits of ES and hence did not practice it.

I think often it's also a lack of education and I think before you actually start saving you have to invest and it's only a short term perspective that many managers have and not a mid or long term perspective, they don't want to invest the money or don't have the money at the moment and they just have to keep going the way it is. (12:43)

The majority of respondents alluded to this 'ignorance' factor as a possible reason for non-adoption, suggesting that there is still an education gap in the industry, which would apply to local establishments (i.e. those not part of international chains) and smaller establishments.

B. *Cost implications*

Respondents indicated that the cost implications associated with the practice of RM and ES activities was a reason for some establishments not adopting them.

maybe they're trying to delay on cost, I think cost ... some people literally just can't afford to do it. (17:61).

I think it because they can't most probably afford it. It must be financially motivated. If you can't do it, it's most probably financially motivated. (24:33)

This suggests that some of the non-adopting establishments were willing, but financially handicapped to adopt RM and ES practices.

C. *Do not care / easier not to*

Some respondents were of the opinion that regardless of any barrier, when an establishment does not adopt any ES activities, it is because there is a lack of concern somewhere, regardless of whatever other barriers exist:

They just don't care. I mean if I have to answer it in one question, it's because they don't care. I mean there is ... that is maybe a broad term, but some of them just don't have time, don't have money, don't care, owners don't care, somewhere someone doesn't care. (2:47)

This suggests that in some cases the lack of will is the most important barrier to implementing ES activities. This idea is anecdotally supported by the fact that there are RM and ES activities (especially behavioural ones) that do not cost anything, but do save on consumption (e.g. switching off lights when not in use to conserve energy, washing only full loads of laundry and dishes to conserve energy, etc.). These activities however involve extra effort as they require behaviour change and hence the motivation of 'caring', either about the environment, or costs, or attracting customers. This reason is exacerbated by the fact that in South Africa, as yet there are no regulations governing environmental actions in the accommodation industry. This is further discussed below.

D. Not regulation yet

Some respondents argued that some establishments needed external incentives in the form of regulations to motivate their adoption of ES initiatives. The non-existence of environmental regulations in the industry, be it punitive or rewarding, served as a barrier to the adoption of such initiatives.

The ones that must, leave it, because... It is not a law yet here. You don't get money back for it yet. (5:36)

well ... the government doesn't worry about caring, why, why must we? (8:47)

they don't, because they're not enforced by law or whatever, they won't do it, unless if you're passionate about it. (13:23)

This suggests that it might be necessary for the government to put in place some form of environmental regulations in the industry, however the small number of respondents suggesting this indicates that there are other more important factors driving non-adoption in the industry, and if these are addressed, regulation might not be necessary.

It is important to note that all respondents mentioned more than one factor when responding to this question. Their responses were hence a combination of two or more of the factors presented in [Table 4.3](#). This indicates that the barriers to the adoption of RM and ES activities in the industry are complex and diverse, and often overlapping. Consequently, addressing one factor can proffer solutions to other factors: for example, educating ignorant members on the potential cost-saving advantages of ES would address the problem of lack of education and cost, and could potentially motivate those who do not care to take action.

E. Drivers of resource consumption

This study further sought to understand respondents' perception of the drivers of resource consumption in the industry. Given that they are involved in the day-to-day workings of the industry, their opinion on the drivers of consumption provides an indication of specific areas of

intervention for resource management initiatives. Specifically, respondents were asked to provide information on what the biggest driver of energy and water was for their individual establishments. In some cases, respondents were asked to provide a breakdown of the factors that drive their consumption in order of importance (i.e. more than one item was allowed), and the items identified as most important were also coded as key drivers in addition to the biggest drivers identified.

Eight drivers of energy and six drivers of water were identified by respondents. The most occurring drivers in terms of frequency are presented in [Table 4.4](#).

Table 4.4: Drivers of energy and water consumption in establishments

<u>Key Energy Drivers</u>	<u>Frequency</u>	<u>Key Water Drivers</u>	<u>Frequency</u>
Heating, Ventilation and Air Conditioning (HVAC)	18	Guest Showers	17
Water Heating	14	Laundry	5
Laundry	6	Others	6
Others	8		

Source: Data analysis from fieldwork, 2015

Most respondents reported that HVAC was by far the largest energy consumer. This applied to the conditioning of guest rooms, common areas and staff areas. This finding is supported by extant literature where space conditioning has been identified as the single largest end-user of energy in TAEs (Hotel Energy Solutions, 2011a; Placet, Katipamula, Liu, Dirks, Xie & Sullivan, 2010). HVAC as a significant energy driver was pointed out both by establishments that made use of centralised systems, as well as those who had individual units in the rooms. Smaller establishments with low or no star grading (especially in the backpacker industry) could get away with just having fans and hot water bottles or panel heaters in rooms and indicated that this was a huge cost saving for them.

Water heating was identified as the second highest energy driver by respondents. This referred to the heating of water for guest rooms and showers, as well as other domestic activities. The water heating devices used in the sample varied by establishment: respondents were asked what specific technology was used in their individual establishments and four types were indicated: geysers, solar geysers, boilers, and heat pumps.

The third most frequently mentioned energy driver was laundry (i.e. the cleaning of bedding, towels and other linen, excluding guests' personal laundry). Respondents indicated that they had the option of outsourcing their laundry to an external company, or having it done in-house. For those who had their laundry done in-house, they specified that the energy used by washing machines is high, but that energy used by dryers is much higher. Some of these establishments hence had washing lines installed to air-dry their laundry when the weather was conducive. For "other" energy drivers mentioned, energy used in the kitchen had a frequency of one, energy for lighting had a

frequency of two, and energy used by hair dryers, refrigeration and swimming pool pumps each had a frequency of one.

On the key water drivers, respondents mostly specified guest showers as the highest water consumer. From the analysis of interviews, especially with regard to challenges faced in adopting ES initiatives, this was a source of frustration for many managers. They stated that given the service nature of the industry and the dependence on guest satisfaction for profitability, they had no control over how long guests spent in the shower. In a bid to exercise some control over the water consumption by guests, some establishments had put in low-pressure shower heads or flow restrictors in taps to reduce the water consumption per minute, and others had taken out all their baths and replaced them with water-efficient showers. This was however still the biggest water consumer identified, and caused respondents high levels of frustration as they had no solutions that would not interfere with guests' comfort.

The second most frequently mentioned high water consumer was the laundry. This was a factor in establishments that had their laundry done in-house. The washing machine was identified as the major device using a lot of water, as in many cases industrial machines were used and they did not account for the weight of the laundry (i.e. how full or empty the machine was). To reduce water consumption, environmentally-conscious establishments had policies to turn on their washing machines only when it was full. For "other" water consumers mentioned, water for domestic use and for irrigation both had a frequency of two, while water for air conditioning and the swimming pool had a frequency of one.

4.4 DISCUSSION OF FINDINGS

The findings of this study also revealed that there are a wide variety of factors that act as barriers to the adoption of ES and RM initiatives in the study sample. The majority of the barriers identified applied to those who were willing to adopt these initiatives but were unable to due to these factors. Figure 4.1 provides a pictorial representation/mapping of the key barriers to the implementation of RM and ES practices in the TAI in the study sample. It also maps the third party perceptions to the four main themes identified for the first party responses.

From the analysis of responses from participants in this study, resource constraint was highlighted as the most frequently occurring challenge faced by respondents. This refers to the scarcity of financial means to meet the time, manpower, and cost requirements of implementing a RM and/or ES initiative. Participants' opinion on why some of their colleagues in the industry did not implement these practices confirms that the resource constraint challenge is industry-wide.

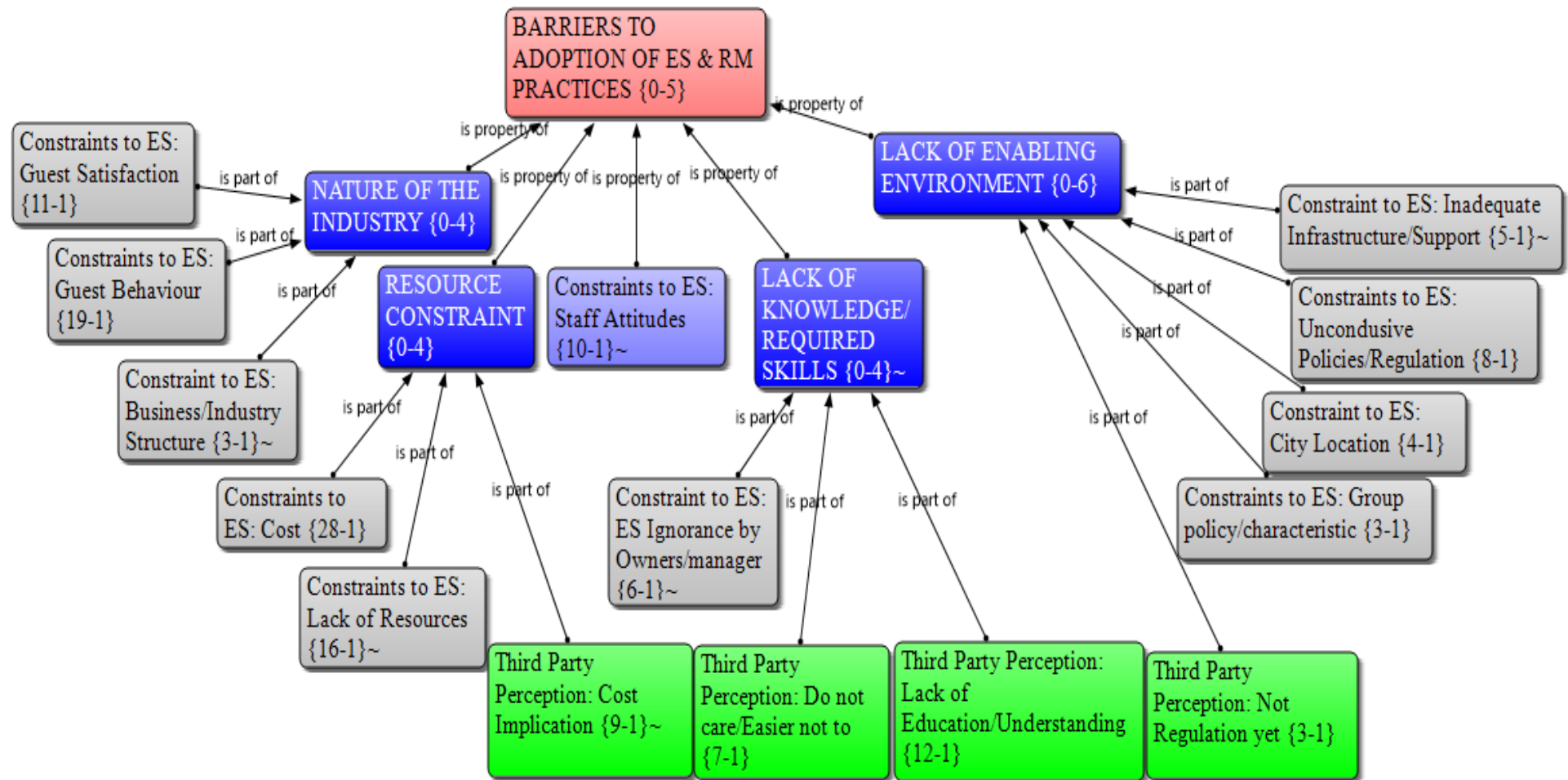


Figure 4.1: Network view of the barriers to adopting ES and RM practices among respondents¹¹

Source: Data analysis from fieldwork, 2015

¹¹ The occurrence of ~ after e.g. *{10-1} implies that the code is annotated in the coding software.

The literature already points out that initial capital cost of adopting/implementing RM or ES activities are often quite high (Kasim, 2007a), especially where such implementation involves the purchase of new devices (e.g. renewable energy devices, energy and water efficient devices), or the setting up of entirely new systems that are more sustainable (e.g. the installation of new building management systems, or recycling systems) (Chan, 2008).

Chan (2008) further explains that even where establishments might be able to overlook the high capital outlay, the cost of maintaining and running such systems to ensure effectiveness can also prove daunting. Participants in this study further added that this cost constraint is relative in nature. They explain that the resources required for implementing ES initiatives are often more expensive than those required for non-ES initiatives, and that for established businesses, this cost almost doubles as to implement a new sustainable system, they lose the sunk cost of the already installed system.

In addition to resource constraints in terms of funds, manpower and time, other barriers identified include the nature of the industry, the challenge of uncooperative policies, challenges with carrying the staff along, inadequate infrastructure, group policy/characteristics, and ignorance on the part of the management. These themes are consistent with the broader findings from the literature but differ in the specifics. Of these challenges, one of the most daunting highlighted by participants had to do with getting the buy-in of the staff. They indicated that finding people with the right mindset, or willing to adopt the sustainability mindset, is extremely difficult. Consequently, they suggested that solving this problem by finding people with the right mindset will make the load of practising ES activities lighter and easier for the management. Given that this might not always be possible, the practical solution will be to constantly train the staff and remind them, as suggested by one of the establishments with a long history of a deeply ingrained sustainable business culture.

However, the single most daunting challenge identified by participants to which they had no envisaged solution was the nature of the industry. This constraint revolved around the service nature of the industry which directly affects expectations and attitudes of guests in relation to sustainability initiatives and the fact that this directly affected the success of the business. According to these respondents, the range of initiatives that could be implemented were limited by the need not to compromise the comfort levels of guests. To further aggravate this, there were some guests who were entirely ignorant of, or opposed to, the idea of sustainability and were hence not willing to compromise in the least on their comfort experiences. Such initiatives generally have to do with the need to reduce resource use (e.g. the use of water, lighting and ventilating equipment) to meet sustainable goals. This highlights a gap for the need to explore options to address this challenge and proffer solutions that allow TAEs to adopt consumption reduction initiatives and at the same time enlist the cooperation of guests in implementing such initiatives.

Participants' responses also indicated that the nature of their business environment constituted a barrier as it was not conducive for implementing ES activities. The four major environment-related barriers identified from the analysis of the data are unconducive policies/regulation, inadequate infrastructure/support, the city location of some establishments, and the characteristics of certain hotel group/chain policies. These challenges limit establishments that are willing and able to implement ES initiatives in their establishments, and extend beyond the tourism industry to the entire community. Kasim (2007a) argues that in the absence of an adequate policy and regulatory environment that encourages and promotes environmental issues in the tourism sector as a whole, the uptake of RM and ES practices will be low. This is valid given that such practices often involve a movement away from the normal way of business operations, and often involve extra financial investments (Chan, 2008; El Dief & Font, 2010a). Consequently, an external nudge in the form of government policies and regulations may be necessary to boost the adoption of these practices, both in the study sample and in similar developing countries where resource constraints are generally an issue. As such, old regulations need to be revisited to assess their impact on the environment, and new ones enacted in consideration of, and to promote, the sustainability of the environment.

To further understand the determinants of the adoption of ES and RM practices in the industry, respondents were asked what they thought the largest drivers of resource consumption were in their establishments. The responses provided are important in identifying problem areas for intervention. Respondents indicated that with regard to energy consumption, space conditioning was the largest driver of consumption. This finding is supported by extant literature where space conditioning has been identified as the single largest end-user of energy in TAEs (Hotel Energy Solutions, 2011a; Placet *et al.*, 2010). Also, with regard to water consumption, the majority of respondents indicated that the water consumed by guests when showering was the largest driver. Respondents further indicated that they are handicapped in addressing this challenge because of the service nature of the industry as it meant that they had no control over how long guests showered. The gap in the education and knowledge on issues of ES amongst some managers was also flagged, highlighting the need for both increased awareness education, as well as more formalised/academic education on ES issues.

The results of this study confirm some of the findings from existing literature with regard to the barriers to the adoption of ES and RM initiatives in TAEs, detail how these barriers vary within the specific context of this study, and have various policy implications. The findings suggest that in enacting policies to improve the adoption of RM and ES activities in TAEs, those targeted at cost reduction or mitigation should be the first line of action. This could be done through subsidising the purchase and implementation of high cost initiatives, such as it did to encourage the take up of solar water heaters in domestic homes (Department of Energy, 2011; Eskom, 2011; South African

Government, 2015). The findings also indicate the need to address the challenge of those comfort and luxury demands of guests which are not environmentally sustainable. A possible solution would be extending the use of behavioural economics tools, such as those prescribed and tested by Schultz *et al.* (2008; 2007), Göckeritz *et al.* (2009), Goldstein *et al.* (2007; 2008) for linen reuse associated with the 'cleanliness aspect of the luxury requirement' in the industry to influence the 'comfort luxury requirement' as well. This approach is adapted and tested in Chapter 6 of this thesis.

4.5 CONCLUSIONS AND RECOMMENDATIONS

This paper set out to identify the challenges faced in adopting and practising resource consumption reduction in the industry, especially as it relates to ES, and to identify these stakeholders' perception of the drivers of resource consumption (especially of energy and water) in the industry. Findings from the seven developing country studies that explore barriers to the adoption of sustainable practices revealed four key barriers to the adoption of RM and ES in developing country TAEs: resource constraints, the nature of the industry, a lack of enabling environment, and a lack of required knowledge or skills on the part of the management or decision makers. The study respondents indicated that consistent with existing research, the cost consideration is the most important barrier to the adoption of ES and RM initiatives.

With regard to the 'nature of the industry' barrier identified in the literature, the following characteristics of the industry were identified as barriers to the adoption and implementation of sustainable practices in the industry: the 'soft industry' characteristic, industry vulnerability, the service nature of industry, and the short tenure of managers in the industry. For the study area, however, the analysis of responses provided by participants revealed that the primary industry characteristic inhibiting the adoption and practice of ES activities is the service nature of the industry. Participants indicated that this barrier was a key problem area to which they felt handicapped to intervene. The barrier involves the behaviour of guests and the industry's dependence on their satisfaction for survival. Given that customers are the main reason for the industry's existence, they are the most important drivers of and barriers to adoption and hence have the greatest influence of all stakeholders in the business and on environmental decisions of industry managers (Chan, 2008). This implies that with environmentally apathetic customers, the resource-saving potential of the industry is greatly reduced, especially with the mindset that resource reduction implies a compromise of comfort (Chan, 2008; Kasim, 2007a). The need to explore options to address this challenge and proffer solutions that allow TAEs to adopt consumption reduction initiatives without compromising the comfort of guests is hence highlighted. The key energy and water drivers identified by participants in the study also provide an idea of the

primary focus areas for policy and practical interventions to reduce industry consumption towards more sustainable levels.

The findings presented in this chapter provide a working framework for researchers, policy makers, and industry specialists intending to address the RM and ES challenges in the TAI, as well as some policy recommendations to kick-start the process. It also provides a background for quantitative studies to evaluate the relative severity of these challenges against a broader spectrum of establishments, as well as studies that empirically investigate and isolate the specific impact and relative importance of the key consumption drivers identified in the study.

CHAPTER 5 :

Energy (Electricity) Consumption in South African Hotels: A Panel Data Analysis¹²

5.0 PREFACE

In Chapter 4, TAI operators' perceptions' on the drivers of resource consumption in their industry were investigated. Findings suggested that air conditioning and guests' showers and baths were the two key drivers of energy and water consumption, respectively. Access to a novel dataset makes it possible to empirically evaluate the drivers of energy consumption in hotels. The focus is on hotels only, and not on other accommodation types. This is due to the limitation in the scope of the dataset. The enquiry pursued in this chapter is premised on the idea that addressing the large energy consumption of hotels requires an understanding of the factors that drive this consumption. This enquiry is crucial for South Africa which has experienced significant strain in meeting its domestic energy demand. This has occurred alongside increases in international tourists, adding to the pressure on already strained resources. This chapter tests hypotheses on drivers of energy consumption in hotels using this novel panel dataset which presents daily consumption data for 22 hotels across South Africa. Findings from various specifications of the Dynamic Random Effects Model suggest that the number of rooms in a hotel, the services and facilities offered, and climatic conditions are strong drivers of consumption. While the role of occupancy could not be robustly ascertained due to severe data limitations, findings indicate that in the design of guidelines for energy efficiency in South African hotels, the energy consumption of the facilities and services offered should be the first point of call, and the strenuous impact of extreme weather conditions on energy consumption needs to be factored in at the phase of building design and construction. Results further suggest that price regulation plays a significant role in curtailing electricity consumption, even in high-end hotels. This confirms the findings of Chapters 3 and 4 where cost considerations were identified as the key motivation factors, as well as barriers, to RM and ES implementation in the TAI.

5.1 INTRODUCTION

Energy – its consumption, production, and distribution – has attracted a lot of attention in the global literature, especially as it relates to sustainable development and the heightened threat of global warming. For developing countries, this energy concern is more pertinent as their energy sectors

¹² A paper based on chapter has been published as a working paper with Economic Research Southern Africa (ERSA), and has been accepted for publication by the Energy and Building Journal, a DHET 2017

are crippled by limits in their production and distribution framework. This research is motivated by the current (2015) energy constraints in South Africa. Within the last decade, the nation has experienced severe energy challenges. Not long after a major crisis in 2008, the nation experienced a severe energy crisis which generated widespread attention as the electricity public utility, Eskom, struggled to meet the energy demand of South Africa's population (Inglesi & Pouris, 2010; Longmann, 2015; Nicolson, 2014; SAnews.gov, 2015; The Times Editorial, 2015). To adequately address this challenge from the demand side, a proper investigation into the drivers of energy consumption is crucial.

Various studies have been done in the past to understand resource consumption of residential, commercial and industrial buildings. These focused on ways of improving building construction and design in line with more sustainable frameworks, and assessing where human activities can be modified with or without building renovations and modifications (see Eichen & Tukel, 1982; Santamouris, Dascalaki, Balaras, Argiriou & Gaglia, 1994; Crawley, Lawrie, Winkelmann, Buhl, Huang, Pedersen, Strand, Liesen, Fisher, Witte & Glazer, 2001; Palanichamy & Sundar Babu, 2005; Xuchao, 2007; Petersen, Shunturov, Janda, Platt & Weinberger, 2007; Pérez-Lombard, Ortiz & Pout, 2008; Rodgers & Bartram, 2011; Crous, 2012; Delmas & Lessem, 2014; Lü, Lu, Kibert & Viljanen, 2015)). Research targeted at resource consumption in tourist accommodation establishments is, however, sparse. This is not satisfactory given that these establishments are high resource consumers, with tourism accommodation having one of the highest environmental impacts of all subsectors in the tourism sector (Gössling, 2002; Perch-Nielsen *et al.*, 2010; UNWTO-UNEP, 2008). In South Africa especially, the tourism sector as a whole has experienced a significant growth surge since 1994, with an increase in foreign visitor arrivals from about 3 million in 1993 to over 10.3 million at the end of 2010 (National Department of Tourism, 2011). This figure is forecast to reach at least 11.75 million by 2017 (PwC, 2013). While this growth has positive implications for the economy in terms of national income and job creation, the attendant implications for the already stressed resources of the country cannot be ignored.

This study investigates hotel energy consumption using a novel panel dataset which presents daily energy consumption data for hotels across South Africa. The data is an unbalanced panel, made up of actual consumption figures for certain hotels in South Africa for periods ranging from four months to sixty-six months. Specifically, the paper estimates the role of building characteristics, geography and climatic conditions in determining consumption, and attempts to model the relationship between occupancy and consumption.

The rest of the chapter is structured as follows: Section 5.2 explores extant literature on energy consumption in tourist accommodation establishments. The key drivers of energy consumption in

these establishments as identified in the global body of literature are indicated and discussed, locating the objectives and findings of this chapter within the overarching global knowledge landscape. The statistical characteristics of hotels in the dataset are discussed in Sections 5.3 and 5.4, while the hypotheses tested and analysis techniques used are discussed in Section 5.5. The results of the empirical analysis are detailed and discussed in Sections 5.6 and 5.7, and based on the findings, conclusions and policy recommendations on the focus of energy saving and efficiency activities are made in Section 5.8.

5.2 DRIVERS OF HOTEL ENERGY CONSUMPTION AS IDENTIFIED IN THE LITERATURE

Various researchers have in the past attempted to quantitatively isolate the factors that drive energy consumption in hotels and other tourist accommodation establishments (see [Table 5.1](#) for a list of such literature). For some researchers this objective was pursued as a primary objective, for others, it was an ancillary objective. The majority of these studies were conducted after the year 2000, with only four studies carried out prior to 2000 as identified from a detailed search of existing literature. This search, however, revealed that studies into the quantitative profiling of hotels' energy consumption are sparse and widely spaced in terms of location and time (year).

The earliest identifiable inquiry into energy consumption in hotels was a survey carried out by Lawson (1983) for the United Kingdom Energy Efficiency Office, as cited by Becken, Frampton and Simmons (2001). The other three studies carried out prior to 2000 were by Chow and Chan (1993), Zmeureanu, Hanna, Fazio and Silverio (1994) and Santamouris *et al.* (1996). Studies carried out since 2000 are listed in [Table 5.1](#) in the order of the year in which they were published. Of key interest in this table are the last two columns, indicating the potential drivers of energy consumption identified in the individual studies, and those found to be significant.

A preview of the literature presented in [Table 5.1](#) shows no consistency in the factors evaluated. The method of analysis used varied between simple statistical summaries, statistical testing and static regression analysis. The energy drivers most frequently analysed in the literature and found to be significant are 1) hotel GFA, 2) outdoor weather conditions, and 3) occupancy. The findings of the surveyed literature for each of the identified drivers are discussed below.

Hotel gross floor area: Six of the nine studies reviewed evaluate the impact of the GFA occupied by the hotel as a driver of energy consumption, and five find it to be a significant driver of energy consumption. Deng and Burnett (2000) express difficulty in establishing a significant relationship.

Table 5.1: Literature on drivers of hotel energy consumption

<u>Author(s)</u>	<u>Year of Publication</u>	<u>Location of Sample</u>	<u>Method of Analysis</u>	<u>Sample Size</u>	<u>Drivers Evaluated</u>	<u>Significant Drivers Identified</u>
Deng & Burnett	2000	Hong Kong	Statistical summaries and multiple regression	16	Year of construction, occupancy, gross floor area (GFA), outdoor temperature, hotel class (i.e. star grading), number of guest rooms, number of restaurants	Outdoor temperature
Becken et al.	2001	New Zealand	ANOVA, multiple regression	120	Floor space, visitor nights, capacity	Visitor night, capacity, and floor space (depending on accommodation type ¹³)
Shiming & Burnett	2002	Hong Kong	Regression analysis	16	Outdoor temperature, number of guests, number of food covers	Outdoor temperature, number of guests
Deng	2003	Hong Kong	Statistical summaries and regression analysis	36	GFA, number of guest rooms, number of guests, number of food covers	GFA
Trung & Kumar	2005	Vietnam	Statistical summaries	50	End use activities (i.e. HVAC, water heating, other)	In order of contribution: HVAC, lighting, water heating, other
Bohdanowicz & Martinac	2007	Hilton International and Scandic Hotels in Europe	Multiple regression analysis	184	Year of construction, GFA, services and facilities (e.g. HVAC, jacuzzi, spa, pool), outdoor temperature, guest room occupancy (i.e. guest nights sold), in-house laundry load	GFA, guest room occupancy, number of food covers, outdoor temperature
Priyadarsini et al.	2009	Singapore	Regression analysis, ANOVA, Pearson correlations	29	GFA, number of guest rooms, outdoor temperature and humidity, worker density, occupancy rate, star rating.	GFA, star rating, outdoor temperature, worker density.
Wang	2012	Taiwan	Multiple regression, Pearson correlation	19	GFA, room rate, occupancy rate, number of floors, total revenue, number of rooms, year of construction, average room rate, hotel location	GFA, number of guest rooms, occupancy, average room rate
Yao et al.	2015	Shanghai	Summary statistics and descriptive analysis	45	Hotel class, outdoor temperature, occupancy	Outdoor temperature

¹³ For hotels, only visitor nights and floor space were found to be significant.

In all papers, GFA was used to capture the impact of hotel size on its energy consumption, although Deng (2003) further explains that for their sample of hotels in Hong Kong, this relationship is driven by the “hot water heating” component. The paper rationalises implicitly that the higher the hotel’s GFA, the more guest rooms it will have, and hence the more hot water it will require. According to the author, “electricity used for water heating may take up to 40% of the total energy used in a hotel in Hong Kong” (Deng, 2003: 783).

Outdoor weather conditions: In studies which evaluated the impact of climate/weather conditions on the energy consumption of hotels, all the studies made use of data on the outdoor temperature where a given hotel is located. In all studies, energy consumption fluctuates significantly with the outdoor temperature and this fluctuation was attributed to the air conditioning needs of the hotels which vary with the outdoor weather conditions.

Occupancy: From the studies surveyed, occupancy was captured either as the number of occupied rooms, the number of guests, or the occupancy rate calculated as the number of occupied rooms/beds divided by the number of available rooms/beds. However, the studies had varying conclusions on the significance of occupancy as a driver of energy consumption in hotels, where some were able to show its significance and others concluded that occupancy was an insignificant contributor to energy consumption. Wang (2012) found that the occupancy rate was significant in predicting the energy use intensity of four of the 19 hotels in the dataset, and Becken *et al.* (2001) found visitor-nights to be a significant predictor of total energy use in hotels and motels, but not in backpackers, or campgrounds. Trung and Kumar (2005) found from their analysis of energy and water resource use and waste management in Vietnamese hotels that “as the occupancy rate increases, the specific consumption decreases and vice versa” (2005: 110), indicating a significant relationship between occupancy and consumption.

The other studies reviewed however found occupancy to be an insignificant driver of energy consumption in the hotels evaluated. The insignificance of occupancy as a driver of energy consumption as found by some of these studies might seem counter-intuitive given that the primary service offered by all TAEs is lodging. The primary explanation for the insignificance of occupancy as a driver of energy consumption in hotels is that in the majority of the hotels evaluated guest rooms were left in almost the same condition regardless of whether or not they were occupied (Deng & Burnett, 2000: 11; Priyadarsini, Xuchao & Eang, 2009: 1322; Yao, Zhuang & Gu, 2015: 1981). Some of the authors also postulated that the data used did not allow them to make conclusive inferences on the relationship between occupancy and consumption (Deng & Burnett, 2000; Yao *et al.*, 2015).

The finding from the body of literature that exists on profiling hotel energy consumption reveals a geographical gap in the quantitative evaluation of drivers of hotel energy consumption. Prior to the

year 2000, four studies were carried out on hotel energy consumption: in Great Britain (Lawson, 1983), Hong Kong (Chow & Chan, 1993), Ottawa (Zmeureanu *et al.*, 1994), and Greece (Santamouris *et al.*, 1996); and from 2000, nine studies were conducted, seven in Asia, and two in Europe. No study was however found that evaluated the drivers of hotels' energy consumption on the African continent as a whole.

This essay fills this gap by making use of daily energy consumption data for 22 hotels across South Africa to evaluate the drivers of energy, and evaluates some of the drivers identified in the literature, incorporating some other variables not evaluated but which plausibly drive consumption. One improvement of this paper over existing studies is that it makes use of more advanced econometric methods which cater to the issue of bias, consistency and reliability associated with the methods used in other studies.

5.3 THE DATASET

The study used an unbalanced panel with data on hotels' real-time energy consumption, disaggregated by consumption components; climate conditions per hotel location; energy tariff rate; and occupancy, mostly captured daily for a period ranging from four months to four years. The final dataset was made up of data from different sources. The energy consumption component of data is generated from smart electricity meters distributed throughout different sections in different hotels and stored in an online server. Climate information data (temperature, humidity, and rainfall) was obtained from the South African Weather Services for the surrounding area by relating the GPS locations of individual hotels to their closest weather station using Google Earth, and using Euclidian distances in a near-analysis technique within a GIS environment. Data on energy tariff rates was obtained from the [Power-Star Energy Intelligence](#)'s website.

Hotels self-select into the dataset by deciding whether to have smart meters installed or not. This decision is directly influenced by when they become aware of the product, as well as whether they are willing to incur the additional cost of obtaining and running the meters. This biases the sample, and so no case can be made for their representivity. While this is a limitation, the information provided by the longitudinal nature of the dataset still presents rich information with relevant policy implications. The choice of installations is, however, independent of the research project and was handled strictly in a business context a long time prior to the conception of the research project. The self-selection process also accounts for the unbalanced nature of the data.

5.4 DATA DESCRIPTION

The final dataset comprises 22 hotels, with record periods between 88 and 2 127 days. There is a total of 3 034 rooms, with an average of 145 rooms and a standard deviation of 135.2 (the range is

from 15 to 641 rooms). This indicates that hotels in the dataset are very dissimilar when compared by size. In the dataset, there are 8 five star, 4 four star, and 7 three star hotels, and 95 percent of all hotels have at least one restaurant, a spa, and conference facilities, as is typical of quality hotels worldwide. This is expected given that they fall into the top three star grades on the grading scheme. A two-tailed t-test was carried out to assess if there are any statistically significant differences in the energy consumption of the hotels based on their star category and facilities available. The result of this test indicates that the mean consumption of respective groups is statistically and significantly different, which confirms that assessing the impact of each of these characteristics on electricity consumption is valuable.

A plot of the data over time for each hotel in the dataset showed that there is some variation in the outside temperature and humidity levels of the hotels. It is, however, expected that the weather data for certain locations will overlap as they get their weather information from the same weather station (as supplied by the South African weather services). This was found to be the case for some of the hotels, albeit the plot of the data indicates that there is enough variation that evaluating the impact of weather elements on energy consumption would be worthwhile.

5.5 ANALYSIS TECHNIQUE

To meet the stated objective of this research, and in consideration of the longitudinal characteristics of the available dataset, both descriptive analysis and econometric models using panel¹⁴ data methods were employed using STATA statistical software. When data has both time and cross-section dimensions, as is the case of this dataset, panel data techniques offer superior analysis as they allow for the exploitation of both dimensions to eliminate unobserved heterogeneity in the data that might otherwise bias results (Asteriou & Hall, 2011: 416). Some of the drivers of energy consumption identified from the literature (i.e. occupancy, hotel size, and climatic conditions) are evaluated within a hypothesis testing framework.

Additional potential drivers (i.e. hotel characteristics and tariff rate) are also controlled for and tested to evaluate their impact on energy consumption. The hotel characteristics evaluated are the presence of conference, spa and restaurant facilities. *A priori* expectations are that the presence of these facilities will drive consumption up significantly. The star grading and number of rooms in a hotel are also controlled for. It is expected that establishments with higher star gradings will have to provide higher comfort levels that require more energy, such as extra lighting and underfloor heating), and the higher the number of rooms, the larger the establishment size, and hence the higher its energy consumption. The impact of tariff rate on consumption is also evaluated because

¹⁴ See the following literature for background information on the econometrics of panel data (Asteriou & Hall, 2011; Baltagi, 2008; Baltagi & Chang, 1994; Cameron & Trivedi, 2005; Wooldridge, 2010).

establishments in the dataset, as well as across South Africa, face varying tariff structures. Also, although guests do not take energy cost into consideration in their energy consumption behaviour, the literature, as highlighted in Section 5.2 shows that consumption is not always primarily driven by guests, but by other hotel characteristics and by the consumption habits of hoteliers. Consequently, the following specific hypotheses were tested:

H0_A: Hotels' characteristics do not drive hotel energy consumption.

H1_A: Hotels' characteristics drive hotel energy consumption.

H0_B: Climatic conditions in the hotel surrounding areas do not drive hotel energy consumption.

H1_B: Climatic conditions in the hotel surrounding areas drive hotel energy consumption.

H0_C: Energy (electricity) tariff rates do not drive hotel energy consumption.

H1_C: Energy (electricity) tariff rates drive hotel energy consumption.

H0_D: Consumer-based occupancy does not drive hotel energy consumption.

H1_D: Consumer-based occupancy drives hotel energy consumption.

To test these hypotheses, the following regression equation for hotel h in time period t was estimated:

$$EC_{ht} = \alpha X_{i,ht} + \gamma Z_{ht} + \varepsilon_{ht}$$

where EC = energy consumption in hotel, X_i = primary independent variables of interest (hotel customer occupancy, electricity tariff rate, hotel's characteristics and surrounding climatic conditions), Z = hotel level controls that independently affect energy consumption, and ε_{ht} is the error term in the regression.

The use of daily consumption data allows for the capturing of seasonal effects in the model specifications run. Various panel model tests were run to determine the model best suited for the data. Given the panel nature of the dataset, a Hausman specification test was run to determine whether the Fixed Effects (FE) or the Random Effects (RE) model was best suited for the data. In this test, the null hypothesis tested is that both the FE and RE models are not correlated with other independent variables and hence would give coefficients that are similar and as such both are acceptable. Rejecting this null hypothesis indicates that due to the assumption of orthogonality between the RE estimator and the regressors of the RE model, which the FE model does not assume, the RE estimates will be biased and inconsistent, while the FE model will remain unbiased and consistent. A Hausman specification yielded a result of 0.9994, indicating that the

null hypothesis cannot be rejected. This implies that the assumptions of the RE model will give more consistent results.

The acceptance of the Hausman test indicates that the RE model is more consistent than the FE model, but does not indicate whether panel components exist in the data (i.e. that the error term is auto-correlated and homoscedastic). Where no panel component exists, both the simple Pooled Ordinary Least Squares (POLS) model and the RE model will both be efficient. The POLS model will, however, provide a better fit for the data as fewer degrees of freedom are lost (Asteriou & Hall, 2011; Wooldridge, 2010). To verify that panel effects indeed exist in the model and that the RE model specification provides a better fit for the model, the Breusch-Pagan Lagrange Multiplier (BP-LM) test, a two-tailed test of the strict exogeneity of the regressors, is run. The result of this test is a P-Value of 0.0000, indicating that the null hypothesis of strict exogeneity cannot be accepted and hence the panel model is best suited for the data.

The high-frequency occurrence of the dataset makes it plausible that auto-correlation might be present in the data (i.e. electricity consumption at time t would be correlated with electricity consumption at time $t-1$). To verify this, the Wooldridge (Wooldridge, 2010) – Drukker (2003) test for panel data auto-correlation was run and yielded a P-Value of 0.0000, indicating that there exists high first-order serial correlation in the data. Given that auto-correlation in the data would render standard models inconsistent, a Dynamic RE First Order Auto Regressive (AR(1)) model is run instead of a simple RE model. The standardised result of various specifications of the AR(1) model is presented in [Table 5.2](#).

Considering the high frequency of occurrence of the data points, it is plausible that consumption in the current time period (day t) is highly dependent on consumption in the preceding period (day $t-1$). If this characteristic exists in the data, the standard FE and RE models will yield biased and inconsistent results due to serial correlation. Serial correlation was hence tested for and confirmed in the data. A dynamic panel model that takes care of first order serial correlation (i.e. an AR(1) panel data model) is also run to yield more robust results. Following from Equation 5.1, the AR(1) model correcting for first-order serial correlation is as follows:

$$EC_{ht} = EC_{ht-1} + \alpha X_{i,ht} + \gamma Z_{ht} + \varepsilon_{ht}$$

where EC_{ht-1} is the first lag of energy consumption on itself, and other variables remain as described *a priori*.

For panel datasets with long time dimensions where t is allowed to increase to infinity, such as is the case with the dataset utilised in this study, the literature strongly suggests that the stationarity and poolability of the data be investigated (Baltagi, 2008; Eberhardt & Teal, 2008; Hsiao, 2004). Both the Im-Peraran-Shin (IPS) and the Fisher-type panel unit root tests are run on the dataset

used in this study, as they both account for the unbalancedness in the dataset. Results of both tests strongly suggest that the dataset is stationary and this result is consistent for both four and seven lag-length specifications.

Another concern associated with panel datasets with long time dimensions is that of poolability and cross-sectional dependence. The concern for poolability of the various cross-sections has to do with the assumption of the homogeneity of the slope coefficients of each individual cross-section (Baltagi, 2008; Hsiao, 2004), while the concern for cross-sectional dependence relates to the assumption of independent distribution of omitted variable effects across cross-sections (Hsiao, 2004). The properties of parameter estimates when the assumption of homogeneity and/or cross-sectional independence is violated has been widely studied, with various tests developed to verify these assumptions, and alternative models suggested for cases where the violation holds. Testing for homogeneity and cross-sectional independence in the data used in this study indicated that these assumptions were violated. Two of these models that correct for these violations in panel data are the Common Correlated Effects Mean Group (CCEMG) developed by Pesaran (2006) and the Augmented Mean Group (AMG) model developed by Eberhardt and Teal (2010). Various challenges¹⁵ associated with applying these models to the data used in this paper necessitated that the Dynamic RE model stipulated above is used for empirical analysis. The reliability of this model despite the questionability of the homogeneity assumption is supported by Baltagi (2008) who, after reviewing key studies on the poolability of panel time-series data, concludes that “the consistent finding in all these studies is that homogenous panel data estimators perform well in forecast performance mostly due to their simplicity, their parsimonious representation and the stability of the parameter estimates” (Baltagi, 2008: 224). Consequently, the Dynamic RE model, with correction for AR(1) disturbances using the Durbin-Watson correction for Auto-Correlation is used for this study.

Due to severe limitations with the data on occupancy for the hotels, the Dynamic RE model is not used to test the hypothesis on occupancy: simpler models are used, and the limitations and model descriptions are discussed in Section 5.6. All empirical results are discussed in the next section.

5.6 PANEL DATA RESULTS

The standardised results of running the Dynamic RE Auto Regressive Model with one lag (AR1 Model) detailed above is presented in [Tables 5.2](#) and [5.3](#).

¹⁵ Running the CCEMG model yields highly insignificant long-run estimates with very large standard errors. The firm specific results from the regression have mostly significant coefficient estimates but the signs on the coefficients are mostly wrong. Running the AMG model returns conformability errors. Correspondence with the author of the code and the AMG model, as well as the STATA codes for AMG and CCEMG models

Table 5.2: Standardised AR(1) regressions for all hotels (part A)

	1	2	3	4	5
	No control for seasons	Two Seasons Dummy	Summer Dummy	Winter Dummy	Four Seasons Variable
Average Temperature in °C	0.00 (3.06)***	0.00 (2.94)***	-0.01 (3.37)***	0.01 (6.37)***	0.00 (2.88)***
Relative Humidity in %	0.00 (0.71)	0.00 (0.76)	-0.00 (1.66)*	0.00 (2.32)**	0.00 (0.79)
Rainfall in mm	0.00 (4.14)***	0.00 (4.18)***	0.00 (4.26)***	0.00 (1.71)*	0.00 (4.18)***
Energy Charge in C/kWh	-0.10 (6.18)***	-0.10 (6.31)***	-0.13 (5.84)***	-0.10 (4.85)***	-0.10 (6.41)***
Time of Use Dummy	-0.14 (1.24)	-0.14 (1.23)	-0.17 (1.48)	-0.13 (1.18)	-0.14 (1.24)
Service Charge Dummy	-0.03 (0.24)	-0.03 (0.24)	-0.04 (0.32)	-0.03 (0.22)	-0.03 (0.24)
Demand Charge Dummy	-0.06 (2.58)***	-0.06 (2.60)***	-0.13 (2.51)**	-0.06 (2.07)**	-0.07 (2.66)***
Conference Facility Dummy	0.28 (1.92)*	0.28 (1.92)*	0.29 (2.01)**	0.29 (1.92)*	0.28 (1.92)*
Spa Facility Dummy	0.24 (2.32)**	0.24 (2.32)**	0.23 (2.26)**	0.25 (2.37)**	0.24 (2.31)**
Restaurant Dummy	-0.13	-0.13	-0.12	-0.13	-0.13
<u>Star Grading:</u>				(Omitted)	
Three-Star	(2.09)**	(2.08)**	(2.06)**	(2.10)**	(2.08)**
Four-Star	-0.22 (0.73)	-0.22 (0.73)	-0.21 (0.71)	-0.21 (0.70)	-0.22 (0.73)
Five-Star	0.79 (3.03)***	0.79 (3.03)***	0.76 (2.98)***	0.81 (3.05)***	0.79 (3.03)***
Number of Rooms	0.40 (2.96)***	0.40 (2.96)***	0.41 (3.10)***	0.39 (2.87)***	0.40 (2.97)***
0 if Summer; 1 if Winter		0.02 (4.19)***			
<u>Season:</u>				(Omitted)	
Autumn					
Winter					-0.02 (2.58)**
Spring					-0.04 (4.74)***
Summer					-0.04 (4.10)***
Constant	-0.45 (2.07)**	-0.46 (2.12)**	-0.45 (2.15)**	-0.45 (2.02)**	-0.43 (1.96)**
N	20,845	20,845	10,194	10,651	20,845

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Standard errors in parentheses.

Markus Eberhardt has indicated that the AMG and CCEMG models are not suitable for this dataset because the high frequency of the data results in the problem of volatility clustering.

Table 5.3: Standardised AR(1) regressions for all hotels (part B)

	6	7	8	9
	Autumn only	Winter only	Spring only	Summer only
Average Temperature in °C	0.02 (7.33)***	-0.00 (1.10)	0.00 (1.52)	-0.01 (6.39)***
Relative Humidity in %	0.00 (1.60)	0.00 (0.98)	0.00 (0.15)	-0.00 (2.03)**
Rainfall in mm	0.00 (1.14)	0.00 (1.06)	0.01 (3.06)***	0.00 (2.82)***
Energy Charge in C/kWh	-0.12 (3.47)***	-0.10 (4.12)***	-0.14 (5.69)***	-0.12 (3.75)***
Time of Use Dummy	-0.17 (1.35)	-0.12 (1.09)	-0.10 (0.88)	-0.14 (1.13)
Service Charge Dummy	-0.04 (0.29)	-0.02 (0.19)	-0.06 (0.48)	-0.03 (0.29)
Demand Charge Dummy	-0.11 (1.68)*	-0.05 (1.79)*	-0.14 (2.67)***	-0.10 (1.24)
Conference Facility Dummy	0.32 (2.00)**	0.28 (1.91)*	0.22 (1.52)	0.28 (1.88)*
Spa Facility Dummy	0.27 (2.41)**	0.24 (2.39)**	0.22 (1.98)**	0.23 (2.24)**
Restaurant Dummy	-0.13	-0.13	-0.09	-0.12
<u>Star Grading:</u>				
Three-Star	(2.10)**	(2.13)**	(1.53)	(2.02)**
Four-Star	-0.23 (0.71)	-0.22 (0.74)	-0.18 (0.52)	-0.21 (0.70)
Five-Star	0.82 (2.95)***	0.78 (3.05)***	0.45 (1.61)	0.76 (2.93)***
Number of Rooms	0.40 (2.77)***	0.39 (2.93)***	0.55 (3.94)***	0.40 (2.96)***
0 if Summer; 1 if Winter				
<u>Season:</u>				
Autumn				
Winter				
Spring				
Summer				
Constant	-0.43 (1.88)*	-0.44 (2.09)**	-0.33 (1.37)	-0.46 (2.13)**
N	5,593	5,058	4,867	5,327

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Standard errors in parentheses.

To make recommendations for policy and practice, it is necessary to compare the sizes and significance of each of the dependent variables. The standardisation of the results reported in [Tables 5.2](#) and [5.3](#) allows for comparability of the coefficients despite the variance in their units of

measurement (non-standardised results are reported in [Tables B.1](#) and [B.2](#) of Appendix B). These results indicate that, *ceteris paribus*, hotel characteristics – captured by its star grading, number of rooms, and facilities offered – are significantly the most important determinants of consumption in hotels, followed by the electricity billing cost and characteristics, and then by weather conditions. A detailed analysis of the regression results follows, according to the variable of interest.

5.6.1 Climatic conditions and energy consumption

The role of climatic conditions in energy consumption in hotels is evaluated for three variables: temperature, humidity and rainfall. A ‘seasons’ variable is constructed using the ‘month’ variable in the dataset. South Africa is in the southern hemisphere, where summer is between December and February. However, “One finds disagreement on the starting dates of the seasons at both the scientific and the lay level. There are however three basic ways in which starting dates may be assigned. South Africa does not really experience four distinct seasons. Throughout South Africa the transitional seasons of Autumn and Spring tend to be very short. Most analysis of climate is done using the assumption that January is mid-summer and July is mid-winter” (South Africa Weather Services, 2015).

Based on the above, a four-season variable was constructed for analysis, with autumn falling between March and May, winter between June and August, spring between September and November, and summer between December and February. A two-season variable was also constructed by aggregating summer and spring into one “summer” dummy, and autumn and Winter into one “winter” dummy.

In all panel regression specifications in [Tables 5.2](#) and [5.3](#) where a variable for season is included (columns 2 and 5), the variable capturing “seasons” is significant for both the two-season and the four-season specifications, indicating that the energy consumption does vary by season. From specification 2, the coefficient on the dummy season variable indicates that energy consumption is significantly lower in winter than in summer, *ceteris paribus*. The four-season categorical variable in specification 5 indicates that energy consumption is higher in summer than in autumn, and lower in winter and spring than in autumn.

The regression results in [Tables 5.2](#) and [5.3](#) are further specified based on seasons. While specification 1 (column 1) does not control for seasons, specifications 2 and 5 control for the dummy season and the categorical season variable respectively. Specifications 3 and 4 report results for regressions restricted to the dummy summer and winter seasons respectively. Specifications 6, 7, 8, and 9 similarly restrict the regressions to autumn only, winter only, spring only, and summer only respectively.

Temperature and energy consumption: In the literature, results have shown that the outdoor atmospheric temperature significantly affects a building's energy consumption, primarily through HVAC (Priyadarsini *et al.*, 2009; Shiming & Burnett, 2002). The results of the regression of daily energy consumption (in kWh) on average daily outdoor temperature (in °C), as shown in [Tables 5.2](#) and [5.3](#), indicates that, holding all else constant, increases in the average outdoor temperature have a highly significant causal impact on energy consumption in the hotels in the dataset. This impact also varies highly with seasonality.

Results from specifications 1, 2, and 5 indicate that irrespective of the season, temperature has a positive and significant causal effect on energy consumption in the hotel buildings in the dataset, *ceteris paribus*. However, when the data is restricted to specific seasons, the sign of the temperature effects become negative but still significant in winter, irrespective of whether a two-season or four-season control is used.

These results are consistent with anecdotal expectations given that it would be expected that as temperature rises in summer, the air conditioning systems in buildings will have to work harder to bring indoor temperatures down to comfortable levels, hence the positive and significant result. In winter, however, temperatures are generally low and hence buildings require the heating system to increase the temperature to comfortable levels. Consequently, rising temperatures in winter mean that heating systems would not need to work as hard, leading to a decrease in energy consumption, hence the negative coefficients observed in winter. The results for autumn and spring also follow anecdotal expectations where it would be expected that the HVAC systems do not need to work as hard as in the extreme seasons of winter and summer, as such, the impact of temperature should be lower, if not minimal, compared with the extremes.

Relative humidity and energy consumption: Interpretation of the coefficients of relative humidity must be done with care as the definition of relative humidity is dependent on external factors. Mackintosh (2001) gives a straightforward definition of relative humidity as “a measure of the water vapor content of the air at a given temperature. The amount of moisture in the air is compared with the maximum amount that the air could contain at the same temperature and expressed as a percentage.”

Following this definition, it can be inferred that as the temperature goes down, the relative humidity goes up, and *vice versa*, given that there is no change in the moisture content (Hardwick Jones, Westra & Sharma, 2010; Jenkins, 2005; Lawrence, 2005; Mackintosh, 2001; Skilling, 2009). Anecdotal evidence would suggest that the moister the air, the lower the evaporation rate, and as such, the warmer the outdoor and indoor “temperature feel”. If this is indeed the case, results of the regression of energy consumption on relative humidity will be expected to follow the same pattern as that for temperature. Specifications 6 to 9 in [Tables 5.2](#) and [5.3](#) show that this is indeed the

case: the seasonal coefficients of humidity and temperature have the same sign, although the significance levels differ.

Rainfall and energy consumption: The impact of rainfall on energy consumption in buildings would be expected to affect building energy consumption via its impact on the outdoor moisture content, outdoor temperature, and occupancy. Although the specifications in [Tables 5.2](#) and [5.3](#) do not control for building occupancy, the coefficient of rainfall in most columns (1 to 5, 8, and 9) indicate that after controlling for the outdoor temperature and relative humidity, rainfall has a positive and significant impact on energy consumption in buildings.

5.6.2 Energy consumption and tariff rates

The energy (electricity) tariff rate in South Africa varies with the billing utility in charge of the area in which an entity is located and the tariff scheme such an entity faces. The tariff schemes are dependent on various factors, including but not restricted to, the property use (i.e. residential, commercial, industrial or charity) and the average consumption of the property. The tariff rate faced by an entity is typically broken down into a service charge, an energy charge and a demand charge. These fees change every six months. However, this categorisation is not consistent across all tariff schemes: some tariff schemes apply all three charges, some apply the service charge and the energy charge, while others apply the demand charge and energy charge. This variation in the charge type imposed exists in this dataset, as such only the cost figures for the energy charge is included in the regression specifications in [Tables 5.2](#) and [5.3](#). The energy charge is also preferred for capture of the impact of cost because whereas the service charge is a fixed charge payable per utility account (irrespective of consumption), and the demand charge is a seasonally differentiated fee (based on the peak energy demand registered during the month), the energy charge is a fixed charge directly dependent on the consumption per month. It is thus a more direct reflection of the direct cost of consumption. However, to capture the effect of the demand charge and service charges, a dummy variable is created for each charge type, and takes on the value of one if the establishment faces the charge type, and zero if it does not.

The regression results in [Tables 5.2](#) and [5.3](#) indicate that the energy charge is a negative and highly significant driver of consumption across all model specifications. It also reflects that this effect is higher in summer when temperatures are high and tourist inflow into the country is high, as opposed to winter. [Tables 5.2](#) and [5.3](#) also shows that imposition of a demand charge to check peak consumption and load of establishments is effective in driving down consumption. The service charge, which does not vary with consumption, returns insignificant coefficients, as is expected.

Some tariff schemes are billed on a time-of-use (TOU) basis and this is captured by a dummy that equals one if the hotel faces a TOU tariff scheme and zero otherwise. Typically, a TOU scheme

implies that three different tariff rates apply to the customer depending on the time of the day: peak, off-peak and standard rates. The timing for these rates can vary with the billing utility implementing them. A quarter (25%) of the hotels in the dataset are billed on a TOU basis. In [Tables 5.2](#) and [5.3](#), the coefficient on the TOU variable is negative and insignificant in all regression specifications, suggesting that this system is not effective in curtailing consumption in hotels in this dataset.

5.6.3 Hotel characteristics and energy consumption

Hotel characteristics in the dataset are captured by the availability of spa, conference, or restaurant facilities in the hotel, the star-grading of the hotel, and the number of guest rooms. The coefficients on the facilities offered by the hotel are highly significant in the majority of the regression specifications. The results indicate that, as expected, the presence of a spa and conference facilities increases the energy consumption of the hotel, *ceteris paribus*. The coefficient is, however, negative for the variable capturing availability of a restaurant facility. This result is puzzling, but the unexpected sign can be attributed to the fact that in the dataset, only one of the hotels does not have a restaurant. Hence, the 20:1 ratio biases the result and yields the implausible coefficient.

Similarly, the coefficient of the “number of guest rooms” variable follows the expected sign in all regression specifications, indicating that holding all else constant, the larger the hotel in terms of number of guest rooms, the larger its electricity consumption. The coefficients on the star-grading categorical variable, however, indicate that there is no significant difference between the energy consumption of three- and four-star graded hotels, but five-star graded hotels consume significantly more electricity.

5.6.4 Energy consumption and occupancy rates

Anecdotally, it is assumed, by both stakeholders in tourism accommodation and the layman, that guest occupancy of tourism accommodation will drive energy consumption as the energy they utilise is on account of these guests. However, as seen in the literature review, some studies in the past have indicated that this might not be the case (Priyadarsini *et al.*, 2009). Results of the Pooled Ordinary Least Square (POLS) regression of energy consumption in hotel buildings are presented in [Tables B.3](#) and [B.4](#) in Appendix B. The dataset used in these regressions differ from that used in the regressions in [Tables 5.2](#) and [5.3](#) in that the number of hotels is limited to four as opposed to 22 used in previous regressions. This data limitation is due to hotels’ reluctance to release confidential ‘occupancy information’. Although the dataset is a daily unbalanced panel, results of a Hausman specifications test and a Breusch-Pagan Lagrange multiplier test for panel effects suggest that the dataset lacks enough characteristics to be analysed as a panel due to the homogeneity in the stations that provide the weather data for three of the four hotels, resulting in

very little variation in the climate variables. The results of POLS regressions run on this data was hence highly inconsistent and inconclusive.

To further investigate the impact of occupancy (in particular) on consumption, separate model specifications (not shown or discussed here) using individual time-series Autoregressive Distributed Lag (ARDL) models were run for each of the four hotels, and the Granger causality of the occupancy, temperature, and energy charge variables, respectively, were evaluated to ascertain the significance/usefulness of each variable in predicting energy consumption. The results are not very conclusive as in three of the four hotels, occupancy is a significant predictor of consumption and in another three of the four hotels, temperature is not significant in predicting consumption. The energy charge variable does not vary for one of the hotels, and is hence omitted, but is significant in predicting consumption in two of the three other hotels.

Furthermore, when an ARDL (1,0) model of energy consumption on occupancy, temperature, and energy charge is run for each individual hotel, the occupancy variable returns a positive and significant coefficient in three of the four hotels. In the fourth hotel, the coefficient is positive but insignificant. When comparing the sizes of the independent variables run, the temperature variable outperforms occupancy in all four hotels evaluated. The results of the ARDL (1,0) model as well as the Granger Causality tests suggest that occupancy can be a useful predictor of energy consumption in the majority of the four hotels, and that the relationship between the two variables is positive.

5.7 DISCUSSION

Results of the data analysis indicates that hotel characteristics captured by star grading, number of rooms, and facilities offered are significantly the most important determinants of consumption in hotels. This is followed by the electricity billing cost and characteristics, and then by weather conditions.

The general implication for policy is that in addressing electricity demand and consumption management in hotels, especially quality hotels, focus should first be directed at the facilities and services offered on the hotel's premises. The result in [Tables 5.2](#) and [5.3](#) indicates that a hotel with more rooms will consume more electricity than a hotel with the same characteristics, but with fewer rooms. Similarly, the presence of a spa, conference facilities or a restaurant significantly increases the energy consumption of that hotel. The implication of this for hotel managers and administrators is that conscious attention needs to be given to the energy consumption activities of these facilities to assess opportunities for consumption reduction. This could be in the form of the installation of more energy-efficient devices in these facilities or behavioural modification in the routine processes of these activities. An example would be the installation of smaller stoves in restaurant kitchens

which consume less energy. These smaller stoves can be used when customer numbers are low as opposed to powering up a big stove to service low customer numbers. Another example involving behaviour change would be for a hotel that offers conference services to ensure that the conference venue is not left in a constant ready state, but turned down completely whenever it is not in use. This would apply mostly to establishments which keep their conference venues in a ready state (with the lights and air conditioners in full swing) even at the close of day of a conference so that the following day, minimal work needs to be done to ready the conference venue.

Evidence is also provided of the significance of tariff in curtailing consumption at these hotels. This confirms the findings of Chapters 3 and 4 where cost considerations were identified as the key motivation factors, as well as barriers, to RM and ES implementation in the TAI. While the role of electricity pricing on tourism accommodation energy consumption has not been adequately investigated in the literature, the result of this study is consistent with the findings in the household sector where electricity tariff rates have been shown to be negatively associated with energy consumption (Boonekamp, 2007). This indicates that the country's energy utility can exploit electricity pricing to curtail the electricity consumption habits of the industry. An example of this would be the implementation of price discrimination based on energy use intensity. In such a situation, a higher energy use intensity would attract a higher electricity tariff rate and *vice versa*. This would encourage establishments to implement energy efficiency and conservation measures so as to be able to approach Eskom with indications of improved energy use intensities in order to take advantage of lower tariff rates. This example presupposes the existence of an industry energy consumption/efficiency benchmark which can be developed in conjunction with the Tourism Grading Council.

The role of weather was also investigated: although its impact on energy consumption does not appear to be very pronounced, there is overwhelming evidence of the variation in consumption by seasons, especially when comparing the seasonal extremes of winter and summer to the more moderate seasons of autumn and spring. This suggests that in the design and construction of tourism accommodation establishments, in addition to functionality and guest comfort, owners and managers should take into consideration green building standards that cater to the impact of extreme weather conditions (see Vierra 2014) for details of various global green building standards). The ARDL (1,0) model used to evaluate the impact of occupancy provides useful insight into the role of occupancy as a driver of energy consumption in hotels. While these results have limited interpretations given the time-series nature of the dataset used, they do indicate that occupancy can be a positive, significant driver of energy consumption, although the outdoor temperature is often a stronger driver of consumption.

5.8 CONCLUSIONS AND RECOMMENDATIONS

This study set out to provide an understanding of energy consumption in South African hotels by profiling the factors that contribute to consumption using an unbalanced panel dataset, made up of actual consumption figures for certain hotels in South Africa for periods ranging from 4 months to 66 months. Specifically, the study intended to evaluate the role of building characteristics, electricity tariffs and climatic conditions in determining consumption, and model the relationship between occupancy and consumption. The evaluation of results from a Standardised Dynamic Random Effects model following an AR(1) process indicates that in policy and practice design for demand side management of energy (especially electricity) resources at hotels, the details of the energy consumption of the facilities and services offered at the hotel should be the first point of call. Also, a hotel with more guest rooms will consume more electricity than one with fewer.

Also of importance is the energy consumption during different seasons. The variation in the results by season indicates that seasonality should be accounted for in policies that aim to address energy consumption, even in a country such as South Africa where the four seasons are not very distinct. The implication for building design lies in the need to factor in the strain on energy resources during extreme weather, at the phase of building design and construction. The role of tariff rates in regulating consumption is also highlighted: price regulation plays a significant role in curtailing consumption of electricity, even in high-end hotels. The evaluation of the price elasticities in further studies will shed more light on the role of prices, and also how such prices can be manipulated in policy to maximise their impact of consumption behaviour.

Although severe data limitations with occupancy limit analysis of the role of occupancy in the electricity consumption of the hotels in the dataset as robustly as other variables, the findings from the models employed indicates that occupancy can be a positive, significant driver of energy consumption, although the outdoor temperature is often a stronger driver of consumption. However, given that this occupancy hypothesis was unable to be fully and robustly tested, the ability to make conclusive inferences is limited. This however poses an opportunity for future research endeavours.

CHAPTER 6 :

The Comfort of the Future: The Role of Social Norms in Constructing the Ideal towards Sustainability

6.0 PREFACE

The stated objective of this thesis is “to better understand resource (energy and water) consumption in the tourism accommodation industry, and on the basis of that improved understanding, to propose and test ways of promoting sustainable consumption of resources in the industry.” Earlier chapters have, within the framework of ES, evaluated the context of energy and water consumption in TAEs. Amongst the various determinants of adoption of resource management and environmentally sustainable practices in these TAEs identified in earlier chapters, a key barrier to adoption identified was ‘the service nature of the industry’. This challenge highlights the constraints faced by TAE managers as they struggle to balance the need to be sustainable with their objective of providing comfort for their guests. To address this challenge, a solution to incorporate ES in these establishments is proposed. This solution is based on the argument put forward by Shove (2003a,b, 2014) and Chappells (2005) that comfort is largely socially constructed, contradicting the positivist approach which emphasises the biological and psychological nature of comfort. Although Shove does not focus on tourism, her argument is adopted and detailed in Section 6.2. The proposed solution in this chapter is targeted at reducing energy consumption in these TAEs, but with the possibility of expansion to water saving initiatives as well.

In designing this solution, the findings from the literature, and Chapters 4 and 5 of this thesis, which indicated that HVAC is one of the biggest energy drivers in TAEs, are incorporated. Managers of these TAEs in South Africa are however challenged with addressing this driver as it often requires building retrofits or the purchase of new technology, both of which are expensive. This challenge is more severe in smaller TAEs who struggle with funding challenges and those in older buildings which require extensive retrofits. This study hence proposes the use of social normative prompts/nudges, a tool of behavioural economics, to modify behaviours associated with HVAC usage, and consequently reduce energy consumption from HVAC systems. The advantages of such behavioural intervention is that the implementation cost is much lower than that of alternative solutions and the potential payback period is short. This implies that small TAEs, as well as those operating in older buildings, can easily implement this intervention to achieve consumption reduction.

6.1 INTRODUCTION

In hotels, space conditioning (heating/cooling, ventilation and air-conditioning – otherwise known as HVAC) has been identified as the largest single end-user of energy in an average hotel (Hotel Energy Solutions, 2011b). The importance of targeting energy efficiency interventions HVAC systems, in line with influencing overall energy consumption in hotels, is hence highlighted. While the role of renewable energy options and technological and architectural interventions in reducing overall energy consumption in hotels cannot be over-estimated, the importance of *behavioural interventions* has also been highlighted in many studies, including but not restricted to the hospitality industry, and the success rates have been varying but highly positive (Hotel Energy Solutions, 2011a; Allcott & Mullainathan, 2010; Ferraro & Price, 2013; Schultz et al., 2008).

The importance and effectiveness of simple behavioural measures, such as pre-setting the maximum and minimum room temperature levels to acceptable temperatures, has been highlighted in the literature (Simpson, Gössling, Scott, Hall & Gladin, 2008; Hotel Energy Solutions, 2011a). The role of hotel guests in contributing to space conditioning consumption, and hence improved energy efficiency is further stressed: “the energy saving potential of hotels is significant; especially when a large part of the energy consumption is due to unnecessary loss and wastage. For instance, guests are frequently given full control over thermostat settings and individual air conditioning units, and they adjust these with little or no concern for energy conservation” (Hotel Energy Solutions, 2011a: 9). TAEs are, however, challenged as they struggle to find effective means to modify guests’ behaviour without compromising their comfort and satisfaction experiences (Kasim, 2007; Rogerson & Sims, 2012). This is because, in the hospitality industry, success is dependent on customer loyalty and satisfaction, which are directly linked and are a function of service quality (Cronin, Brady & Hult, 2000; Kandampully & Suhartanto, 2000).

The use of the behavioural economics tool of non-price interventions, in the form of social normative prompts and nudges, to modify hotel guests’ behaviour has been highlighted and tested (using various message framing techniques) in the literature (Cialdini, 2003, 2007; Cialdini, Demaine, Sagarin, Barrett, Rhoads & Winter, 2006; Goldstein *et al.*, 2008; Morgan & Chompreeda, 2014; Schultz *et al.*, 2008; Shang *et al.*, 2010). These studies have found successful indications of the superiority of social norms in inducing behavioural modifications when compared to traditional environmental appeals. These studies have, however, focused on towel and linen reuse policies, because the response behaviour of the guests can be easily monitored and measured within this initiative. The effectiveness of these tools of behavioural economics in sustainable initiatives that directly impact the comfort experience of guests has not been studied in the literature, due to the difficulty in observing guests’ behaviour while they are in the rooms due to privacy and comfort concerns. To circumvent this challenge, the study proposes the use of non-invasive information technology (IT) to observe hotel guests’ behavioural responses.

The role of IT in tourism has been widely investigated. IT has proved effective as a tool for data collection, cost reduction, understanding customer preferences, improved service delivery, and improved customer experience (Law, Leung & Buhalis, 2009; Singh Abhi & Rana, 2015). While the reference to IT in the tourism literature often focuses on the internet (Singh Abhi & Rana, 2015), this study proposes the use of an information collection and storage technology called a Temperature Data Logger (TDL). TDLs have a wide application, including temperature monitoring for agriculture, horticulture and environmental studies, food and medical storage, and transportation. It will, however, be adopted in this study to monitor how hotel guests' temperature settings vary with various behavioural messages placed in the rooms. This study aims to provide further evidence of the superior effectiveness of social normative prompts over environmental prompts on the compliance behaviour of hotel guests using TDL technology.

The contribution of this study to the existing body of knowledge is twofold: 1) it verifies to what extent thermal comfort is socially constructed by providing evidence of the effectiveness of previously tested tools descriptive social norms in modifying hotel guests' environmental behaviour; and 2) It contributes to the findings of previous studies on the effects of social norms on individual private behaviour, such as hotel guests' towel reuse behaviour, and demonstrates that these findings extend to guests' room temperature setting behaviour. These contributions help better understand the preferences of hotel guests and provide useful insights for the design of sustainability-centred intervention programs that affect hotel guests' comfort levels.

The rest of this chapter is structured as follows: Section 6.2 provides the theoretical and conceptual lens via which this study is approached. Section 6.3 provides a brief review of relevant literature in order to locate this study within the context of previous studies on hotel guests' environmental behaviour. Section 6.4 details the nature of the data, methods of analysis used, and empirical results of the study. A discussion and the policy implications of these results are presented in Section 6.5, and Section 6.6 concludes the chapter and makes recommendations for further studies.

6.2 THE SOCIAL CONSTRUCTION OF THERMAL COMFORT – THEORETICAL AND CONCEPTUAL UNDERPINNINGS

To address the challenge of the service nature of the TAI which limits TAEs from implementing ES initiatives due to their concern for guests' comfort, this study adopts the approach to comfort postulated by Elizabeth Shove in many of her works. Shove (2003b,c) addresses what she calls the three Cs – Comfort, Cleanliness and Convenience, which can be argued to be three key pillars in the TAI. Although her studies and arguments regarding the three Cs were not focused on the TAI but on society as a whole, she demonstrates the implications of the current trends in these Cs for the challenge of climate change and ES.

Arguing from a social constructionist perspective, Shove suggests that instead of focusing solely on improving the eco-efficiency of technological equipment, the focus should be on understanding and addressing the specification of the services represented in and by the three Cs, and the possibility of modifying the current trend (Shove, 2003b). Focusing on the indoor thermal dimension of comfort, the showering dimension of cleanliness, and the frozen food dimension of convenience, Shove traces the development of these activities and services over time, examining what they represent for the three Cs, and how they are “intimately linked in reproducing what people take to be normal and, for them, ordinary ways of life” (Shove 2003b: 395). From a sociological perspective, she expounds the systemic relationship between such everyday life and the discourse of sustainability.

Although not explicitly stated in her works, she adopts the social constructionist approach, and demonstrates, via these services and activities, how the three Cs are largely socially constructed via various phases of evolution, and hence have a potential for evolving from their current environmental-threatening pattern to more sustainable and environmentally preserving patterns. Subsequent sections examine the social constructionist approach and demonstrate the way in which Shove employs it in deconstructing the evolution of the three Cs.

6.2.1 The social constructionist approach

According to Gergen (1985: 266), one of the earliest scholars in the Social Constructionist movement, “Social Constructionism views discourse about the world not as a reflection or map of the world, but as an artefact of communal interchange”. This approach arose to challenge the then conventional positivist approach to discourses which emphasised the “importance of the biological and physiological substrate in the determination of specific emotions” (Kemper, 1981: 336). The social constructionist approach views practices in the world as largely determined by social norms, and suggests that there is ‘great plasticity’ to human behaviour, such that social and cultural norms can determine, almost exclusively, appropriate and acceptable human behaviour and actions, and the construction of these by humans (Kemper, 1981: 337). Consequently, what is viewed as normal in both physical and social reality is ‘value-based’, depending on historical events, economic contexts, and socio-political backgrounds and frameworks, such that “there is no normality outside of a particular context” (Freud, 1999: 333). This indicates a linking between the socio-economic, socio-political, ethical and moral aspects of human life and standards of normality, all of which are time-, era- and geography-dependent.

According to Gergen (1985: 266), at the “metatheoretical level”, the social constructionist approach holds one or more of the following four assumptions: 1) That “what we take to be experience of the world does not itself dictate the terms by which the world is understood” (Gergen, 1985: 266); 2) “The terms in which the world is understood are social artefacts, products of historically situated

interchanges among people" (*ibid.*, 1985: 267); 3) "The degree to which a given form of understanding prevails or is sustained across time is not fundamentally dependent on the empirical validity of the perspective in question, but on the vicissitudes of social processes (e.g., communication, negotiation, conflict, rhetoric)" (*ibid.*, 1985: 268); and 4) "forms of negotiated understanding are of critical significance in social life, as they are integrally connected with many other activities in which people engage" (*ibid.*, 1985: 268).

These assumptions imply that "knowledge is not something people possess somewhere in their heads, but rather something people do together" (Gergen, 1985: 270), and is hence constructed and not created (Andrews, 2012). As such, human actions, reactions, and behaviours depend critically on their cognitive perceptions of the world – that is, how they cognitively process information presented or observed, rather than on the "world as it is" (Gergen, 1985: 269). Consequently, in answering questions about the whys of human actions in order to explain them, the focus shifts from the "psychological state or process" to the interrelationships amongst individuals (Gergen, 1985: 271). A key implication of this, as implemented and demonstrated repeatedly by Shove (2003b,c) and Chappells and Shove (Chappells & Shove, 2005) is that "professional agreements become suspect", for example, internationally adopted standards of thermal comfort such as the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 55 (Shove, 2003b); and "normalised beliefs become targets of demystification", for example Shove's (2003a: 26) inquiry into "how is it that so many people spend their days in an environment that wavers little around 22 °C and that stays the same all year round, whatever the weather outside".

Since the introduction of the approach decades ago (see Gergen, 1985 and Andrews, 2012 for a detailed history of its development and progression over time), it has been widely adopted in various fields including sociology, psychology, social work, education and literacy, gender and sexuality studies, management studies, and the medicinal and health sciences (see Cohen, Duberley & Mallon, 2004; Burningham & Cooper, 1999; Shotter, 1997; Sayer, 1997; Kitzinger, 1995; Holman, Pavlica & Thorpe, 1997; DeLamater & Hyde, 1998; Houston, 2001; Siebers, 2001; Rust, 1993; Bury, 1986; Green & Stiers, 2002; Freud, 1999). In its various discourses, various concepts and unique nomenclature arise and are debated, such as the exogeneity and endogeneity of knowledge (Gergen, 1985), the subjectivity and objectivity of reality (Andrews, 2012), the role of language, the dynamics of power and privilege in constructionism in society, and the hierarchical structures and norms which are critical to constructionism (Green & Stiers, 2002). Exploring these is, however, outside the scope of this study. Despite the diverse adoption of the approach and its evolution over time, like any other approach, social constructionism has its critics (see Sayer, 1997; Cromby & Nightingale, 1999; Burr, 1998; DeLamater & Hyde, 1998; Houston, 2001; and Andrews, 2012 for some of the criticism of the approach). Regardless, this study's

interest in the theory is as it relates to Shove's discussion and elucidation of comfort as a social construct.

6.2.2 Thermal comfort as a social construct

ASHRAE Standard 55-2010 defines thermal comfort as "that condition of mind that expresses satisfaction with the thermal environment and is assessed by subjective evaluation" (ASHRAE, 2010: 3). The "subjective evaluation" qualifier captures ASHRAE's findings after extensive research that "because there are large variations, both physiologically and psychologically, from person to person, it is difficult to satisfy everyone in a space. The environmental conditions required for comfort are not the same for everyone" (ASHRAE, 2010: 4). Despite acknowledging this difficulty, ASHRAE still adopts the positivist approach, in that they emphasise the physiological and psychological definition of thermal comfort. Based on this definition, they have conducted extensive field experiments to "define conditions that a specified percentage of occupants will find thermally comfortable" (ASHRAE, 2010: 4), and based on these definitions, they have produced standards which guide building designs and HVAC systems worldwide (Shove, 2012; Walker, Shove & Brown, 2014).

Shove argues against this seeming positivist approach and demonstrates that, consistent with the second and third metatheoretical assumption of social constructionism, at its core, this idea is not only unnatural, but is also a product of socially constructed ideals designed to serve commercial interests. In demonstrating this, she emphasises how the current definition and need for comfort and energy was invented, showing how changes in the definition of comfort has varied over time. She further highlights the irony of how the objective of creating the most natural environment for human comfort has resulted in the complete annihilation of nature from the process, with emphasis now being on "shielding people from nature".

In her analysis, Shove proxies for comfort using thermal comfort. However, she acknowledges this and argues for it stating that "there is more to comfort than space heating and cooling, but these two processes account for the lion's share of domestic energy use" (Shove, 2003b: 396). She states however that this has not always been the case. Tracing the word comfort to its Latin origin as the verb '*confortare*', Shove argues that comfort was first defined in relation to the state of the mind and associated with physical strength, mental strength, and psychological encouragement or consolation (Shove, 2003a: 23). Over time, the definition of comfort became more focused on materiality, and in this sense, comfort was seen as an achievement representing a form of middle ground between necessity and luxury. Consequently, the pursuit of comfort led to the reconceptualisation of values, the redesigning of the physical material environment, and the modification of behaviours, emphasising the physical characteristic of comfort, as opposed to the mind-centred characteristic. This, Shove says, "legitimised new forms of consumption" and

“provided a useful benchmark for social reform, offering a point of reference against which to assess ‘normal’ societal entitlements.” (Shove, 2003a: 24). This “reformulation of comfort as an achievement emphasised a physical nature associated with entitlements, which exists independent of the means and technologies by which it is produced and known” (Shove 2003a: 24) was, however, flawed as the definition of these entitlements remained unclear and ambiguous, and the question of who defines it, as well as when it is achieved, remained vague.

Shove theorises that this gap was filled by a further redefinition of comfort as an ‘attribute’ in line with the materialistic orientation. In this definition, comfort became viewed as a material attribute of products and objects such as furniture and clothing, with emphasis being laid on quality (Shove, 2003a). However, there was still a gap in that quality remained ambiguous and undefined. This, Shove argues, shaped the space for designers and manufacturers of products and objects to create definitions of quality that reflected various comfort levels/attainments. To do this, designers and manufacturers structured their products in such a way that there were various standards of quality, and each standard could be sold as a component of the products they offered. In this, the commoditisation and commercialisation of comfort as a material attribute was birthed, with various standards being developed, associated with varying levels of quality.

However, as far back as 1969, the idea that ‘what is thermally comfortable’ can be standardised has been contested. Cooper (1982), quoting Banham (1969: 277), argues that “there are no absolute environmental standards for human beings because: ‘... the environmental needs of the whole living man are variable in sickness and in health, youth and age, education and culture, physical and social circumstances.’; Nor are standards relative simply in the sense that they may alter over time.” Likening comfort to other scarce commodities and resources in societies, Cooper (1982) and Shove (2003c, 2012) posit that thermal comfort standards are a service industry commodity, promoted and sold by the HVAC industry, who are regulated by engineers such as those of ASHRAE. Abstracting from the commodity construction of thermal comfort, Cooper argues that thermal comfort is, in reality, a “social construct which reflects the beliefs, values, expectations and aspirations of those who construct them”, and as such is relative and subject to change, like the factors it reflects (Cooper, 1982: 270).

In line with Cooper’s argument, Shove (2003b) calls into question the quantification and standardisation of thermal comfort by the reminder that for thousands of years, humans have lived in tropical, arctic and arid regions of the world and have had to cater to their thermal comfort needs given the vulnerability of the physical human body. The management of comfort hence predates the modern standardisation attempt by thousands of years, as humans have had to protect themselves using “shelters ranging from the thin fabric of a tent to the thick ice blocks of an igloo, [and] have found ways of modifying the thermal variability of the outdoor environment” (Shove, 2003a: 29). Tracing the evolution of conceptualisations of thermal comfort over time, she

questions the validity of the “heat balance model”, which is the basis for many HVAC standardisation protocols, and its assumption that “people will report being comfortable given the right environmental conditions” (Shove, 2003a: 29). Enshrined in this assumption is the idea that there exists the “perfect environmental condition”, that humans are “passive recipients of thermal stimuli”, and that once the perfect environment is identified, it can be replicated indoors (*ibid*, 2003a: 29). This, she argues, led to the search for the perfect environmental condition – such as the “best of the beach” or the “fresh breeze of a mountain resort” (Shove, 2003a: 30). The search was, however, not too long as it was discovered that many varying factors, beyond the environment, contribute to what makes an individual feel comfortable.

This however, did not mean the end of the pursuit of indoor thermal control. With the discovery in the 1920s that it was possible to reproduce, and hence control, certain parameters, such as temperature, humidity, and ventilation, the quest for thermal comfort standardisation continued (Chappells & Shove, 2005; Shove, 2003b; Shove, 2003a). Architects, engineers, building scientists and designers were all the more interested in quantitatively identifying and creating the optimal indoor environment. Over time, standards such as ASHRAE-55 and ISO-7730 were developed, with narrow definitions of thermal comfort based on quantitative computations with input from field studies. In emphasising the position of these standards more as commodities than as practical reflections of reality, Chappells and Shove (2005) contrast the trend in the 1900s which emphasised the importance of fresh air for the healthy development of an individual, with the current trend that emphasises limiting exposure to natural weather elements to improve productivity. This reversal of convention, they argue, led to an explosion in the market for artificial ventilation, such that HVAC systems based on the prescribed standards are “bought and sold in places as climatically varied as Norway and Singapore” (Chappells & Shove, 2005: 34). This emphasises the paradox in the precise definitions of comfort generated by scientific research, and points to the ‘self-fulfilling’ nature of these standards as they, increasingly by these standardisations, construct and reproduce ideas and ideals of normality.

Shove (2003b,c), hence, concludes that the normalisation of the need for air conditioning is unnatural, and a product of a series of events, processes and interactions which have yielded a specific definition of comfort, which over time has become reified and reproduced. This reproduction is further associated with increasing consumption of energy resources (such as fossil fuels) and release of waste by-products and side-products (such carbon dioxide (CO₂) and chlorofluorocarbons (CFCs)) which are harmful to the environment.

6.2.3 Reconfiguring normality

Shove (2014) argues that for such services for which the convergence of their definitions of normality are characterised by unsustainable patterns of consumption which has become a threat

to the environment, and for which it can be demonstrated that their transitional paths over time are “outcomes of dialectical interaction between individuals and institutional projects” (Shove, 2014: 423) (such as certain services of comfort), focusing on reforming technology to become more ‘green/sustainable’ without accounting for the internal dynamics of these interactions will be futile. This is because for such services, the “practices and associated standard of living are, in effect, inscribed in how infrastructures are conceptualised and managed” and exist “as part of a backdrop of taken-for-granted order” (Shove, 2014: 426). She argues that this taken-for-granted order of what is normal is malleable (Shove, 2003b), and posits that to achieve that the change policy makers seek, the dynamic contexts of such services need to be revisited. This, Shove argues, might reveal the need for changes in societal values, the reorganisation of institutions, and the reformulation and/or recasting of legislation.

Without this, the focus on technological reforms will only lead to a reversal to the initial *status quo* of negative patterns because, quoting Pred (1981: 17), “social transformation and altered structural relations can only occur through the introduction, disappearance or modification of institutional projects” (Shove, 2014: 425). Shove (2014: 426) hence argues for the reconfiguration of the current conversation on climate change and sustainability, and further investigation into how “policy making structures patterns of consumption”. This will help in better understanding the current unsustainable demand for resources associated with consumption on which the taken-for-granted order of normality hinges. In this the potential for the “transformation of sociotechnical regimes of normality with the re-specification of concepts of services” (Shove, 2003b: 416) is highlighted.

The next section further explores the social construction of normality, especially as determined by societal settings, and how these societal settings can be manipulated towards a more sustainable definition of normality.

6.2.4 Social normative influence

The preceding sections demonstrate that normality is socially constructed and is a result of intricate dynamics of relations between different agents, and that these constructs can be reformulated. Scholars over time have investigated the role of societal definitions of ‘normal’ (or social norms) on the behaviour and actions of humans. One of the foremost scholars in the theory, discourse, and literature of social norms, Robert Cialdini, in his book chapter with Melanie Trost, defines social norms as “rules and standards that are understood by members of a group, and that guide/constrain social behaviour without the force of laws” (Cialdini & Trost, 1998: 152). Consistent with the social constructionist paradigm, the social normative discourse asserts that in social settings, individuals source information to guide their actions and reactions from these norms (Elster, 1989; Cialdini, Kallgren & Reno, 1991; Kandori, 1992; Cialdini & Goldstein, 2004; Cialdini & Trost, 1998). Tilyard (2011), however, identifies from the trends in the literature that although the

active observation/witnessing of the actions of others provides the norm information for a given social context, physical social interaction is necessary, but not a prerequisite for obtaining social information. Normative information can be communicated via secondary environmental fixtures such as billboards, message cards, information pamphlets, computerised messages, and even the litter-state of a public area/facility (see Costa & Kahn, 2010; LaBrie & Lewis, 2013; Ayres, Raseman & Shih, 2009; Baca-Motes, Brown, Gneezy, Keenan & Nelson, 2012; Schultz et al., 2008; Schultz et al., 2007; Ford, 2010; Göckeritz et al., 2009; Morgan & Chompreeda, 2014; Ferraro, 2014; and Cialdini, Reno & Kallgren, 1990).

The effectiveness of social normative information on individual decision making is independent of the source of the information (Cialdini & Trost, 1998), and influences individual behaviour as long as individuals perceive that the behaviour of the other individuals in their context follows in the given norm. The construction of a norm hence provides a theoretical tool for guiding behaviour towards desirable outcomes (Aarts & Dijksterhuis, 2003; Göckeritz et al., 2009), and is unique in its effectiveness in that norms function unconsciously – individuals are not consciously aware of the influence of social norms on their actions.

Cialdini et al. (1990), however, emphasise that the effectiveness of a norm in influencing behaviour is dependent on the ‘salience’ characteristic of the norm. They argue that the likelihood of a norm influencing an individual’s behaviour is highly dependent on whether or not it is activated at the time the individual’s decision is being made. This emphasises the role of proximity of the social normative information to the setting in which the relevant behaviour is to occur – the closer the proximity to the setting, the more effective the influence on behaviour. The role of proximity is associated with the fact that the understanding of a norm is individual specific as “norms reside in the head of the individual, and they can often differ dramatically in their degree of accuracy” (Göckeritz et al., 2009: 515). Social norms hence vary with the ‘normative belief’ of an individual, and modifying such belief requires proximity.

Cialdini et al. (1990) differentiate between two categories of norms: descriptive norms, which refer to an individual’s perception/thought about common social conduct, and injunctive norms, which refer to an individual’s thought of the social approval of a conduct. Descriptive norms provide information on the most effective and adaptive behavioural conduct within a specific setting, and a baseline behavioural standard from which individuals refrain from deviating (Cialdini, 2007; Cialdini et al., 1990; Goldstein et al., 2008; Schultz et al., 2007). Injunctive norms, on the other hand, provide information on what mode/pattern of behaviour is socially sanctioned, and influence individual behaviours via their beliefs about the social penalties and rewards associated with such behaviour (Cialdini et al., 1991, 1990; Schultz et al., 2008; Smith, Louis, Terry, Greenaway, Clarke & Cheng, 2012). The source of such norms, be it from close associates or strangers, significantly

influences decision making amongst individuals with regard to behaviour associated with the norms (Cialdini, 2007; Schultz et al., 2008; Smith et al., 2012).

The distinction between descriptive and injunctive social norms lies in their source of motivation (Cialdini et al., 1990; Reno, Cialdini & Kallgren, 1993). The injunctive norm is primed on the idea that people seek to gain the approval of an audience (real or imagined), or at least satisfy their expectations, while the descriptive norm anchors on indicating how a given action/behaviour is performed (Reno et al., 1993). The priming of injunctive norms on real or imagined audiences emphasises the irrelevance of the physical presence of another in influencing behaviour. This characteristic of injunctive norms bears significant implications for research which seek to modify environmental behaviour, especially that associated with resource consumption (i.e. energy, water and waste) as such behaviour is often privately conducted (Tilyard, 2011). The effectiveness of a norm when the reference audience is imagined has been tested by Goldstein et al. (2008) and Schultz et al. (2008) in studies on towel reuse behaviour amongst hotel guests, and by Nolan et al. (2008) on energy consumption in households.

Shove's (2003a,b,c) discussions on the social construction of comfort and cleanliness, particularly focus on the social construction of private activities, such as indoor thermal settings and showering, and demonstrates how these private activities are indeed influenced by a non-present audience.

Section 6.3 provides a review of studies that have implemented social norms to private behaviour decision making in the TAI. These studies focus on the effectiveness of social norms in influencing hotel guests to reuse their towels – an activity that borders between Shove's Cs of cleanliness and convenience (i.e. in TAEs, the daily changing and refolding of linen (by staff) is packed as a luxurious service associated with higher levels of cleanliness and convenience).

6.3 REVIEW OF RELEVANT LITERATURE

The first published study that applies social norms to modify the actions of hotel guests in line with sustainability-oriented outcomes was carried out by Goldstein et al. in 2007 with further details published in 2008 (Goldstein *et al.*, 2008, 2007). In 2007, Goldstein et al. carried out an initial study to evaluate the psychology behind various invitations to hotel guests to reuse their towels and linen. The objective of this enquiry was to identify the most effective ways of improving guests' participation rates. Using different message framing techniques (e.g. different message types printed on cards and placed in hotel bathrooms), they find that cards bearing environmental appeals and those bearing social responsibility appeals were more effective at inducing compliance than cards bearing appeals that would benefit the hotel only. Furthermore, they proffer

and test the idea of solutions which invoke societal norms in the form of '*reciprocation norms*' and '*descriptive norms*'.

Reciprocation norms appealed to guests to cooperate with the hotel's environmental initiatives by reusing their towels because the hotel was already contributing to a sustainable/developmental cause (Goldstein et al., 2007: 147–149), while descriptive norms provided an indication of the action/behaviour that is most effective or adaptive in a given situation (i.e., told guests that other hotel guests reused their towels). They hence have the power to influence and motivate the actions of individuals, both in private and in public (Goldstein et al., 2008; Cialdini et al., 1991; Goldstein et al., 2007). The findings of the study indicated that these social norms were significantly more effective in inducing compliance behaviour than the environmental appeal and social responsibility appeal.

In a follow-up study in 2008, the authors (Goldstein et al.) carried out field experiments to test the effect of social proximity on the results from the former study. They examined the responsiveness of hotel guests to messages with varying proximity of the reference group types associated with a given social norm and compared this to traditional environmental appeals. Within the framework of a Randomised Control Trial (RCT), different message types were randomly assigned to hotel rooms and data was collected by observing whether or not the guests indicated that they wanted to reuse their towel by NOT leaving it on the floor. Results from the experiment further highlighted the superiority of social normative appeals to traditional appeals to pro-environmental behaviour in eliciting cooperative responses to these towel reuse messages, and demonstrated that the closer the social reference group, the more effective the norm in inducing behaviour change. That is, references to community members induced higher response rates than references to fellow countrypersons.

The second published study was by Schultz et al. (2008). In a social experiment similar to that carried out by Goldstein et al. (Goldstein *et al.*, 2008, 2007), these authors tested the ability of printed normative messages to influence conservation behaviour among hotel guests, using the platform of the towel reuse program. The ideas and methods used were similar to Goldstein et al. (2008), and they obtained similar findings. The studies reviewed above, as well as others that seek to test hotel guests' compliance rates (Shang et al., 2010; Baca-Motes et al., 2012), consistently evaluate the effectiveness of their intervention techniques within the towel reuse program initiative. A key reason for this is that the response behaviour of the guests can be easily monitored and measured when compared to other guest-oriented sustainable initiatives. The effectiveness of social norms in sustainable initiatives that directly impact the comfort experience of guests, such as taking shorter showers, turning off air conditioners or making use of pre-set temperatures, is non-existent. This is often because observing guests' behaviour while they are in the rooms is a challenge due to privacy concerns.

Following from Shove's argument, this study carried out an experiment to test the possibility of modifying the current construction of comfort. Adopting evidence from the literature on social norms, which demonstrates the ability of norms to modify behaviour in certain spheres of human activities and behaviour, the study tests if this effectiveness extends to the idea of thermal comfort. It argues that if thermal comfort is purely socially constructed, then the positive evidence from other studies will extend to it and will be picked up in this experiment. In the case that it is picked up, it will evince Shove's argument and proposition for addressing the challenge of increased resource use and climate change. Although the war on changing tracks in HVAC system use might be as tough as that of fossil fuels given the current commercial stake in the HVAC industry, a little progress at a time may go a long way.

To circumvent the challenge of observing guests' behaviour while they are in the rooms, the study used non-invasive information technology to observe hotel guests' responses to behavioural prompts.

6.4 DATA, METHODOLOGY, AND RESULTS

In this section, a detailed summary of the experimental procedure adopted in this study is first presented. The data generated from the experiment is then described, and the methodology utilised to analyse the data, detailed. Finally, the results of the data analysis are presented.

6.4.1 The experiment

The objective of this study was to evaluate the effectiveness of non-price interventions in the form of social normative prompts on environmental compliance behaviour of hotel guests where such behaviour directly affects their comfort levels. The overall aim is to design an effective intervention program and increasing compliance without compromising the comfort level and satisfaction experience of guests. Specifically, the study aimed to answer the question: How do hotel guests' respond to prompts to adjust their room temperature to be in line with prescribed environmentally sustainable levels? To accomplish this, an experimental program¹⁶ was designed for implementation in a hotel.

Need assessment: The need for the program, as discussed in the introduction and literature review, is twofold: a) Given Shove's argument for the social construction of thermal comfort, the effect of social normative prompts on activities that affect guests' comfort (i.e. air conditioning) on hotel guests' pro-environmental behaviour is yet to be explored; and b) heating and cooling are by far the largest consumers of energy in the average hotel and there is great potential for energy

¹⁶ This program was developed alongside a city hotel in Cape Town, South Africa, and approved for implementation by the hotel's management and the University of Stellenbosch Research Ethics Committee.

savings from this activity. Given the service nature of the TAI and the international construct of thermal comfort, the possibility of indirectly enlisting the cooperation of guests without compromising their comfort is yet to be explored. This study hence contributes to the literature on the impact of non-price interventions on hotel guests' sustainability compliance behaviour and further by applying it to a sphere of initiatives that directly affects guests' comfort, and by using IT tools.

Inputs: Two different message cards were placed in hotel rooms asking guests (who were unaware that they were in an experiment) not to turn the room air conditioning temperature above a certain level. The effectiveness of two different message types was tested here. The first message contained a descriptive social norm: "the majority of hotel guests find 20°C to be a comfortable room thermostat setting in this climate and season" while the second message contained the industry standard appeal to help save the environment: "please help save the environment by setting your room thermostat to 20°C".

To ensure that the guests saw the message, the messages were placed next to the temperature setting dial in the rooms. The dial is located next to the key card system where guests need to insert their key cards to activate the electricity supply in the rooms. [Figure 6.1](#) is an example of the placement of the treatment message relative to the temperature dial and key card system.

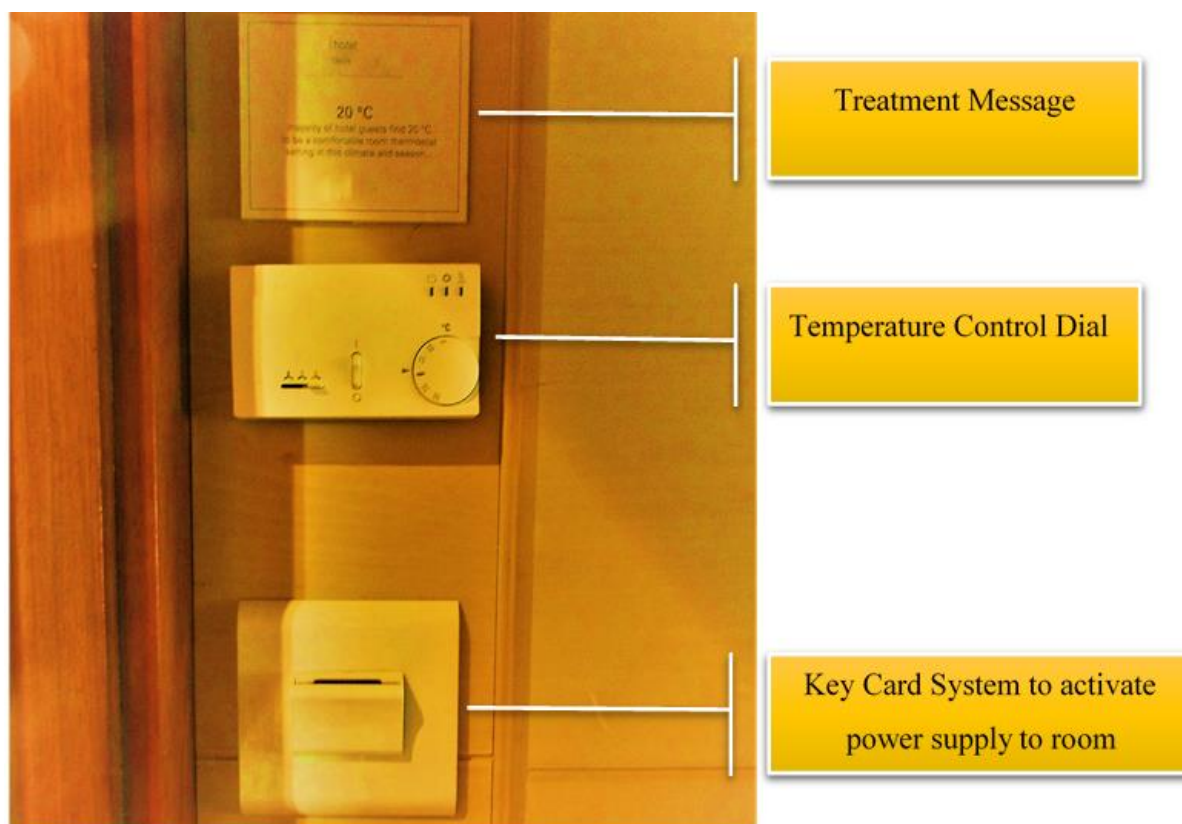


Figure 6.1: Message Placement Position

Observable behaviour: To circumvent the challenge of observing guests' behaviour while they are in the rooms, non-invasive information technology was used to observe hotel guests' responses to behavioural prompts. The behaviour of interest was the observed room temperature in each room. This was monitored by TDLs placed in each room.

Expected output: Guests read the messages placed in rooms.

Hypothesised intermediary outcome: Guests comply with the prescribed temperature level, with the level of compliance expected to vary with administered treatment. The level of compliance would be expected to vary both by the average temperature reading recorded by the temperature logging device, as well as by the standard errors. A high compliance rate will be evidenced by temperature recordings that are close to the prescribed 20°C.

Hypothesised Primary outcome: Guests modify their behaviour to conserve energy. The rate of compliance in terms of behaviour modification is expected to vary with the type of message placed in the rooms. Based on the theoretical background and evidence from the towel reuse studies in the literature, it is hypothesised that the guests who get the descriptive social normative message will be more likely to conform with the prescribed thermostat setting than guests who get the environmental appeal message.

6.4.2 Experimental method

To implement the program detailed above, an RCT was carried out in line with the method employed in the pioneering towel reuse program (see Goldstein *et al.*, 2008; Schultz *et al.*, 2008). In the RCT method, a given population of interest is randomly assigned into different groups (one or multiple treatment group(s), and typically one control group). A given intervention program is then assigned to those in the treatment group with the control group capturing the necessary counterfactual state of the treatment group to enable estimation of causal effects of treatment/intervention (Glennester & Takavarasha, 2013). For the purpose of this experiment, the design in Figure 6.1 was used to evaluate the effectiveness of message framing in inducing behavioural change in hotel guests. Interventions were administered and evaluated within the RCT framework. The details are as follows:

Unit of randomisation: The target of the intervention was hotel guests, while the unit of randomisation was the hotel rooms. The unit of analysis was the room temperature at a given time in the hotel. Controlling for confounding factors like outdoor temperature, room location and floor level, the set-temperature was observed for compliance.

Data and sample size: This was generated by the inflow and outflow of guests in the hotel. Given the RCT methodology, the sample size was pre-determined by the program design and arrived at

through power-calculations (Glennester & Takavarasha, 2013). The basic program design in Figure 6.2 indicates that there are to be three groups: two treatment groups and one control group.

Required sample size and power calculations: When randomisation is done at the cluster level with outcomes of interest at the individual level, as is the case with this study where randomisation was done at the room level and outcomes observed at the guest level, Glennester and Takavarasha (2013) stipulate that power calculations to determine sample size need to factor in the intra-cluster correlation. However, because it was difficult to determine a priori what the inter-cluster correlation of individuals staying in each room will be, power calculations were done at the individual level, and the challenge of clustering is handled during analysis.

A once-off pilot observation was carried out on random rooms in the hotel, and the temperature dial setting in each room was observed and recorded¹⁷. Most guests were found to set the room thermostat between the 15 and 30 degrees marker (where 5 is the minimum and 30 is the maximum possible dial setting). Working with an estimated standard deviation of 3.1, and hypothesising a 1 degree decrease in the temperature in the treatment group, the standard 95% confidence interval, and the standard statistical power level of 80%, it was estimated that the experiment would require a minimum sample size of 333 guest observations per treatment assignment group. This totals at least 999 guest observations for all three groups combined. Splitting this figure equally across 51 hotel rooms for observation, with a proposed occupancy rate of 70% and turnover rate of two guests per week, it was anticipated that the experiment needed to run for a minimum of 14 weeks.

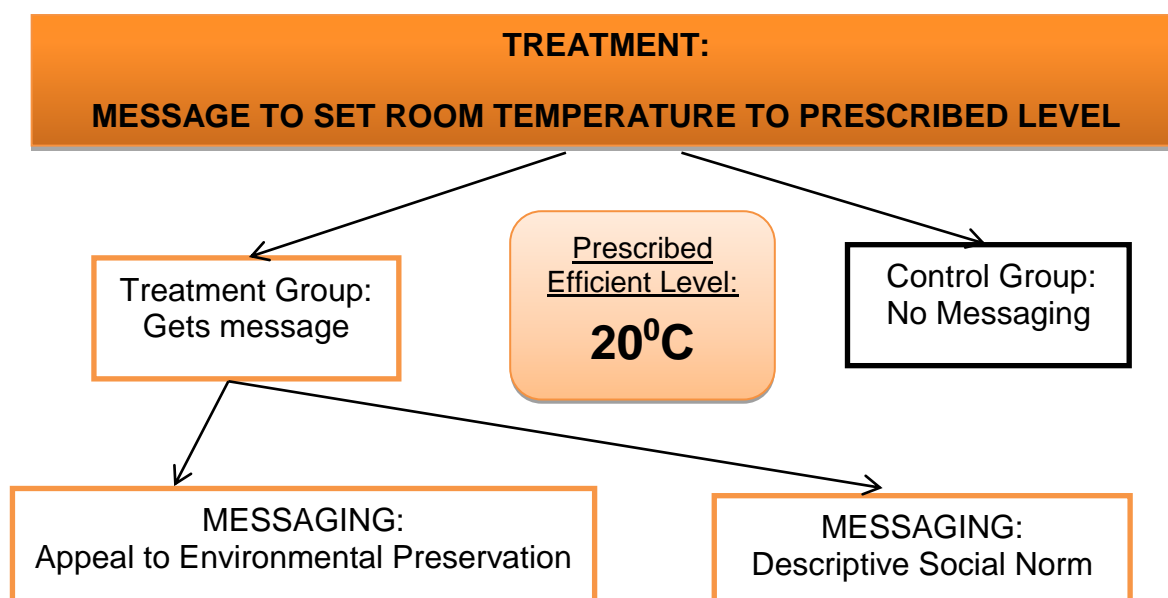


Figure 6.2: Detailed program design

¹⁷ Note that TDLs were not used to observe behaviour at this pilot phase.

Data capturing technology: A simple TDL with the capacity to record high accuracy real-time temperature was placed in rooms on the hotel's premises. Each room was fitted with the device in a convenient location, and thereafter accessed to download the data.

6.4.3 The dataset

Data was collected between 31st October 2016 and 22nd March 2017. The temperature loggers were set to take the temperature readings in the rooms every 30 minutes¹⁸. On average there were 1 048 guests stays in the dataset, 40 of which were repeat guests (i.e. 1 008 unique guest stays), for which temperature readings were observed. These observations were for 38¹⁹ rooms over the study period, and guests in these rooms stayed for an average of 3.4 nights, with one person who did not spend the entire night (i.e. 0 nights). Consequently, in the rest of the analysis, the sample is restricted to those who stayed for at least one night. This brings the total sample size to 1 047 guest stays. [Table 6.1](#) provides a description of the demographic characteristics of individuals for which information is available, by treatment assignment. For the gender variable, the category 'other' refers to rooms who had two females or two males in the room. To verify for the balance in the distribution of these characteristics across the three experimental groups, the effect of attrition needs to be evaluated first.

Attrition in the dataset:

There was some attrition in the dataset due to the temperature loggers being removed from the rooms and never found. In all, the loggers were recovered from 38 of the 51 rooms assigned for the experiment. The ratio of missing to non-missing loggers was 4:17 for the control group and the descriptive norm group and 5:17 for the environmental group. These ratios suggest that attrition across the groups was random, and hence would not compromise the integrity of the results. To verify this, [Figure 6.3](#) below presents the histogram plot of the temperature readings for each group, with the kernel and normal density distribution superimposed on them.

¹⁸ For the purpose of data analysis, only readings between 6pm and 10am, when guests were expected to be their rooms, were included in the data analysis.

¹⁹ The loss of temperature loggers in 14 of the 51 rooms allocated for the experiment brought the number of rooms down to 38 (see section on attrition for implication of this).

Table 6.1: Demographic characteristics by treatment assignment

	Control Group		Environmental Appeal (EA)		Descriptive Norm (DN)		Total	
	N	%	N	%	N	%	N	%
Gender								
Female	75	7.16	63	6.02	71	6.78	209	19.96
Male	231	22.06	155	14.80	158	15.09	544	51.96
Male & Female	104	9.93	81	7.74	88	8.40	273	26.07
Other	10	0.96	6	0.57	5	0.48	21	2.01
Total	420	40.11	305	29.13	322	30.75	1,047	100.00
Payment								
Non-paying	99	9.46	66	6.30	75	7.16	240	22.92
Paying	321	30.66	239	22.83	247	23.59	807	77.08
Total	420	40.11	305	29.13	322	30.75	1,047	100.00
No of Occupants								
1	301	28.75	212	20.25	229	21.87	742	70.87
2	119	11.37	93	8.88	93	8.88	305	29.13
Total	420	40.11	305	29.13	322	30.75	1,047	100.00
Bed nights								
0	1	0.10	0	0.00	0	0.00	1	0.10
1	110	10.51	74	7.07	64	6.11	248	23.69
2	115	10.98	85	8.12	83	7.93	283	27.03
3	60	5.73	50	4.78	60	5.73	170	16.24
4	48	4.58	34	3.25	45	4.30	127	12.13
5	34	3.25	19	1.81	21	2.01	74	7.07
6	18	1.72	16	1.53	15	1.43	49	4.68
7	9	0.86	10	0.96	7	0.67	26	2.48
8	3	0.29	5	0.48	7	0.67	15	1.43
9	5	0.48	4	0.38	3	0.29	12	1.15
10	3	0.29	3	0.29	6	0.57	12	1.15
11	2	0.19	1	0.10	1	0.10	4	0.38
12	0	0.00	1	0.10	0	0.00	1	0.10
13	3	0.29	0	0.00	3	0.29	6	0.57
14	3	0.29	0	0.00	3	0.29	6	0.57
15	1	0.10	0	0.00	2	0.19	3	0.29
16	1	0.10	0	0.00	0	0.00	1	0.10
20	1	0.10	1	0.10	0	0.00	2	0.19
21	1	0.10	0	0.00	0	0.00	1	0.10
28	0	0.00	0	0.00	1	0.10	1	0.10
29	1	0.10	0	0.00	1	0.10	2	0.19
35	1	0.10	0	0.00	0	0.00	1	0.10
43	0	0.00	1	0.10	0	0.00	1	0.10
55	0	0.00	1	0.10	0	0.00	1	0.10
Total	420	40.11	305	29.13	322	30.75	1,047	100.00

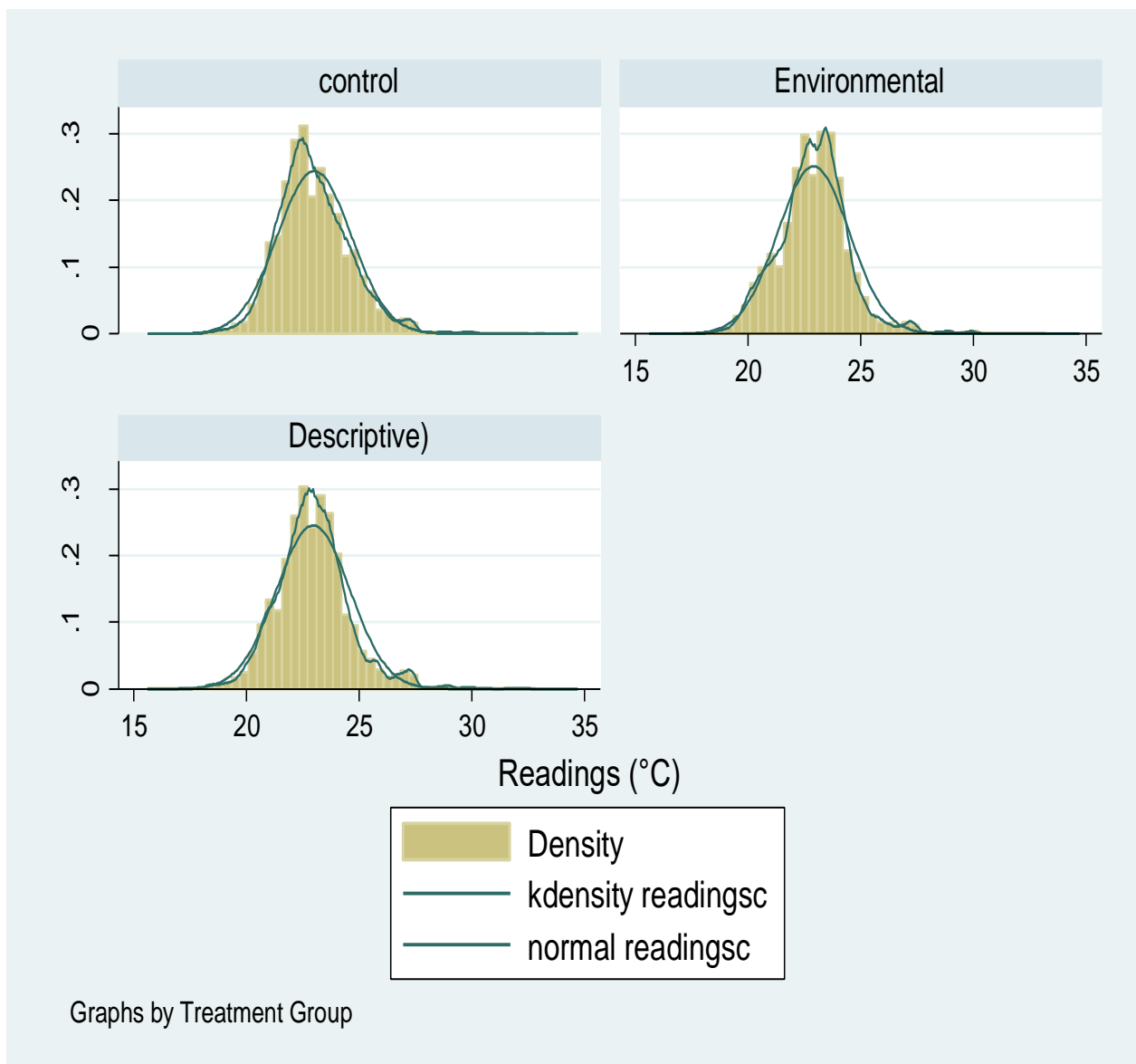


Figure 6.3: Temperature logger readings across the different groups

The kernel density curves shows that except for the variations in the mean values (which is expected) all three curves have a somewhat similar distribution, with the exception of the control group where the tails are fatter (also as expected).

To further ensure that the attrition was not 'differential' and hence did not compromise the random assignment to the treatment groups, the data was tested for systematic differences among the three groups, based on the key variables that could affect the room temperature readings, hence biasing the effect of the random group allocation (Glennerster & Takavarasha, 2013: 350). Systematic differences in gender distribution, bed night stays, number of occupants, whether the guests paid or not, and if HVAC repairs were carried out in the room on a given day, are tested for by running a regression of treatment assignment on these characteristics to evaluate if any significant differences occurred in these characteristics across the three groups. Given that the

dependent variable in this regression (treatment assignment) is a nominal categorical variable with three un-ordered categories, using a multinomial logit model for the regressions, as opposed to an ordinary least square (OLS) regression is appropriate (Cameron & Trivedi, 2005). In each regression, the constant term is suppressed to allow for direct comparison of the two treatment groups to the control group. The results of this regression are presented in [Table 6.2](#).

Table 6.2: Multinomial logit regression of occupants' characteristics on treatment outcome

VARIABLES	Control Group (reference category)	Environmental Appeal	Descriptive Norm
<u>Gender</u>			
Female		-0.386 (0.306)	-0.0966 (0.298)
Male		-0.610** (0.272)	-0.417 (0.266)
Male and Female		-0.509 (0.350)	-0.226 (0.343)
Other		-0.742 (0.593)	-0.745 (0.618)
<u>Paying quest or not?</u>			
Yes		0.100 (0.183)	-0.00671 (0.177)
No		(Omitted)	
<u>AC repairs done during stay?</u>			
Yes		1.484 (1.160)	0.297 (1.419)
No		(Omitted)	
No of Occupants		0.0922 (0.175)	-0.00937 (0.174)
Bed nights		0.00568 (0.0221)	0.0175 (0.0204)
Observations	1,047	1,047	1,047

Standard errors in parentheses, no intercept in model

*** p<0.01, ** p<0.05, * p<0.1

All variables (except the male gender in the environmental appeal group) return insignificant coefficients, indicating that holding all else constant, they are not significant in predicting the treatment assignments. This implies that the attrition was random and not differential, and that, on these characteristics, there are no systematic differences among the three groups. Observed differences in the outcome variable (temperature setting in the rooms) can hence be ascribed to the intervention (Glennerster & Takavarasha, 2013).

6.4.4 Preliminary analysis

In the design of the experiment, the hypothesis was that one would expect the highest compliance rate in the Descriptive Norm (DN) group, followed by the Environmental Appeal (EA) group, with the control group having the lowest compliance rate. Given the continuous nature of the temperature data (accurate to two decimal places) as opposed to the categorical nature of the

towel-reuse studies (reuse or not reuse), for analysis, the observed temperature means relative to the prescribed temperature level, and the standard deviations in all three groups are evaluated to assess compliance. The expectation is that these measures will be lowest in the social norm group and highest in the control group. Deviations from the prescribed temperature are also expected to be lower in the treatment groups than in the control group. The readings reported are restricted to those observed between 6pm and 10am of the following day so as to capture the thermostat settings when the guests were actually in the rooms. [Table 6.3](#) presents the average temperature readings across all three groups over the duration of observation.

Table 6.3: Summary of temperature readings by treatment assignment

	Summary of Readings (°C)					
	Group Mean	Std. Dev.	Robust Std. Error	Min	Max	Frequency
Control Group	22.84	1.62	0.07	18.00	32.20	40,390
Environmental Appeal	22.74	1.56	0.08	17.30	32.70	31,126
Descriptive Norm	22.79	1.63	0.09	15.60	32.40	33,833
Total	22.80	1.61	0.05	15.60	32.70	105,349

Note: Table reflects figures for the data restricted to the 6pm to 10am time period; Reported means clustered by individual stay.

These figures indicate very interesting results. Consistent with the hypothesis set out at the beginning, the mean temperature setting in the treatment groups is closer to 20°C than in the control group, but contrary to anecdotal preliminary expectations, the mean temperature is higher in the DN group than in the EA group. To check if the mean differences are statistically significant, a pairwise comparison of the means is evaluated using the t-test. The result is presented in [Table 6.4](#).

Table 6.4: Pairwise comparison of mean temperature readings between groups

	Contrast	Std. Err.	Unadjusted t-stat	Unadjusted P> t
Treat A vs 1. Control	-0.18	0.01	-19.69	0.00
Treat B vs 1. Control	-0.03	0.01	-3.89	0.00
Treat B vs 2. Treat A	0.15	0.01	15.29	0.00

Note: The contrast value is the difference between the unadjusted group mean temperature for each group, for the data not restricted to the 6pm to 10am time period.

These simple mean comparison analyses suggest that the differences in temperature readings across the different groups are statistically significant, and that the DN group sets its average temperature about 0.15° Celsius higher than the EA group.

These simple statistical analysis, however, do not take into consideration the unique characteristics of the data. The data is an unbalanced panel with varying start and end dates per individual observation. Consequently, other factors, like the outdoor climatic condition on each day, the room characteristics, and occupants characteristics come to play in influencing the observed temperature readings. The true Average Treatment Effect (ATE) would hence be better estimated

if these characteristics were controlled for. To do this, econometric modelling is employed as detailed in the following section.

6.4.5 Econometric framework

To estimate the ATE, both a cross-sectional linear model and a panel linear model were applied to the data. The cross-sectional model provides a snapshot of the treatment effect for all individuals on their first day of stay, while the panel regression takes into account information from extended stays, and hence provides more statistically robust estimates (Asteriou & Hall, 2011). In the analysis, two dependent variables are utilised: the first dependent variable is the temperature in degrees Celsius, as captured every 30 minutes by the TDLs, and the second is the average of these temperatures per day. In both dependent variables, the data is restricted to observations that were recorded between 6pm and 10am the following day²⁰. This is motivated by the objective of the study which is to observe the behaviour of guests when they are in the room. It is hence hypothesised that most guests will be in their rooms within this time period. Given the high frequency and continuous nature of the temperature variable, the cross-sectional model is utilised with the second dependent variable (i.e. temperature averages), while both dependent variables are utilised in the panel model. To allow for easier interpretation of the coefficients (as percentage deviations from the base group), both dependent variables are logarithmically transformed in all regression specifications.

In this experiment, randomisation was at the room (group) level, and not at the individual level, but analysis is carried out at the individual level as the outcome of interest (temperature readings) is at the individual level. Glennerster and Takavarasha argue that when estimating the treatment effects with group-level randomisation and individual-level outcomes, to avoid overestimating the magnitude of the standard errors, it is important to “correct for the fact that randomisation was at the group level [as] ... outcomes tend to be correlated within groups” (2013: 356–357). To correct for group level randomisation they suggest that the inter-group correlation amongst individuals be controlled for by clustering the standard errors by the randomisation groups, instead of using the individual standard errors. Consequently, in all regressions, the standard errors are clustered by room number.

For the cross-sectional model, regressions with the following specifications are run:

$$\ln(\text{Average Room Temperature})_i = \beta_1 (\text{TREAT})_i + \beta_{g-j} (\text{Room number dummy variables})_j + v_j + \varepsilon_{i,j}, \dots(6.1)$$

²⁰ In this hotel, check-in time is 12pm and check-out is 10am.

$$\ln(\text{Average Room Temperature})_i = \beta_1 (\text{TREAT}) + \beta_{2-4} (\text{Climatic Variables}) + \beta_{5-7} (\text{Occupants Characteristics})_i + \beta_{8-j} (\text{Room number dummy variables})_j + v_j + \varepsilon_{i,j,t} \quad \dots(6.2)$$

As stated in section 6.4.4, due to the continuous nature of the temperature variable, the average temperature is used as the dependent variable for both cross-sectional regressions. In Equation 6.1, the impact of treatment assignment is evaluated, controlling for the room level assignment, while Equation 6.2 controls for climatic variables and occupants' characteristics. In both equations, the variable '*TREAT*' is categorical and takes the value of 1 for the control group, 2 for the Environmental Appeal group, and 2 for the Descriptive Norm group; the variable '*Room number dummy variables*' controls for individual room characteristics given that randomisation was at the room level; the error term '*v*' accounts for the group level errors; and the error term '*ε*' accounts for the individual level errors by their groups (Glennester & Takavarasha, 2013). Equation 6.1 estimates the ATE, and does not control for any exogenous variables that might influence the temperature setting by the guests. Equation 6.2 adds controls for daily climatic factors (maximum and minimum temperature in degrees Celsius, rainfall in millimetres, and humidity in percentage); occupants' characteristics (number of occupants, the duration of their stay, and the gender of the occupants) and whether or not on a given day there were repairs to the HVAC system in the room.

For the panel model, as stated earlier, two dependent variables are used. Fixed Effects (FE) regressions (controlling for individual, room, month, and day fixed effect) of the form below are run:

$$\ln(\text{Average Room Temperature})_{i,t} = \beta_1 (\text{TREAT})_{i,t} + \beta_8 (\text{Individual FE}) + \beta_9 (\text{Room FE}) + \beta_{10} (\text{Month, Day FE}) + v_{j,t} + \varepsilon_{i,j,t} \quad \dots(6.3)$$

$$\begin{aligned} \ln(\text{Average Room Temperature})_{i,t} &= \beta_1 (\text{TREAT})_{i,t} + \beta_{2-4} (\text{Climatic Variables})_t + \beta_{5-7} (\text{Occupants Characteristics})_{i,t} \\ &+ \beta_8 (\text{Individual FE}) + \beta_9 (\text{Room FE}) + \beta_{10} (\text{Month, Day FE}) + v_{j,t} + \varepsilon_{i,j,t} \end{aligned} \quad \dots(6.4)$$

$$\ln(\text{Room Temperature})_{i,t} = \beta_1 (\text{TREAT})_{i,t} + \beta_8 (\text{Individual FE}) + \beta_9 (\text{Room FE}) + \beta_{10} (\text{Month, Day FE}) + v_{j,t} + \varepsilon_{i,j,t} \quad \dots(6.5)$$

$$\begin{aligned} \ln(\text{Room Temperature})_{i,t} &= \beta_1 (\text{TREAT})_{i,t} + \beta_{2-4} (\text{Climatic Variables})_t + \\ &\beta_{5-7} (\text{Occupants Characteristics})_{i,t} + \beta_8 (\text{Individual FE}) + \beta_9 (\text{Room FE}) + \beta_{10} (\text{Month, Day FE}) + v_{j,t} + \\ &\varepsilon_{i,j,t} \end{aligned} \quad \dots(6.6)$$

In Equations 6.5 and 6.6, the dependent variable is the room temperature recorded every 30 minutes, while the average temperature is used in Equations 6.3 and 6.4. Except for the time dimension and fixed effects characteristics controlled for in these panel specifications, the control variables in Equations 6.3 and 6.5 are similar to those in the cross-sectional Equation 6.1, while those in 6.4 and 6.6 are similar to Equation 6.2.

6.4.6 Econometric results

The results of running the various regression specifications are presented in [Tables 6.5.](#) and [6.6](#). The first hypothesis tested, based on the theoretical postulation that thermal comfort is socially constructed, was consistent with previous studies on hotel guests' conservation behaviour: that the social norm group will deviate less from the prescribed temperature than the environmental norm group. Columns 1 to 6 in [Table 6.5](#) display the results of running Equations 6.1 to 6.6 above, respectively, while columns 7 to 12 in [Table 6.6](#) display the results of running Equations 6.1 to 6.6 but with the dependent variable in its original form and not logarithmically transformed. All results are interpreted *ceteris paribus* (i.e. holding all other variables constant).

Results of the cross-sectional regressions in columns 1 and 2 indicate that, as expected, the difference between the temperature setting in the EA group and the control group, and the DN group and the control group are both negative and statistically significant from zero. These results imply that both the DN and EA groups set their room temperature lower than that of the control group, and this is significant at the 99% level. The EA group has a temperature setting that is between 1.0% and 1.2% lower than that of the control, while the DN group's temperature setting is between 7.1% and 7.9% lower than that of the control. These results are consistent with hypothesis to be tested in this study, with the DN message being more effective in reducing the temperature settings of the hotel guests. The constant term in columns 7 and 8 (untransformed dependent variable of columns 1 and 2) indicates that the temperature setting in the control group is between 22 and 23° Celsius, implying that the EA group set their temperature between 0.2 to 0.4 degrees lower than their control group counterparts, while the DN group set their room temperature between 1.5 to 1.8 degrees lower than the control group. Given that the average temperature setting in the control group is higher than the prescribed 20° Celsius, settings lower than the average are desirable.

The panel model results in columns 3 to 6 however tell a somewhat different story. These results indicate that the difference between the temperature setting in the EA group and that in the control group is not significantly different from zero. This thus implies that the EA message had no impact on the behaviour of the hotel guests in the study. The difference between the temperature setting in the DN group and that in the control group is, however, negative and significantly different from zero.

Table 6.5: Econometric Estimation of Treatment Effect (part A)

	Log(Average Temperature Readings)				Log(Actual Temperature Readings)	
	1	2	3	4	5	6
	equation 6.1	equation 6.2	equation 6.3	equation 6.4	equation 6.5	equation 6.6
<u>Treatment Assignment</u>						
Control			(omitted)			
Environmental Appeal	-0.01697*** (0.00000)	-0.00950*** (0.00264)	0.01403 (0.02646)	0.01679 (0.05350)	0.01499 (0.02220)	0.01736 (0.04472)
Descriptive Norm	-0.07907*** (0.00000)	-0.07094*** (0.00387)	-0.14891*** (0.02670)	-0.07609* (0.04051)	-0.14976*** (0.02226)	-0.07803** (0.03417)
Max Temp (°C)		0.00379*** (0.00068)		0.00095*** (0.00033)		0.00094*** (0.00028)
Min Temp (°C)		-0.00496*** (0.00123)		0.00262*** (0.00090)		0.00263*** (0.00076)
New Rainfall (mm)		-0.00059 (0.00044)		-0.00065*** (0.00024)		-0.00064*** (0.00020)
Humidity (%)		0.00050** (0.00020)		0.00052*** (0.00009)		0.00051*** (0.00007)
<u>Gender</u>						
Female						
Male		-0.00637 (0.00477)	(omitted)	-0.09320*** (0.02144)		-0.09385*** (0.01799)
Male and Female		0.00033 (0.00578)		-0.12626*** (0.01441)		-0.12652*** (0.01221)
Other		0.04973*** (0.01402)		-0.16805*** (0.02475)		-0.17265*** (0.02043)
<u>No of Occupants</u>						
One						(omitted)
Two		-0.01008** (0.00371)		0.03460* (0.01988)		0.03441** (0.01656)
Bed nights		-0.00027 (0.00046)		0.00091* (0.00051)		0.00092** (0.00043)
<u>AC repairs done on this day?</u>						
No						(omitted)
Yes		-0.01020 (0.03033)				
<u>Paying or not?</u>						
No			(omitted)			
Yes				0.03191* (0.01615)		0.03096** (0.01381)
Constant	3.13893*** (0.00000)	3.08158*** (0.03609)	3.11927*** (0.01565)	3.10763*** (0.03549)	3.11825*** (0.01310)	3.10765*** (0.02999)
Observations	1,047	1,047	3,682	3,682	124,585	124,585
R-squared	0.15319	0.21430	0.78511	0.79320	0.60478	0.61102

*** p<0.01, ** p<0.05, * p<0.1; Robust standard errors in parentheses; clustered by room number; single 3 occupants excluded

Table 6.6: Econometric Estimation of Treatment Effect part (B)

	Average Temperature Readings				Actual Temperature Readings	
	7	8	9	10	11	12
	equation 6.1a	equation 6.2a	equation 6.3a	equation 6.4a	equation 6.5a	equation 6.6a
<u>Treatment Assignment</u>						
Control			(omitted)			
Environmental Appeal	-0.41044*** (0.00000)	-0.19971*** (0.05792)	0.40632 (0.61471)	0.42808 (1.27137)	0.41153 (0.51540)	0.43991 (1.06486)
Descriptive Norm	-1.76377*** (0.00000)	-1.46322*** (0.07809)	-3.08826*** (0.63269)	-1.21892 (0.92341)	-3.08544*** (0.53051)	-1.21551 (0.77664)
Max Temp (°C)		0.08863*** (0.01716)		0.02228*** (0.00761)		0.02222*** (0.00639)
Min Temp (°C)		-0.11372*** (0.03265)		0.05829*** (0.02106)		0.05815*** (0.01768)
New Rainfall (mm)		-0.01313 (0.01028)		-0.01542*** (0.00547)		-0.01544*** (0.00459)
Humidity (%)		0.01228*** (0.00441)		0.01176*** (0.00189)		0.01174*** (0.00158)
<u>Gender</u>						
Female			(omitted)			
Male		-0.12203 (0.10408)		-2.04425*** (0.49802)		-2.04788*** (0.41704)
Male and Female		0.03457 (0.12814)		-2.91142*** (0.33321)		-2.91136*** (0.28035)
Other		1.29076*** (0.35771)		-4.01319*** (0.58387)		-4.10337*** (0.48209)
<u>No of Occupants</u>						
One						
Two		-0.21812** (0.08257)		0.91465* (0.49390)		0.91028** (0.41295)
Bed nights		-0.00624 (0.01024)		0.02059* (0.01138)		0.02064** (0.00954)
<u>AC repairs done on this day?</u>						
No			(omitted)			
Yes		-0.24880 (0.62674)		0.16039 (0.14869)		0.16018 (0.12467)
<u>Paying or not?</u>						
No			(omitted)			
Yes		0.07514 (0.11507)		0.83941** (0.36730)		0.84121** (0.31018)
Constant	23.11853*** (0.00000)	21.91299*** (0.81678)	22.59109*** (0.36057)	22.27572*** (0.83171)	22.58707*** (0.30120)	22.27472*** (0.69949)
Observations	1,047	1,047	3,682	3,682	124,585	124,585
R-squared	0.14795	0.19960	0.79255	0.80056	0.61751	0.62376

*** p<0.01, ** p<0.05, * p<0.1; Robust standard errors in parentheses; clustered by room number; single 3 occupants excluded.

For Equations 6.3 and 6.5, this difference is significant at the 99% confidence interval, and at the 90% and 95% confidence interval for Equations 6.4 and 6.6, respectively. Interpreting the results for columns 3 to 6, the DN group's temperature setting is between 7.6% and 15.0% lower than that of the control group. The constant term in columns 9 to 12 (untransformed dependent variable of columns 3 to 6) indicates that the temperature setting in the control group is between 22 and 23° Celsius, implying that the DN group set their temperature between 1.2 to 3.1 degrees lower than their control group counterparts.

In interpreting the results for other control variables using the panel model (columns 3 to 6, and 8 to 12), it can be seen that in all regression specifications, the temperature, rainfall and humidity levels significantly affect the room temperature reading, where the coefficients are positive for temperature and humidity, and negative for rainfall. Also the gender of the room occupants, the number of occupants, and the number of bed nights they spend, as well as whether they are paying guests or not, are significant determinants of the room temperature settings. Females set their temperature to levels significantly higher than other gender categories. In descending order of temperature settings, Females are followed by the Male category, then the Male and Female category, and finally, the Other category. The temperature setting in rooms with two occupants is about 3.5% higher than in rooms with only one occupant; longer-staying guests tend to set their room temperature level less than 0.01% higher; and paying guests set their room temperature levels between 3.1% and 8.4% higher than non-paying guests. Whether or not repairs were carried out on the HVAC systems in the rooms was insignificant in determining the room temperature settings. The implications of these results are discussed in the following section. Interaction terms were constructed to evaluate the impact of treatment assignment and these characteristics on room temperature settings.

The results (not reported here) indicate that being assigned to a treatment group (i.e. not control group) and having these characteristics does not significantly affect the room temperature settings, suggesting that the treatment effect does not vary with individual demographics.

6.5 DISCUSSION AND POLICY IMPLICATIONS

Focusing on the results of the panel models as these are more robust, the following findings can be drawn as they relate to this study:

- i. Descriptive Norms are highly effective in influencing room temperature levels, while Environmental Appeals are not. This corroborates the argument by Elizabeth Shove

that thermal comfort is socially constructed as it can be significantly modified by social normative prompts/nudges.

- ii. Outdoor climatic factors are very significant determinants of HVAC setting and use by individual guests in hotels. This is consistent with the findings in Chapter 5 of this thesis.
- iii. Compared to Males, Females tend to prefer higher room temperature settings.
- iv. An additional occupant significantly affects the desirable temperature setting in the room.
- v. Whether a guest is paying for their stay or not significantly affects their choice of room temperature setting.
- vi. The temperature setting by guests is fairly constant throughout the duration of their stay, increasing significantly by less than 0.01% (about 0.02° Celsius).

Given the theoretical lens from which this study is advanced, findings indicate that the optimistic argument of Elizabeth Shove and others that the future of thermal comfort can be influenced towards more sustainable levels is supported by this field experiment. This finding has implications for policy beyond the hospitality industry, extending to building design and construction across all industries and sectors of human activity. These findings suggest that, at the most optimistic, the design and construction of buildings can be gently nudged toward incorporating more natural ventilation and less artificial HVAC systems. This will imply massive savings in the consumption of energy resources, as well as the reduction in GHG emission. At the more conservative level, the findings indicate that building managers can directly and indirectly regulate the HVAC settings in buildings towards more energy efficient levels by using soft appeals to socio-cultural normative values. It also suggests that, as demonstrated in previous studies, social normative prompts will be more effective in stimulating pro-environmental behaviour as opposed to the standard environmental appeals often adopted. The need for factoring in the outdoor climatic conditions at the point of building design and construction is further highlighted.

For the hospitality industry, these findings are also very promising. They emphasise that, consistent with the findings of Goldstein et al. (2008) and Schultz *et al.* (2008), ideals of thermal comfort and linen reuse are socially constructed, and with social normative prompts, they can be modified towards more sustainable resource consumption levels. While these two activities only fit, albeit somewhat loosely, into Shove's (2003c) Cs of Comfort and Cleanliness, it can be argued that future experiments will be able to demonstrate that many other activities within these Cs, including the C of Convenience, are socially constructed,

and can hence be socially modified. The dynamics of interaction leading to this modification are, however, outside the scope of this study, but the field experiment carried out in this study can be modified and extended to other resource consuming activities such as showering (which, from the findings of Chapter 4, is the largest consumer of water resources by TAEs). The findings also inform TAE operators that although their paying guests are more likely to set their room temperature higher than the prescribed efficient level, the effect of Social Normative messaging is still very strong.

The design of the study was such that feedback could be gathered from guests on their perceived thermal comfort levels. Initially, this was to be done via means of an emailed questionnaire after the guests had checked out. The hotel's management was however concerned about being a bother to the guests. Consequently, to ascertain that the program did not inconvenience guests, two random visits were made to randomly selected rooms at different times during the experiment. These checks were to ensure that the loggers were still capturing data. After attrition was observed, two more random visits were made to all rooms where the loggers were not missing, so as to download captured data as at that point. Between these four visits guests who were in their rooms and willing to talk to the researcher were informed that the visit was to monitor the performance of the HVAC system in the room, but were not informed that they were participating in an experiment. Cooperative guests were also asked if they found their room temperature to be comfortable, regardless of whether it was a treatment or control room. Except for rooms that had faulty air conditioners and subsequently had to undergo repairs, all the guests reported that they were fine with whatever they had set their room temperature to. Although questionnaire responses would have provided more robust evidence of the non-comfort encroaching characteristic of this experiment, the word of mouth approach still provides some evidence, and questionnaires can be employed, if feasible, in future studies.

6.6 CONCLUSION AND RECOMMENDATIONS FOR FURTHER STUDIES

This chapter set out to incorporate the findings of the first five chapters of this thesis to proffer a solution to one of the most daunting challenges faced by TAE operators with regard to ES and RM – the service nature of the industry, combined with tackling the largest energy driver in these establishments – HVAC. In Chapter 3, a key barrier to adopting sustainable services was identified as “the service nature of the industry”. This barrier highlights the challenge faced by TAE managers in balancing the need to be sustainable with their objective of providing comfort for their guests. To address this challenge, a solution based on the argument put forward by Shove (2003a,b, 2014) and Chappells and Shove (2005)

that comfort is largely socially constructed, is proposed. The proposed solution in this chapter is targeted at reducing energy consumption in these TAEs, but with possibilities for expansion to water saving initiatives as well.

In designing this solution, the findings from the literature, as well as Chapters 4 and 5 of this thesis, which indicated that HVAC is one of the biggest energy drivers in TAEs, is incorporated. Managers of TAEs in South Africa are however challenged with addressing this driver as it often requires building retrofits or the purchase of new technology, both of which are expensive. This challenge is more severe in smaller TAEs who struggle with funding and those in older buildings which require extensive retrofits. This study hence proposed the use of social normative prompts/nudges, a tool of behavioural economics, to modify behaviours associated with HVAC usage, and consequently reduce energy consumption from HVAC systems. The advantages of such behavioural intervention are that the implementation cost is much lower than that of alternative solutions and the potential payback period is short. This implies that small TAEs, as well as those operating in older buildings, can easily implement this intervention to achieve consumption reduction.

This study adopted the framework of Shove and her colleagues, where she argues that thermal comfort is socially constructed, and tests the effectiveness of social norms in modifying hotel guests' room temperature setting behaviour. A field experiment, akin to that carried out by Goldstein et al. (2008) and Schultz et al. (2008) was carried out in a hotel in Cape Town, South Africa. Consistent with the theoretical framework adopted, the study provides evidence for the effectiveness of social normative prompts in influencing hotel guests' room temperature settings, indicating that thermal comfort is to a large extent socially constructed. The implication of this is that the future of the current unsustainable trend in resource consumption and GHG pollution, driven by the increasing adoption of, and demand for, HVAC systems in buildings, can be modified towards more sustainable levels. The implications for the TAI, building design and construction across industries and sectors are discussed.

The contribution of this study to the existing body of knowledge is hence twofold: 1) it verifies the extent to which thermal comfort is socially constructed by providing evidence of the effectiveness of previously tested descriptive social norms in modifying hotel guests' environmental behaviour; and 2) it contributes to the findings of previous studies on the effects of social norms on individual private behaviour, such as hotel guests' towel reuse behaviour, and demonstrates that these findings extend to guests' room temperature setting behaviour. These contributions help better understand the preferences of hotel guests and

provide useful insights for the design of sustainability-centred intervention programs that affect hotel guests' comfort levels.

Furthermore, the learnings from this intervention program are applicable to foster behavioural modification for consumption reduction, not only for other energy drivers but also for water drivers in TAEs. The learnings from this intervention therefore assist in designing sustainability-driven intervention programs to modify other comfort-related guest behaviour, such as time spent in the shower, turning off lights not in use while in the room etc. The findings are relevant to TAEs in South Africa, as well as other developing countries where resource management is a challenge, and the growth of their tourism industry cannot be compromised.

CHAPTER 7 : Thesis Conclusion

7.0 PREFACE

This thesis is a collection of essays which explore the issue of Resource Management within the context of Environmental Sustainability in the Tourism Accommodation Industry (TAI) in South Africa. Focusing on demand side management of energy and water resources, it aims to understand the context of resource use in the TAI with the aim of influencing consumption towards more sustainable levels. The Resource Management (RM) focus of Environmental Sustainability (ES) in this study is consistent with extant literature on ES in this field. The literature has identified that the resource-intensive nature of the TAI, driven by the specificity of the hospitality functions it renders, necessitates the RM focus of ES in the industry. The South African focus is motivated by the energy and water crisis in the country which is combined with growth in the tourism sector and international tourist arrivals, and the implications of this growth for the already strained energy and water resources in the country. The thesis is composed of five separate, but thematically connected articles, organised into chapters, which focus on understanding and addressing resource consumption issues in South Africa's TAI. Figure 7.1 provides a graphical view of the interconnectedness between the papers. Each paper employs its own framework, data, and method to arrive at conclusions that support the objective of the thesis. A summary of the key findings of each paper, and how they link to the other chapters of the thesis, is detailed in Section 7.1.

7.1 SUMMARY OF KEY FINDINGS

The first paper is based on the premise that an important starting point in the analysis and understanding of ES issues and challenges, is the contextualisation of the industry's take on the concept. Hence, the paper sought to understand the perception of ES by managing stakeholders (i.e. owners, manager, and operators of accommodation establishments) in the industry, their understanding of the applicability of ES to the TAI, who they think should be responsible for ES in the industry, and the activities they have implemented to conserve energy and water resources. Using thematic analysis of thirty semi-structured interviews, the findings of the paper indicate that the respondents are very aware of ES and its specific applicability to the TAI. Emerging themes revealed that the industry operators mostly viewed ES in line with energy, water, and waste management and preservation of the environment.

of tourism accommodation establishment (TAE), and the need to preserve the planet for future generations. They conveyed that the applicability of ES to the industry is driven by the resource-intensive nature. These themes indicate a proficient understanding of ES and its specific applicability to their industry. Participants also indicated that the responsibility for ES in TAEs falls on all establishment stakeholders – management, staff and guests, with each having unique but overlapping roles. However, despite the adept level of understanding, the acceptability of the concept's relevance by industry stakeholders, and the acceptance of ES responsibility shown by these stakeholders, the paper finds that the level of take-up of RM activities in the industry is still very low, and at best basic. This low level of adoption is consistent with the findings of other studies for the developing country TAEs.

The second paper investigates the low adoption rates identified in the first paper by evaluating reasons why industry operators adopt RM and ES initiatives. Drawing on semi-structured interviews with thirty TAE operators, this paper employs a qualitative content analysis methodology to understand participants' motivations and goals for adopting ES in the industry. The analysis of responses strongly suggests comparative advantage and ethically-driven motives as the primary drivers of ES adoption in the industry, showing that industry establishments adopt ES initiatives to improve their comparative advantage, operating as economic agents seeking to minimise their costs and maximise their revenue. It also indicates a strong ethical mindfulness, where industry operators are driven to adopt ES by their perceived duty to preserve the environment and satisfy their conscience. These two dominant themes explain the finding of the first paper where respondents adopted basic ES initiatives which saved costs. Also, these initiatives were such that they were sufficient to be used for marketing to attract a certain niche of ES-conscious customers, and at the same time to allay their desire to contribute to the preservation of the planet.

In the same vein as the second paper, the third paper investigates the barriers to adopting ES initiatives in the industry. Using the same data and methodology as the second paper, it attempts to explain the low level of adoption in the industry despite the high awareness and acceptability rates identified in the first paper, and the compelling motivations in the second paper. Analysis of participants' responses reveal a paradoxical finding: resource constraint was identified as the single largest barrier to adopting ES initiatives in the industry despite the cost saving motivation identified in paper two (see link 1 in Figure 7.1). The resource constraint barrier alludes to limited financial capacity to provide the resources (funds, manpower, and time) required to implement ES initiatives.

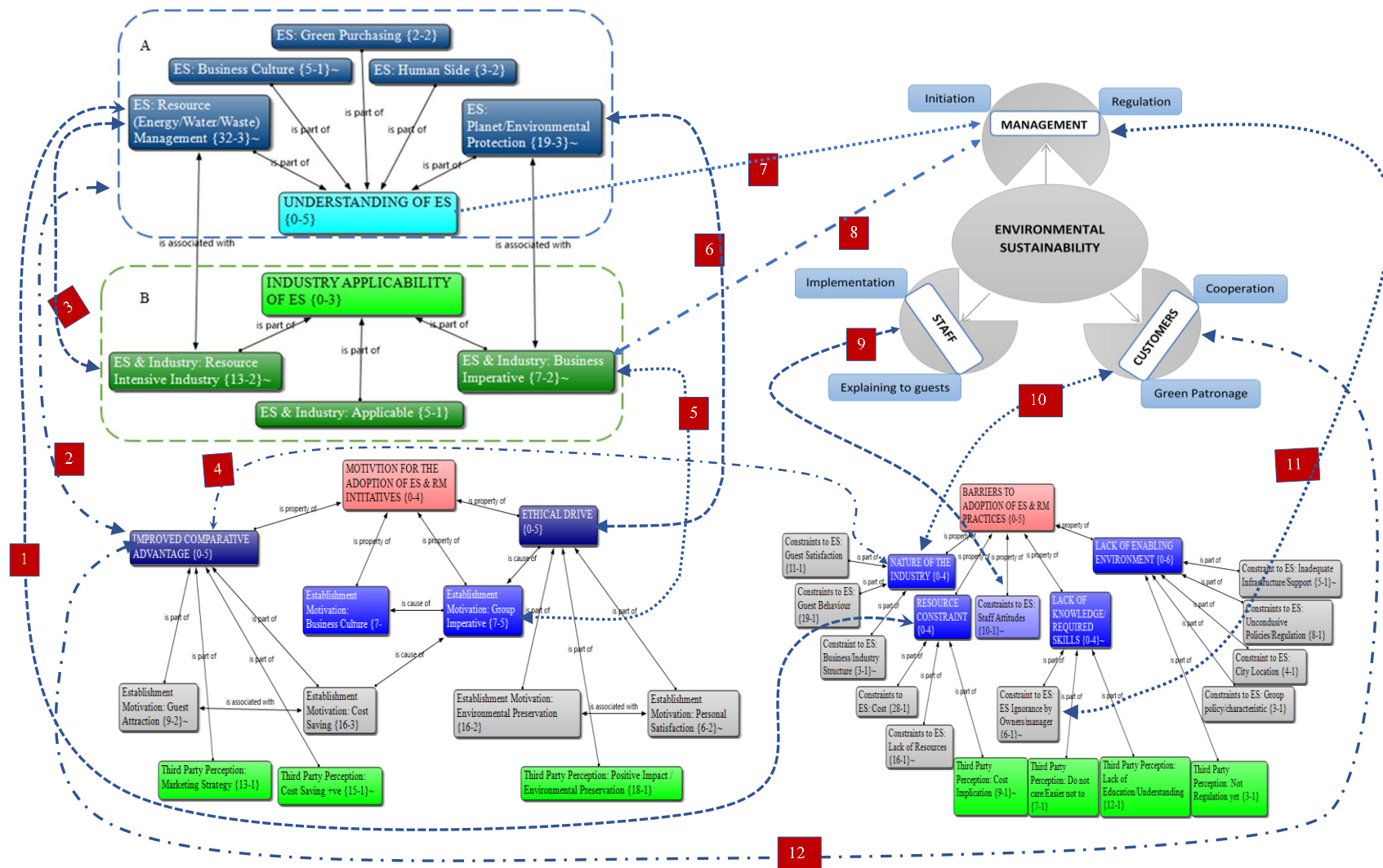


Figure 7.1: Interdependence and Interconnectedness of thesis chapters

This paradox is explained by the fact that many ES initiatives require high initial cost outlay to implement, as well as to run and maintain. These TAEs, however, have difficulty in securing this initial cost outlay, despite the cost-saving benefits of the initiatives over time. This further explains the basic, low-cost initiatives adopted by establishments as identified in paper one. The analysis of these responses strongly suggests that in TAEs, financial considerations are the most important determinates of the adoption of ES and RM initiatives. These financial considerations occur in various forms ranging from the desire to improve competitive advantage (via increased revenue and cost saving) as a motivation for adopting these initiatives, to the high scarcity of funds to provide the necessary resources to adopt these activities as a barrier to adopting them (see link 3 in Figure 7.1). The repeated occurrence of financial considerations is indicative of the nature of these businesses as economic agents seeking to maximise their profits and minimise their costs. The results from the analysis of third party perceptions indicates that this financial consideration is industry wide and not just limited to the study sample. This is evident in the fact that cost consideration was one of the most highlighted determinants both as a barrier to and motivation for the adoption of the adoption of ES and RM initiatives. This response is valid in light of the industry's understanding of ES in terms of RM, and their understanding of its applicability to the industry being "the resource intensive nature of the industry" and "the business imperative" for survival (see links 1 and 12 in Figure 7.1).

The second key barrier to adoption identified by the majority of participants was the nature of the industry. The service nature of the TAI demands that success is dependent on the satisfaction of the clients (see links 4 and 10 in Figure 7.1). This requirement constrains the actions of industry operators with regard to guests who have the prerogative of acting as they like and requesting what they want, regardless of the environmental implications of their actions, as well as decisions regarding adjustments to the establishment's facilities which might impact guests' comfort. This barrier, as well as the challenge of gaining staff support, were identified as the most debilitating of the challenges as fixing them requires an attitude shift for both guests and staff. The paper suggests the development of a continuous training program to gradually and lastingly adjust staff behaviour, and the use of social normative messages to delicately modify guests' behaviour, without impacting on their comfort levels, during the duration of their stay. To gain further insight on key problem areas for possible intervention in the industry, the paper explores participants' perception of the key drivers of resource consumption in the industry. The findings indicate that consistent with the international literature, Heating, Ventilation and Air-conditioning (HVAC) was the single largest driver of energy consumption, and guests' showers was the largest driver of water consumption. Participants also suggested that occupancy is a significant driver of water

consumption in their establishments, but that its contribution to energy consumption is minimal.

The fourth paper employs a quantitative approach to investigate the drivers of energy²¹ consumption in the industry. Following the findings of the preceding paper, it evaluates the role of climate (a driver of HVAC consumption), energy tariffs, establishment characteristics and facilities, and occupancy in driving energy consumption across twenty-two hotels in South Africa. Results from a Dynamic Random Effects panel econometric model indicates that hotel characteristics (such as size and star-grading) and facilities offered (e.g. spa or restaurant facilities) are the biggest drivers of consumption, followed by electricity cost which serves to drive consumption downwards. This is followed by climatic variables (measured by temperature, humidity and rainfall) and then occupancy. Given that data on climate effect could not be disaggregated by the facility types in establishments, the direct impact of HVAC could not be directly assessed, however, it can be intuitively deduced that the facilities offered would imply increased HVAC usage, as would bigger hotels and hotels with higher star grading.

This fifth paper incorporates one of the suggestions of the third paper to tackle one of the most debilitating challenges to adopting ES and RM initiatives faced by TAE operators – the service nature of the industry. This challenge is fully conceptualised by links 1, 2, 3, 4, 10, and 12 of Figure 7.1. The links show that while the resource intensive nature offers opportunities for cost saving via RM adoption, the service nature of their industry, which places the comfort of guests ahead of RM, combined with the anti-sustainable and non-cooperative behaviours of some guests, makes adopting ES and RM initiatives difficult for even willing establishments. The paper explores the effectiveness of social norms in inducing sustainable behaviour in TAE guests, as a delicate means of increasing cooperation without compromising comfort. Adopting the theoretical lens of Shove (2003b,c, 2014), who argues that thermal comfort is socially constructed, the paper focuses on energy consumption associated with HVAC (identified as the single largest energy driver in the industry), and evaluates the effectiveness of Social Normative prompts on appeals to guests to set their room thermostat to a prescribed temperature within the experimental framework of a Randomised Control Trial. Results from this experiment provide strong evidence for the effectiveness of social normative prompts in influencing hotel guests' room temperature settings, indicating that thermal comfort is to a large extent socially constructed. This result is very promising for the future of sustainable tourism in that it offers hope that the current

unsustainable trend in resource consumption and GHG pollution, driven by the increasing adoption and demand for HVAC systems in buildings, can be modified towards more sustainable levels.

This thesis, hence, employs a bottom-up approach in that it first begins by exploring the understanding, perceptions, and preferences of key decision makers in the tourism accommodation industry with regard to resource management and environmental sustainability. This approach has resulted in findings that provide evidence of the willingness of the private sector to participate in sustainable initiatives and highlights the real problem areas that constitute barriers to the adoption of sustainability initiatives. The result of this inquiry provides a better, more informed background for “green behaviour” recommendations. Based on this, the study tests the effectiveness of one of these recommendations, taking into consideration the findings from the exploratory section of the study.

7.2 STUDY LIMITATIONS AND RECOMMENDATIONS FOR FUTURE STUDIES

The first limitation of this study is the balance between the energy and water focus in two of the essays given that the study's key objective is to address energy and water issues in the tourism accommodation industry. While the first three essays (Chapters 2 to 4) incorporate both the energy and water dimension, the last two essays focus on energy only. The fourth essay quantitatively evaluates the drivers of energy consumption in the study sample and does not incorporate the drivers of water consumption. This is due to the severe challenge in obtaining water consumption data for the industry. The fifth essay focuses on a behavioural intervention focused on reducing energy consumption in accommodation establishments. This energy focus is motivated by the ease of experimental testing associated with observing energy behaviour. The findings of this fifth essay can, however, be extrapolated to the water case as it tests a behaviour modification ideology that can be argued to cut across both energy- and water-related issues. It will be exciting to see future studies that are able to circumvent the water data availability challenge for the industry encountered in the fourth essay, and also to test the applicability of the behavioural intervention in the waste consumption context. Such studies will improve the understanding of the dynamics of water consumption in the industry for informed sustainable policy decision-making.

²¹ The focus on energy only in the paper is as a result of constraints in obtaining data on water consumption for the industry.

Another limitation associated with this study is that the geographical focus of the exploratory essay – which is the Western Cape region – might limit the applicability of its findings to destinations with similar geographical and climatic features. This limit to the Western Cape region is due to the resource intensity associated with widening the scope, given the face-to-face characteristic of interviews used in these essays. The findings in this case can hence not be extrapolated to regions with different climate characteristics which affect energy and water consumption. For example, those in year-round water stressed regions, such as the Karoo in South Africa, might have different perceptions with regard to certain issues investigated (e.g. water.). However, the consistency of some of the findings with extant literature for developing countries suggests that they are not entirely geography and climate dependent, but that there are certain socio-economic characteristics of the evaluated contexts which are consistent across most TAIs in developing countries.

The third possible limitation in this study is the time period of the data collected and utilised in some of the essays in the study. The data for the first three essays, which use qualitative interviews, were collected in 2015. Given the time gap between 2015, when the data was collected, and 2017, when this thesis was completed, it is reasonable to expect that some changes would have occurred in the study area, which might influence the findings. Indeed, one major change which is notable and worth mentioning is the shift from the energy crisis in the nation in 2015, to the water crisis in 2017. During the data collection phase, energy was a big concern in the country and for the industry due to power outages caused by load shedding, but water was not such a challenge. However, at the time of completing this thesis, the energy challenge has been relatively ameliorated/reduced, while the water issue has moved from “not a problem” to full blown crisis with severe water restrictions being implemented nationwide. While this identifies as a study limitation, it also highlights the timeliness of this research in that it provides the background for addressing the resource consumption issues in the industry, and proffers possible solutions and practice recommendations that apply to both energy and water consumption in the industry.

Finally, the scope of study, which is limited to TAEs and not the entire tourism sector, limits the applicability of the findings to other industries in the tourism sector. This is because of the variation in the sustainability focuses in each of these industries. For example, the sustainability focus in the travel sector is more energy consumption related, with focus on reducing CO₂ emissions associated with various transport options, while the focus in marine and wildlife tourism industry is more focused on the impact on human touristic activities on the survival of marine and wildlife ecosystems. While there are areas of overlap and interconnectedness in these various focuses, with all working toward achieving the same

overall goal, the specifics of perceptions, motivations, challenges, problem areas and proposed solutions will differ with the industry under consideration. Similarly, the accommodation types included in this study are backpackers, bed and breakfasts, guest houses and hotels. Other accommodation types such as campgrounds, safari and wildlife lodges/resorts, golf course resorts, self-catering accommodation, cruise ships and private home rentals (such as via the Air BnB portal) are not included. The energy and water consumption habits of these establishments might vary from those of the types explored in this study. However, given that a key characteristic of their activities is the provision of accommodation for tourists, it is argued that the majority of the findings in this study can be generalised to them. Nevertheless, studies that incorporate these in their study sample, or evaluate the energy and water characteristics solely of these establishment types, will be invaluable in addressing the idiosyncratic contexts of these establishment types.

7.3 CONCLUDING REMARKS

The thesis has adopted a bottom-up approach to address the challenge of energy and water demand management in the TAI in South Africa. The findings of the five separate but thematically connected essays, suggests that the industry is keen to adopt sustainable and resource management practices. For policy makers, this implies that to engender rapid adoption of ES initiatives, excess resources will not need to be expended on education and re-orientation of the operators of TAEs as most of them are already participating in ES in one form or another, albeit at low levels. Policy makers will, however, need to focus on making the environment more conducive, by enacting new regulations and policies and/or amending previous ones to make it easier for willing establishments to readily adopt ES initiatives. The South African Department of Tourism and the Tourism Grading Council of South Africa both need to work together to promote sustainability incentives to encourage operators in the industry. This could be in the form of subsidies for renewable energy and water saving devices, low cost pricing for efficient energy (and water) usage based on a predetermined benchmark (as suggested in Chapter 5), adjusting the current star grading system to award extra grades for sustainability initiatives, or assisting the industry with staff training in sustainable hospitality. Policy makers and consultants can also borrow from the results of this study (especially Chapter 6) to train TAE operators on the use of behavioural economics tools of nudges and social norms to improve guests' cooperation on sustainability related initiatives associated with comfort, such that guests' comfort levels are not compromised. This learning can also be extended to other comfort qualities, as well as services of cleanliness and convenience associated with luxury in the hospitality industry.

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APPENDICES

APPENDIX A: ELECTRICITY TARIFF DEFINITIONS

Energy Demand Charge is R/kVA or R/KWh charge per premise which is seasonally differentiated and is based on the chargeable demand registered during the month in order to recover peak energy costs.

Power Factor is the ratio of kW to kVA measured over the same integrating period.

Service Charge is a fixed charge payable per account to recover service-related costs.

Note: For the Home power, Land rate and Business rate tariffs the service costs and administration costs are combined to make up the service charge and are charged per premise.

Tariff is a combination of charging parameters applied to recover measured quantities such as consumption and capacity costs, as well as unmeasured quantities such as service costs. Note: The tariff rate, multiplied by the measured service quantities, recovers the cost of service.

(Active) energy charge is a charge for each unit of energy consumed, typically charged for as c/kWh or R/MWh.

Chargeable demand is the highest average demand measured in kVA in a billing month during the chargeable time periods specified for each tariff.

Source: Eskom Tariff Guide, 2008.

APPENDIX B: FURTHER REGRESSION RESULTS

Table B.1: Non-Standardised AR1 Regressions for All Hotels (part A)

	No control for seasons	Two Season Dummy	Summer Dummy	Winter Dummy	Four Seasons Variable
	1	2	3	4	5
Average Temperature	9.23 (3.06)***	8.88 (2.94)***	-11.70 (3.37)***	31.12 (6.37)***	8.68 (2.88)***
Relative Humidity in %	0.30 (0.71)	0.32 (0.76)	-0.80 (1.66)*	1.62 (2.32)**	0.33 (0.79)
Rainfall in mm	3.50 (4.14)***	3.53 (4.18)***	3.82 (4.26)***	2.57 (1.71)*	3.54 (4.18)***
Energy Charge in C/kWh	-30.45 (6.18)***	-30.83 (6.31)***	-40.48 (5.84)***	-30.45 (4.85)***	-31.11 (6.41)***
Time of Use	-3,038.01 (1.24)	-3,021.76 (1.23)	-3,677.56 (1.48)	-2,967.81 (1.18)	-3,035.51 (1.24)
Service Charge	-1,127.94 (0.24)	-1,149.66 (0.24)	-1,470.39 (0.32)	-1,066.85 (0.22)	-1,139.77 (0.24)
Demand Charge	-1,312.62 (2.58)***	-1,317.07 (2.60)***	-2,626.00 (2.51)**	-1,255.68 (2.07)**	-1,340.62 (2.66)***
Conference Facility Dummy	12,879.85 (1.92)*	12,871.74 (1.92)*	13,187.75 (2.01)**	13,093.46 (1.92)*	12,854.49 (1.92)*
Spa Dummy	5,572.04 (2.32)**	5,554.21 (2.32)**	5,293.41 (2.26)**	5,771.08 (2.37)**	5,532.60 (2.31)**
Restaurant	-14,590.85 (2.09)**	-14,544.38 (2.08)**	-14,035.99 (2.06)**	-14,858.92 (2.10)**	-14,491.17 (2.08)**
<u>Star Grading:</u>					
Three-Star				(Omitted)	
Four-Star	-2,134.53 (0.73)	-2,135.33 (0.73)	-2,035.16 (0.71)	-2,082.28 (0.70)	-2,134.03 (0.73)
Five-Star	7,707.36 24.29	7,712.22 24.33	7,391.79 24.77	7,887.23 23.92	7,715.79 24.37
No. of Rooms	(2.96)*** (3.03)***	(2.96)*** (3.03)***	(3.10)*** (2.98)***	(2.87)*** (3.05)***	(2.97)*** (3.03)***
0 if Summer; 1 if Winter		226.05 (4.19)***			
<u>Season:</u>					
Autumn				(Omitted)	
Winter					-200.96 (2.58)**
Spring					-376.15 (4.74)***
Summer					-354.18 (4.10)***
Constant	5,808.04 (1.11)	5,706.37 (1.09)	7,526.73 (1.46)	5,219.39 (0.98)	6,046.79 (1.16)
N	20,845	20,845	10,194	10,651	20,845

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Standard Errors in Parentheses.

Table B.2: Non-Standardised AR1 Regressions for All Hotels (part B)

	Autumn only	Winter only	Spring only	Summer only
	6	7	8	9
Average Temperature	54.53 (7.33) ^{***}	-6.91 (1.10)	8.42 (1.52)	-28.32 (6.39) ^{***}
Relative Humidity in %	1.87 (1.60)	0.78 (0.98)	0.11 (0.15)	-1.25 (2.03) ^{**}
Rainfall in mm	4.05 (1.14)	1.54 (1.06)	4.30 (3.06) ^{***}	3.25 (2.82) ^{***}
Energy Charge in C/kWh	-35.24 (3.47) ^{***}	-29.56 (4.12) ^{***}	-43.61 (5.69) ^{***}	-37.70 (3.75) ^{***}
Time of Use	-3,757.61 (1.35)	-2,634.34 (1.09)	-2,243.50 (0.88)	-3,145.53 (1.13)
Service Charge	-1,471.90 (0.29)	-889.01 (0.19)	-2,281.60 (0.48)	-1,365.20 (0.29)
Demand Charge	-2,256.22 (1.68) [*]	-1,061.34 (1.79) [*]	-2,922.02 (2.67) ^{***}	-2,146.54 (1.24)
Conference Facility Dummy	14,469.65 (2.00) ^{**}	12,584.71 (1.91) [*]	9,984.78 (1.52)	12,923.61 (1.88) [*]
Spa Dummy	6,198.14 (2.41) ^{**}	5,625.86 (2.39) ^{**}	5,048.40 (1.98) ^{**}	5,364.35 (2.24) ^{**}
Restaurant	-15,612.85 (2.10) ^{**}	-14,635.61 (2.13) ^{**}	-10,538.25 (1.53)	-14,159.34 (2.02) ^{**}
Star Grading: Three-Star				
Four-Star	-2,236.99 (0.71)	-2,123.87 (0.74)	-1,739.00 (0.52)	-2,062.89 (0.70)
Five-Star	8,015.28 24.16	7,609.94 23.51	4,400.06 33.32	7,418.66 24.13
No. of Rooms	(2.77) ^{***} (2.95) ^{***}	(2.93) ^{***} (3.05) ^{***}	(3.94) ^{***} (1.61)	(2.96) ^{***} (2.93) ^{***}
0 if Summer; 1 if Winter				
Season: Autumn				
Winter				
Spring				
Summer				
Constant	5,516.19 (0.97) 5,593	6,011.44 (1.15) 5,058	7,059.70 (1.30) 4,867	7,525.08 (1.39) 5,327

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Standard Errors in Parentheses.

Table B.3: POLS Regressions for four hotels in the dataset (part A)

	No control for seasons	Four Seasons Variable	Two Season Dummy	Summer Dummy	Winter Dummy
	1	2	3	4	5
Occupancy rate (%)	-4.03 (2.71)	-4.03 (14.20)	-3.86 (15.85)	-13.58 (25.26)	3.56 (8.28)
Average Temperature	205.79 (23.84) ^{***}	205.79 (240.91)	212.00 (207.49)	133.36 (154.61)	238.01 (220.83)
Relative Humidity (%)	22.32 (3.89) ^{***}	22.32 (29.82)	22.78 (27.92)	10.26 (16.25)	28.91 (34.90)
Rainfall in mm	-5.85 (5.33)	-5.85 (6.64)	-6.07 (6.11)	-3.40 (4.76)	-11.50 (13.01)
Energy charge(c/kWh)	-46.17 (1.83) ^{***}	-46.17 (23.49)	-46.00 (23.75)	-45.37 (21.79)	-45.81 (24.68)
Time of use dummy	-3,940.80 (79.71) ^{***}	-3,940.80 (1,367.85)	-3,950.43 (1,333.53)*	-3,678.25 (1,274.87)	-4,238.70 (1,354.83)*
Season: Autumn					
Winter	-178.69 (211.87)	-178.69 (981.71)			
Spring	-246.16 (150.05)	-246.16 (828.20)			
Summer	-110.10 (189.73)	-110.10 (1,045.33)			
0 if Summer; 1 if Winter			76.21 (361.82)		
Constant	8,258.70 (628.39) ^{***}	8,258.70 (3,338.04)	7,929.35 (1,839.63) ^{**}	10,603.49 (481.70) ^{***}	6,670.94 (3,399.31)
R^2	0.49	0.49	0.49	0.48	0.50
N	4,307	4,307	4,307	2,161	2,146

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Robust Standard Errors in Parentheses; All standard errors are clustered by hotel identity unless otherwise stated.

Table B.4: POLS Regressions for four hotels in the dataset (part B)

	Autumn only	Winter only	Spring only	Summer only
	6	7	8	9
Occupancy rate (%)	0.36 (1.22)	6.92 (5.63)	-34.70 (51.29)	1.90 (3.58)
Average Temperature	257.66 (281.64)	236.69 (297.54)	71.67 (65.56)	165.78 (203.99)
Relative Humidity (%)	34.30 (40.37)	26.73 (34.70)	4.97 (8.57)	10.68 (17.12)
Rainfall in mm	-49.32 (67.14)	-7.37 (10.48)	-9.44 (8.98)	3.14 (8.71)
Energy charge(c/kWh)	-37.76 (23.82)	-52.62 (22.03)	-40.91 (14.98)	-46.24 (22.78)
Time of use dummy	-5,106.33 (1,306.04)*	-3,364.70 (1,606.57)	-3,685.86 (994.04)*	-3,659.52 (1,439.67)
Season: Autumn Winter Spring Summer 0 if Summer; 1 if Winter				
Constant	6,008.93 (5,951.92)	6,692.44 (4,350.50)	13,341.53 (4,028.44)*	9,038.07 (1,798.85)**
R^2	0.53	0.46	0.52	0.47
N	1,136	1,010	1,069	1,092

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Robust Standard Errors in Parentheses; All standard errors are clustered by hotel identity unless otherwise stated.