The Taiwanese Hotel Sector's Response to Climate Change: Environmental Behaviours and Practices

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Acknowledgments

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Abstract

This thesis examines the response of Taiwanese hotels to climate change. Climate change is increasingly recognised by industry, governments and researchers as one of the most substantial challenges to the sustainability of tourism at both a destination and business level in both the short and long-term. Hall (2008) observed that tourism was explicitly recognised by the IPCC as one of the most important industries in Asia, yet the lack of research on tourism and climate change in an Asian context was identified, with especially little explicit research on the climate change response of the hospitality and accommodation sector. This is also despite the accommodation sector being the most significant tourism sector contributor to emissions after aviation (United Nations World Tourism Organisation [UNWTO] and United Nations Environment Programme [UNEP] 2008; World Economic Forum [WEF] 2009; Scott et al. 2012). Therefore this research seeks to explicitly respond to this knowledge gap by examining the response of the Taiwanese hotel sector to climate change. It is also the first known study that explores the extent to which the hotel sector meets the specific recommendations of the UNWTO-UNEP (2008) with respect to accommodation sector measures in relation to climate change.

In order to provide a firm basis of methodological comparison with the previous international literature on environmental studies of the accommodation sector, this thesis conducted a baseline survey to investigate the response of Taiwanese hotels towards environment and climate change with respect to four main dimensions, including perception, attitudes, actions, and influencing factors for environmental and climate change practices. Overall, 270 hotel participants answered the email-based questionnaire survey of the total population of Taiwanese hotels, reflecting a response rate of approximately 10%.

Taiwanese hotel respondents acknowledged the existence of climate change, but rarely related this phenomenon to their daily business operations. Their attitude towards their own hotel's contribution to climate change was especially reserved. In addition to waste management, energy-saving practice, and the offer of local-produced cuisine, the level of implementation of environmental practices in Taiwanese hotels was relatively limited. There were also low compliance rates with existing environmental policy, although they were aware of environmental schemes.

The factors of size and extreme weather event experience were identified as the more significant variables to differentiate Taiwanese hotel response to environment and climate change. The significance of hotel size, standard, and experience of weather extreme variables were also examined. Finally, this research discussed the prospective contributions and issues of the results of this study, and argues for their application in the fields of climate change research, benchmarking development, education and and training, government regulation and policy, and hotel management.

Papers Published From This Research

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List of Abbreviations and Acronyms

ADB	Asian Development Bank
B&B	Bed and Breakfast
CO_2	Carbon Dioxide
EMS	Environmental Management System
EPA	Environmental Protection Administration
GHG	Greenhouse gas
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
ITP	International Tourism Partnership
LEED	Leadership in Energy and Environmental Design (US Certification)
Mt CO_2	Million tons CO_2
NGO	Non Government Organisation
OECD	Organisation for Economic Co-operation and Development
SLR	Sea Level Rise
SM	Small-Medium (hotel)
TTB	Taiwan Tourism Bureau
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNWTO	United Nations World Tourism Organisation
WEF	World Economic Forum
WHO	World Health Organisation
WMO	World Meteorological Organization
WTTC	World Travel and Tourism Council
WWF	World Wide Fund for Nature

Chapter 1

Introduction: Tourism and Hospitality Response to Climate Change

This thesis examines the environmental practices of Taiwanese hotels and their response to climate change. Climate change is increasingly recognised by industry, governments and researchers as one of the most substantial challenges to the sustainability of tourism at both a destination and business level in both the short and long-term (United Nations World Tourism Organization and United Nations Environment Programme [UNWTO & UNEP] 2008; World Economic Forum [WEF] 2009; Scott et al. 2012; Gössling et al. 2013; Hall et al. 2013). However, despite a rapid expansion in the literature on tourism and climate change (Scott & Matthews, 2011; Scott et al. 2012), there is a dearth of information on the responses of business to climate change in an Asian context. For example, in a survey of benchmark Intergovernmental Panel on Climate Change (IPCC) reports, Hall (2008) observed that tourism was explicitly recognised by the IPCC as one of the most important industries in Asia, yet the lack of research on tourism and climate change in an Asian context was identified as an issue by the IPCC with Cruz et al. (2007) stating 'only a few assessment studies are on hand for this review'. Furthermore, Hall (2008) also noted that with respect to subject matter, there was relatively little explicit research on climate change response from the hospitality and accommodation sector as compared to that on aviation, ski resorts, and coastal and winter tourism (see also the surveys by Scott and Matthews [2011] and Scott et al. [2012]), this is despite the accommodation sector being the most significant tourism sector contributor to emissions after aviation (UNWTO & UNEP 2008; WEF 2009; Scott et al. 2012). Therefore, this research seeks to explicitly respond to this knowledge gap by examining the response of the Taiwanese hotel sector to climate change, including with respect to UNWTO recommendations for accommodation businesses (UNWTO & UNEP).

This introductory chapter aims to provide a brief context to this thesis. The chapter first outlines some of the definitions of climate and climate change as well as key findings with respect to the science of

climate change. It then goes on to briefly outline the relationship between tourism and climate change before outlining some of the issues associated with tourism and climate change in the Asian context. The chapter then concludes with an overview of the thesis.

Tourism and Climate Change: An Overview

Climate is generally defined as the weather averaged over a period of time, and effectively represents the conditions one would anticipate experiencing at a specific destination and time (Scott et al. 2012; IPCC 2013a). The Intergovernmental Panel on Climate Change (IPCC 2013b: glossary) states

> Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization. The relevant quantities are most often surface variables such as temperature, precipitation and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.

Descriptions of climate and associated change are specific to a time and a location and are defined over various scales from the local to the global, and over varying degrees of time. Changes in climate are described by the IPCC (2013b: glossary) in terms of either

> • climate variability – variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events;
> • climate change – Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.

As will be seen below, climate change is often understood by tourism businesses in terms of changes in the frequency and magnitude of weather events over time, i.e. variability (e.g. Hall 2006; Saarinen & Tervo 2006; Tervo 2008; Scott et al. 2012).

Although climate change remains a significant media and political issue, the reality of climate change is no longer open to scientific dispute. The most recent IPCC report on the physical science of climate change (2013b) concluded in its summary for policy makers: 'Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased' (IPCC 2013a: 2). They emphasise: 'Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system' (IPCC 2013a: 13). Other key findings of the IPCC (2013a, b) are highlighted in Table 1.1.

In addition to assessing recent climate change, the IPCC use a number of models to project changes in the climate system. These are important not only because of their assessment of potential environmental futures and their corresponding relationship with potential economic, societal and political futures, but also because they act as important drivers for international climate change negotiations, and the actions of industry, governments and communities, including the tourism industry (UNWTO & UNEP 2008, 2012; WEF 2009; World Travel and Tourism Council [WTTC] 2009, 2010; Gössling et al. 2013). Table 1.2 indicates some of the key findings of the IPCC (2013a, 2013b) with respect to future global and regional climate change.

Table 1.1: Key findings of the IPCC with respect to the physical science of climate change

- Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850… In the Northern Hemisphere, 1983–2012 was likely the warmest 30-year period of the last 1400 years (*medium confidence*)[1]
- Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010 (*high confidence*). It is *virtually certain* that the upper ocean (0−700 m) warmed from 1971 to 2010.
- Over the last two decades, the Greenland and Antarctic ice sheets have been losing mass, glaciers have continued to shrink almost worldwide, and Arctic sea ice and Northern Hemisphere spring snow cover have continued to decrease in extent (*high confidence*)
- The rate of sea level rise since the mid-19th century has been larger than the mean rate during the previous two millennia (*high confidence*).
- The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification.
- Total radiative forcing[2] is positive, and has led to an uptake of energy by the climate system. The largest contribution to total radiative forcing is caused by the increase in the atmospheric concentration of CO_2 since 1750

1. The IPCC use a level of confidence to characterize uncertainty as to the correctness of an analysis or a statement:

- very high confidence at least 9 out of 10 chance of being correct;
- high confidence about 8 out of 10 chance;
- medium confidence about 5 out of 10 chance;
- low confidence about 2 out of 10 chance;
- very low confidence less than 1 out of 10 chance.

Likelihood refers to a probabilistic assessment of some well defined outcome having occurred or occurring in the future:

- virtually certain >99 % probability of occurrence;
- very likely >90 % probability;
- likely > 66 % probability;
- about as likely as not 33–66 % probability;
- unlikely <33 % probability;
- very unlikely <10 % probability;
- exceptionally unlikely <1 % probability.

(IPCC 2007a)

2. Radiative forcing provides a way to compare the magnitude of different natural and anthropogenic perturbations of the climate system, including cooling (–) and warming (+) influences. When combined, the net radiative forcing indicates the direction and magnitude of influence on the climate (Scott et al. 2012: 23).

Source: IPCC 2013a

Table 1.2: Key findings of the IPCC with respect to future global and regional climate change

- Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.
- Global surface temperature change for the end of the 21st century is likely to exceed 1.5°C relative to 1850 to 1900 for all Representative Concentration Pathways (RCP)[1] scenarios except RCP2.6. It is *likely* to exceed 2°C for RCP6.0 and RCP8.5, and *more likely than not* to exceed 2°C for RCP4.5. Warming will continue beyond 2100 under all RCP scenarios except RCP2.6. Warming will continue to exhibit interannual-to-decadal variability and will not be regionally uniform
- Changes in the global water cycle in response to the warming over the 21st century will not be uniform. The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions
- The global ocean will continue to warm during the 21st century. Heat will penetrate from the surface to the deep ocean and affect ocean circulation
- It is *very likely* that the Arctic sea ice cover will continue to shrink and thin and that Northern Hemisphere spring snow cover will decrease during the 21st century as global mean surface temperature rises.
- Global mean sea level will continue to rise during the 21st century… Under all RCP scenarios, the rate of sea level rise will *very likely* exceed that observed during 1971 to 2010 due to increased ocean warming and increased loss of mass from glaciers and ice sheets.
- Climate change will affect carbon cycle processes in a way that will exacerbate the increase of CO_2 in the atmosphere (high confidence). Further uptake of carbon by the ocean will increase ocean acidification.
- Cumulative emissions of CO_2 largely determine global mean surface warming by the late 21st century and beyond… Most aspects of climate change will persist for many centuries even if emissions of CO_2 are stopped. This represents a substantial multi-century climate change commitment created by past, present and future emissions of CO_2

1. A new set of scenarios of anthropogenic contributions to the climate system which were used for the new climate model simulations carried out for the IPCC under the framework of the World Climate Research Programme.

Source: IPCC 2013a

Tourism, Hospitality and Climate Change

The physical impacts and science of climate change presents a number of significant challenges for tourism with respect to its effects on businesses, destinations, infrastructure and resources, generating regions, competitiveness and tourist flows and behaviours as well as adaptation and mitigation (Hall & Higham 2005; Gössling & Hall 2006a, 2006b; Becken & Hay 2007; Hall 2010a; UNWTO & UNEP 2008;

Scott & Becken 2010; Scott 2011; Scott et al. 2012; Gössling et al. 2013). Climate change is a significant subject of media and public debate. Because tourism is often associated with transport, and with aviation in particular, tourism is often a focal point for discussions on climate change in general (Scott & Lemieux 2009, 2010; Scott et al. 2012). There is a growing awareness of tourism impacts and the tensions that may exist in attempting to balance economic development with social and environmental goals (Gössling & Hall 2006a; Scott et al. 2012; Gössling et al. 2013). Undoubtedly, the relationship between tourism and climate change reflects some of the issues faced by other industries and economic sectors (Parry et al. 2007). However, as Scott et al. (2012) identified, tourism also has specific characteristics and peculiarities that demand its own mitigation and adaptation response (see also Coles et al. 2004; Hall et al. 2004; Peeters et al. 2007; Gössling, Hall & Scott 2009c). These include tourism's significant role in less developed countries (Hall 2007; UNWTO & UNEP 2008; Gössling et al. 2009a; Pentelow & Scott, 2011; Hall et al. 2013) and in biodiversity conservation (Hall et al. 2011), as well as the role of climate, environment, risk and security in influencing tourist travel patterns (Gössling & Hall 2006b; Gössling et al. 2013; Hall 2013).

As with other economic sectors tourism therefore both contributes to and is affected by climate change. However, tourism is often regarded as being among the more vulnerable sectors because of its dependence on the environment as a factor in the attractiveness of destinations (UNWTO & UNEP 2008; Scott et al. 2012), although the long term effects of climate change on tourist decision-making is relatively unknown given the adaptive capacity of tourists (Gössling, Scott, Hall, Ceron and Dubois 2012; Gössling et al. 2013).

The Contribution of Tourism and Hospitality to Climate Change

Tourism and travel contribute to climate change through emissions of greenhouse gases (GHGs), including in particular CO_2, as well as methane (CH4), nitrous oxides (NOx), hydrofluorocarbons (HFCs),

perfluorocarbons (PFCs) and sulphur hexafluoride (SF6) (Scott et al. 2012). There are also various short-lived GHGs that are important in the context of aviation and transport (Lee et al. 2009). Because tourism is not recognised within existing industrial classification schemes, estimating tourism-related emissions requires the integration of information on the range of components that comprise the tourism system. Tourism-related emissions include all domestic and international leisure and business travel, and have so far been calculated for three major subsectors: transport to and from the destination; accommodation; and activities at destinations (UNWTO & UNEP 2008; WEF 2009). A more complete analysis would also have to include food and beverage (Gössling & Hall 2013), infrastructure construction and maintenance, as well as tourist retail and services (Gössling 2010); all of these including a lifecycle perspective accounting for the energy embodied in the goods and services consumed in tourism (Gössling 2010; Scott et al. 2012; Gössling et al. 2013).

Tourism transport, accommodation and activities are estimated by independent assessments conducted for the UNWTO and UNEP (2008) and WEF (2009) to contribute approximately 5% to global anthropogenic emissions of CO_2 in the year 2005 (Table 1.3). Most CO_2 emissions are associated with transport, with aviation accounting for 40% of tourism's overall carbon footprint, followed by car transport (32%) and accommodation (21%) (UNWTO & UNEP 2008) (The World Meteorological Organisation [WMO] also contributed to the original study from which the UNWTO and UNEP technical report was based). Cruise ships are included in 'other transport' and, with an estimated 19.2 Mt CO_2, account for approximately 1.5% of global tourism emissions (Eijgelaar et al. 2010).

Significantly, the UNWTO and UNEP (2008) and WEF (2009) assessments of tourism's contribution to climate change do not include the impact of non-CO_2 short-lived greenhouse gases (GHGs). A more accurate assessment of tourism's contribution to global warming should be made on the basis of radiative forcing (RF) (see also IPCC 2013b). Given the range of uncertainty with respect to RF, especially for aviation emissions, Scott et al. (2010) estimated that tourism contributed between 5.2% to 12.5% of

all anthropogenic forcing in 2005, with a best estimate of approximately 8% (Gössling et al. 2013).

Table 1.3: Distribution of emissions from tourism by subsector, 2005

Subsector	CO_2 (Mt)	Percentage
Air transport	515	40%
Car transport	420	32%
Other transport	45	3%
Accommodation	275	21%
Activities	48	4%
Total	1,304	100%
Total world	26,400*	
Tourism contribution		5% of global emissions

* From IPCC (Metz et al. 2007)

Source: UNWTO & UNEP (2008).

Although tourism's contribution to climate change is already substantial, managing emissions from tourism given forecast growth in the foreseeable future appears a major challenge. Emissions from tourism will grow because of several trends, including the growing number of people travelling, increasing frequency of trips, as well as growth in the average length of trips made, and the growing energy intensity of the transport modes used (Dubois et al. 2011; Peeters & Landré 2011; Scott et al. 2012; Gössling et al. 2013). Table 1.4 illustrates historical tourism growth as well as future forecasts to 2030. Based on a business-as-usual scenario for 2035, which considers changes in travel frequency, length of stay, travel distance and technological efficiency gains, UNWTO and UNEP (2008) calculate that CO_2 emissions from tourism will increase by about 135% compared with 2005 (UNWTO & UNEP 2008), reaching 3059 Mt CO_2 by 2035. These estimates can be compared with a projection for emission growth by the World Economic Forum (WEF 2009), which estimates that CO_2 emissions from tourism (excluding aviation) will grow at 2.5% per year until 2035, and emissions from aviation at 2.7%, which suggests emissions of 3164 Mt CO_2 by 2035 (Gössling et al. 2013). However, it should be emphasised that these forecasts are likely low estimates given the failure to incorporate assessment of potential rebound

affects and an overreliance on efficiency gains (Hall 2010a, 2014a; Gössling et al. 2013).

Table 1.4: International tourism arrivals and forecasts 1950-2030 (millions)

Year	World	Africa	Americas	Asia & Pacific	Europe	Middle East
1950	25.3	0.5	7.5	0.2	16.8	0.2
1960	69.3	0.8	16.7	0.9	50.4	0.6
1965	112.9	1.4	23.2	2.1	83.7	2.4
1970	165.8	2.4	42.3	6.2	113.0	1.9
1975	222.3	4.7	50.0	10.2	153.9	3.5
1980	278.1	7.2	62.3	23.0	178.5	7.1
1985	320.1	9.7	65.1	32.9	204.3	8.1
1990	439.5	15.2	92.8	56.2	265.8	9.6
1995	540.6	20.4	109.0	82.4	315.0	13.7
2000	687.0	28.3	128.1	110.5	395.9	24.2
2005	799.0	34.8	133.3	153.6	440.7	36.3
2010 forecast	940.0	50.2	150.7	204.4	474.8	60.3
2020	1 360	85	199	355	620	101
2030	1 809	134	248	535	744	149

Source: UNWTO 2006, 2012; Cooper & Hall 2012.

Although the growth in international tourism is substantial, it should be emphasised that international tourism contributes only a relatively small percentage of total tourism trips. Even domestic tourism data is relatively sparse at a global scale the, UNWTO and UNEP (2008) estimated that approximately 15.5% of tourist trips were international. Based on these estimates, Cooper and Hall (2012) highlighted the growing extent of tourism mobility (Table 1.5), and hence potential implications for emissions. Importantly, for the present work the greatest area of tourism growth 2010-2030 is regarded as being the Asia-Pacific and the south and East Asian economies in particular (UNWTO 2012), meaning that these areas will contribute a greater proportion of GHG emissions. Nevertheless, while the overall growth for the region is expected to be positive until 2030 there are, as the next section discusses, already concerns being expressed over the implications of climate change for particular destinations.

Table 1.5: Global international and domestic tourist arrivals 2005-2030

	Year/billions			
	2005	2010	2020	2030
Actual / Estimated number of international visitor arrivals	0.80	0.94	1.36	1.81
Approximate / Estimated number of domestic tourist arrivals	4.00	4.7	6.8	9.05
Approximate / Estimated number of total tourist arrivals	4.80	5.64	8.16	10.86
Approximate / Estimated global population	6.48	6.91	7.67	8.31

Note: Actual and estimated forecasts of international visitor arrivals based on UNWTO (2012) (See Table 1.4); 2005 approximate figures based on UNWTO and UNEP (2008).

Source: Cooper & Hall 2012.

Tourism and Climate Change in Asia

The Asia-Pacific region is likely to account for about half (47%) of global carbon emissions by 2030 (IPCC 2007a). Because of its rapid rate of growth, the Asian tourism industry (UNWTO 2012) is a key player in the regional tourism response to climate change. The Asia-Pacific is estimated to account for 23% of international tourist arrivals (233 million) in 2012 with a growth rate of 6.8% (Kester 2013; UNWTO 2013), and is predicted to achieve a 30% global market share by 2030 (UNWTO 2012). As a result, and of particular relevance to the current research, the Asia-Pacific region is forecasted to have the highest rate of accommodation emissions growth, increasing from 29% of all accommodation emissions in 2005 to 40% in 2035 (WEF 2009). Despite its economic significance (UNWTO 2012), few assessments have been done on the relationships between tourism and climate change in an Asian context at a regional or national level (Cruz et al. 2007; Hall 2008; Simpson et al. 2008; Amelung et al. 2008; Gössling et al. 2009a; Scott et al. 2012). However, there does appear to be increased recognition that the Asian tourism industry is becoming increasingly vulnerable to climate phenomena, including higher temperatures, more frequent and intense extreme weather events, and sea level rise (Cruz et al. 2007; Scott et al. 2012).

Driven by rapid economic development, Asia has become a significant contributor to climate change. According to the IPCC (2007a) the Asia-Pacific area, will account for 47% of global carbon emissions by 2030, and will simultaneously face temperature increases, sea-level rise, and a higher frequency and magnitude of weather extremes (Li et al. 2012). Table 1.6 summarizes IPCC (2012) climate predictions for Asia that indicate that the temperature increase for Asian sub-regions is generally higher than that of the global average (1.8-4 ^{o}C) by 2100. The highest increase is projected for North Asia (4.3^{o}C), followed by Central and West Asia (+3.7 ^{o}C), East and South Asia (+3.3 ^{o}C), and Southeast Asia (+2.5 ^{o}C).

Table 1.6: Climate change projections for Asian regions by 2100

		North Asia	East Asia	South Asia	Southeast Asia	Central & West Asia
Annual mean Temp.		+4.3 ^{o}C	+3.3 ^{o}C	+3.3 ^{o}C	+2.5 ^{o}C	+3.7 ^{o}C
Annual mean Precipitation		+	+9%	+11%	+7%	-3%
Heat wave	Frequency	+	+	+	+	+
	Intensity		+			+
	Duration	+	+	+	+	+
Forest Fire	Frequency	+				
	Area	+				
High-precipitation Events	Frequency	+	+	+	+	+
	Intensity	+	+	+		
Strong Tropical Cyclone	Frequency		+10-20%	+10-20%	+10-20%	

East and North-East Asia: China, Democratic People's Republic of Korea, Japan, Mongolia and the Republic of Korea.

North and Central Asia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Russian Federation, Turkmenistan and Uzbekistan.

South-East Asia: Brunei Darussalam, Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste and Viet Nam.

South and South-West Asia: Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan, Sri Lanka and Turkey.

Source: Solomon et al. 2007; Cruz et al. 2007; IPCC 2012

Temperature increases are likely to lead to increased glacier and permafrost melt in the Himalayas, Xizang Autonomous Region, and the northwestern part of China with potential consequences for water availability in the long-term (Whaley 2008a, 2008b; ADB 2012) as well as for tourism development. The melting of mountain permafrost will increase natural hazards for mountain communities as well as for infrastructure.

As highlighted by the impacts of Typhoon Haiyan in the Philippines in November 2013 (Vidal 2013), Asia is affected by 90% of global climate-related catastrophes (Greater London Authority 2007; Kreft & Eckstein 2013), and is predicted to be expose to the highest life and asset risks in the world as a result of increases in climate extremes (Hanson et al. 2011; ADB 2012). Heat wave events are likely to increase in frequency and duration region-wide and become more intense in some areas, such as East Asia, Central and West Asia (IPCC 2012). There is also an increasing trend of stronger tropical cyclones (also called typhoons or hurricanes) in East Asia, South Asia, and Southeast Asia, and high precipitation events in all sub-regions. Regional sea level rise could reach 40 cm by 2100, which is potentially higher than the estimated global average of 18-59 cm. Given such conditions, the coastal lowlands of Asia are therefore highly vulnerable to environmental change (IPCC 2007b).

With a coastal erosion rate of up to four to six metres per year in some locations (Cruz et al. 2007), Asian mega cities (also recognized as major tourist destinations, transport hubs and source regions), including Tokyo, Shanghai, Guangzhou, Seoul, Taipei, Bangkok, Ho Chi Minh City, Jakarta, Manila, Dhaka, Kolkata, Mumbai, Chennai, and Karachi, will be potentially highly affected by climate change, including flooding and landslides (ADB 2012). Approximately 88% of regional coral reef is also likely to disappear because of the multiple effects of climate change in the next 30 years (Cruz et al. 2007; Scott et al. 2012), creating significant issues for a number of coastal destinations. However, it is important to stress that the impacts of climate change will affect tourism not just because of their direct impact on destinations, but also because of their capacity to reduce economic growth and per capita income in source regions thereby

affecting levels of tourism demand as well.

Indeed, the region's capacity to cope with the effects of climate change have arguably been eroded as a result of overdevelopment in some locations derived from population and industry growth, as well as a series of natural disasters (Cruz et al. 2007; Simpson et al. 2008; Hall 2010b; ADB 2012). The economically important Asian tourism industry is especially vulnerable to climate change because many local tourism businesses are directly or indirectly dependent on natural tourism resources and demonstrate a substantial lack of adaptive capacity (Cruz et al. 2007; Simpson et al. 2008; ADB 2012). For example, the Lushan hotspring area in Taiwan was forced to close in 2012 because of its fragile land status, which had mainly been caused by the water overconsumption of hotspring resorts and the destruction wrought by typhoon and flood events (Liberty Times 2004; Taiwan Panorama 2009; Water Resource Agency 2011; Nantou County Government 2012).

Asian ski tourism, beach tourism, and eco-tourism have been identified in IPCC reports as especially vulnerable to climate change (Cruz et al. 2007; Hall 2008). Extreme weather events, e.g. heat wave, sand storm, drought, typhoon, and extreme rainfall, which are expected to worsen in frequency and intensity are already reported to affect tourism to some degree, especially in the fields of urban tourism, heritage tourism, nature-based tourism (e.g. mountain, forest, lake and river), coast and small islands tourism, and events that depend on climate influenced attractions (e.g. floral, water, ice and birdwatching festivals). Table 1.7 provides an overview of some of these actual and perceived impacts on the basis of government, NGO, scientific, industry and media reports.

Table 1.7: Summary of climate change impacts on the Asian tourism industry

Type of Tourism	Higher temperatures & heat waves	Sand storm	Drought	Typhoon & extreme rainfall	Sea level rise
Urban [a]	●		●	●	●
Heritage [b]	●	●		●	
Hot spring [c]	●		●	●	
Mountain & Forest [d]	●			●	
Lake & River [e]	●			●	
Coast & Small Island [f]	●		●	●	●

Sources:

a. China Times 2007a; Liberty Times 2007a; 2009a; Kumar et al. 2008; Bangkok Metropolitan Administration et al. 2009; WWF 2009; Marks 2011

b. Xinhua News 2008; CBN 2010; MCOT 2010; Mingpao News 2011

c. Taipei Water Department 2003; BCC 2004; Liberty Times 2004; China Times 2007b; Economic Daily News 2009; Taiwan Panorama 2009; East Rift Valley National Scenic Area 2012; Nantou County Government 2012

d. Fukushima et al. 2002; Heo & Lee 2008; MEXT et al. 2009; National Policy Foundation 2009; Nyaupane & Chhetri 2009; Xinhua News 2009; Pakistan Wetlands Programme 2010; Aowanda National Forest Recreation Area 2012

e. Now News 2008; MEXT et al. 2009; Pakistan Wetlands Programme 2010

f. Raksakulthai 2003; Ministry of Environment, Energy and Water, Maldives 2007a; ETtoday 2007; Kelkar & Bhadwal 2007; Penghu Daily News 2008; WWF 2008; China Times 2009; Liberty Times 2009b; Ministry of Housing, Transport and Environment, Maldives 2009; Vietnam Business Forum 2010; Athulathmudali et al. 2011

Urban Tourism

Much Asian urban tourism is located in highly vulnerable in low-lying, mega cities, such as Manila, Ho Chi Minh City, Shanghai, Jakarta, and Calcutta. Flooding events, mainly driven by typhoon, extreme rainfall and sea level rise, are one of the most influential weather events in Asian urban tourism (Liberty Times 2007a; 2009a; China Times 2007a; Kumar et al. 2008; WWF 2009; Bangkok Metropolitan Administration et al. 2009; Marks 2011). In Bangkok, 72% of the current metropolitan area will be affected by sea level

rise within the next 50 years (Bangkok Metropolitan Administration et al. 2009; Marks 2011). Since these megacities are core tourism destinations and generators as well as transportation hubs, both domestic and inbound tourism are vulnerable to weather events. In the 2011 Thailand flood event inbound tourism suffered a loss of 15-25 billion baht (Bangkok Post 2011; Shankar 2011). In contrast, some Asian cities, such as Manila, are also at risk of water scarcity due to increasing drought events (WWF 2009). Climate change can also lead to higher energy costs. For instance, Taipei tourism operators are reported to face increased air-conditioning costs because of higher temperatures (Liberty Times 2007a, 2009a).

Heritage Tourism

Some Asian heritage sites are vulnerable to climate change phenomena (Xinhua News 2007; CBN 2010; MCOT 2010; Mingpao News 2011). For example, over 20% of Dunhuang Cave in China has been damaged by the increasingly frequent sand storms and severe floods, and the onset of desertification (Xinhua News 2007; CBN 2010; Mingpao News 2011). It is also reported that 90% of Ayutthaya, the UNESCO heritage site in Thailand, was damaged or destroyed by the 2010 Thailand flood event (MCOT 2010).

Hotspring Tourism

Hotspring tourism is an important part of the tourism culture in north-east Asia. Yet the Taiwanese experience suggests that this form of tourism may be vulnerable to extreme weather events. In Taiwan, the period of the peak season of hotspring businesses (the winter period) has been decreasing due to higher air temperatures. Beitou hotspring resorts has lost 30% of their annual business, partially attributed to warmer winters, as well as hotter and longer summers (China Times 2007b). In such conditions, market competition has increased because many hotspring operators promote lower-price products in an attempt to attract customers. The supply of hotspring water might also be potentially

restricted because of increasing drought periods (Taipei Water Department 2003). Hotspring resorts located in mountain areas, e.g. the Ku Kuan, Chihpen and Lushan hotspring areas, have also experienced monetary and property loss due to extreme rainfall and typhoon events (Liberty Times 2004; Taiwan Panorama 2009; East Rift Valley National Scenic Area 2012; Nantou County Government 2012). The Lushan hotspring resorts were forced to close in 2012 after a series of extreme events, such as the July 2004 flood event which damaged eight hotels, the 2008 Typhoon Sinlaku events which led to a loss of 36 hotels, and the 2008 Super Typhoon Jangmi event (Water Resource Agency 2010, 2012; Nantou County Government 2012).

Mountain and Forest Tourism

The development of Asian mountain tourism is also affected by climate change phenomena, including changing temperatures and the occurrence of extreme weather events. Higher temperatures have affected biodiversity attractions, infrastructure, seasonality, and water supply in mountain sites. For instance, the Qinghai-Tibet railway and highway, the major gateway to the Qinghai-Tibet Plateau in China, is vulnerable to damage from melting permafrost (Xinhua News 2009). The peak season of many Asian ski resorts appears to be shorter (Fukushima et al. 2002; Heo & Lee 2008; MEXT et al. 2009). Some mountain destinations, such as Mt Everest (Sagarmatha) National Park in Nepal, are likely to experience water scarcity as glacier runoff decreases (Nyaupane & Chhetri 2009). Asian forest destinations are also threatened by typhoon and extreme rainfall events (Pakistan Wetlands Programme 2010; Hall, James & Baird 2011; Aowanda National Forest Recreation Area 2012). For instance, Alishan National Forest Recreation Area in Taiwan was closed for 9 months with a loss of NT$1 billion of tourism income and 300,000 tourists per month because of the 2009 Typhoon Morakot event (National Policy Foundation 2009).

Lake and River Tourism

Lake and river destinations have been adversely influenced by high-magnitude climatic events. For example, flood and typhoon events can cause a financial loss for operators both from their direct impacts as well as consumer perceptions. In 2008, hotels in Sun Moon Lake, Taiwan, experienced a cancellation of 80% of room bookings as a result of news of a typhoon landing (Now News 2008). Climate events have also left long-term or unrecoverable impacts on water-side infrastructure and attractions in Asia. For instance, 80% of park facilities and 60 riverside hotels in the Swat Valley, Pakistan, were destroyed by the 2010 flood event (Pakistan Wetlands Programme 2010). In Japan, the iconic drift-ice scenery in Lake Suwa, is disappearing with the increase of temperatures (MEXT et al. 2009).

Small Island and Coast Tourism

The future of Asian small islands and coastal tourism becomes challenging with the change of climate. The common regional issue is the deterioration of marine resources, which are mainly caused by higher temperature, frequent droughts, typhoons and heavy rainfalls (Raksakulthai 2003; Gössling & Hall 2006a; Ministry of Environment, Energy and Water, Maldives 2007a; ETtoday 2007; WWF 2008; China Times 2009; Liberty Times 2009b; Ministry of Housing, Transport and Environment, Maldives 2009; Athulathmudali et al. 2011). For example, eighteen dive sites in Krabi, Thailand, were closed as a result of severe coral bleaching (WWF 2008). Coastal erosion, mainly driven by sea level rise (Kelkar & Bhadwal 2007; Athulathmudali et al. 2011), threatens the operation of 45% of tourist resorts in the Maldives as well as infrastructure (Kelkar and Bhadwal 2007). Thua Thien-Hue, Vietnam's central province, is forecasted to lose 28.8% of tourism revenues with the disappearance of four iconic beaches by 2020 due to sea level rise (Vietnam Business Forum 2010). Coastal and island tourism businesses are especially vulnerable to typhoon events, especially when transport is closed for safety reasons. Penghu Island in Taiwan lost 2000 visitor arrivals and NTD$200 million of tourism income as a result of the closure of the air and marine transport network in the 2008 Typhoon Sinlaku event (Penghu Daily News 2008).

Responding to Climate Change

Although the notion of sustainable tourism has become embedded in destination, business and government tourism planning strategies, tourism is arguably less sustainable than ever (Hall & Lew 2009; Gössling et al. 2010; Hall 2011, 2014a; Peeters & Landré 2011). This situation is partly due to the substantial growth in tourism impacts, including emissions, at a rate faster than improvement in efficiency (Gössling et al. 2013; Hall 2014a). However, it also arises because of substantial gaps in our knowledge about the sustainability of tourism business and their response to environmental problems such as climate change (Scott et al. 2012). As stressed earlier, little is known with respect to the response of Asia tourism industry (Cruz et al. 2007; Simpson et al. 2008; ADB 2012). This is significant as it cannot be assumed that business actions in one context will automatically translate to another (Scott et al. 2012). As previous studies have indicated, the environmental behaviour of tourism business may vary with their cultural background (Bohdanowicz 2006b; Becken 2012). The direct application of Western-focused research and strategies with respect to improving the environmental behaviours of Asian tourism business may result in a low implementation or adoption rate. For example, as of December 2013 only three Taiwanese hotels have received green hotel labels after years of government promotion of the scheme (EPA nd) and despite adaptation of tourism business being considered as urgent (ADB 2012; Scott et al. 2012). Thus, research into the response of Asian tourism businesses to climate change would appear to be essential.

Therefore, this research seeks to examine the response of the Taiwanese hotel sector to climate change. The accommodation sector is the focus of this thesis since it is not only a significant carbon contributor in the tourism industry given its high growth and energy-intensive nature, but also because it is vulnerable to climate change risks due to its nature as a fixed asset (Kyriakidis & Felton 2008; UNEP–Oxford University-UNWTO-WMO 2008; UNWTO & UNEP 2008; Gössling 2010; Scott et al. 2012).

The hotel sector is also significant because it is subject to particular measures recommended by the UNWTO and UNEP (2008) for emissions reduction (Table 1.8). However, the extent to which these measures have been implemented in any location prior to the undertaking of the present research is unknown. Furthermore, Taiwan provides an ideal location to examine the relationship between the hotel sector and climate change because of the extent to which the threat of climate change, and especially weather extremes, on accommodation and destination services has been well reported in government and business reports as well as the media if not in the scientific literature (e.g. Liberty Times 2003; Taipei Water Department 2003; BCC 2004; Liberty Times 2004; China Times 2007b; Now News 2008; Economic Daily News 2009; Taiwan Panorama 2009; Water Resource Agency 2011; Wang 2011; East Rift Valley National Scenic Area 2012; Nantou County Government 2012; Taiwan Tourism Bureau 2013d). Therefore, a baseline study of Taiwanese hotels is designed to answer: (1) how do hotels perceive the impacts of climate change, ranging from environment phenomena to tourism development? (2) What role do business social and environmental policies and actions, including green marketing initiatives play in response to climate change? (3) What is the level of implementation of UNWTO and UNEP (2008)'s recommended climate change measures by tourism business and accommodation establishments in particular? (Table 1.8). The factors that influence their involvement are also explored.

Table 1.8: UNWTO-UNEP (2008) recommended measures for mitigation responses in accommodation establishments

• Energy conservation and efficiency in buildings and tourist attractions:
— setting targets and benchmarking, apply certification;
— integrating sustainability and customer comfort;
— motivating employees and customers through awareness-raising and through incentives for energy reduction;
— enhanced building siting, and design (orientation, natural ventilation, insulation, etc.);
— reducing the need for air conditioning where possible;
— installation of devices that permit heating, cooling and lighting only when the room is occupied;
— use of energy-efficient appliances (light bulbs, heat exchangers, etc.);
— frequent maintenance and cleaning of heating, cooling and refrigeration equipment;
• use of alternative fuels (e.g., biodiesel) and renewable energy sources (e.g., wind, photovoltaic, solar, thermal, geothermal, biomass and waste);
• integrated emission management (including supply chain management) and wider environmental management (e.g., waste), designating manager specified on environmental management systems (EMS) and emission issues;
• awareness-raising among customers on recycling;
• development of an environmental 'Code of Ethics', (checklist or criteria that a hotel chain can provide to its suppliers/providers, to help them perform their services to the sector in an environmentally respectful manner;
• capacity building, and climate change and environment related education for managers of the accommodation establishments and in related sectors; such as architecture, construction and engineering;
• development of a network of climate change focal points in the accommodation sector to promote activities proposed in the Davos Report and Declaration;
• inclusion of energy-efficiency and renewable energy use support programmes in national tourism policies and development plans (Agenda 21, guidelines, regulations, incentives, planning, capacity building, stakeholder cooperation);
• development of links with international policies (e.g., Clean Development Mechanism), cooperation and standards.

Source: UNWTO & UNEP (2008): 11-12.

Thesis Outline

This thesis is divided into seven chapters. This chapter has positioned the thesis within the issue of the relationship between tourism and climate change and, in particular, the scientific knowledge gap surrounding this relationship in an Asian and Taiwanese context. Chapter Two explores the literature on the environmental behaviour of international hotel business in response to climate change and environmental issues in general. This includes studies of perception, attitude, action, as well as identifying the influential factors that lead to behavioural change. Research suggests that hotels and hotel operators that have experienced extreme weather events or faced environmental threats to local tourism resources have a higher awareness of climate change impacts. In previous studies, most hotel respondents appear opposed to government intervention and have a low trust in green marketing. On the other hand, attitudes towards environmental responsibility appear quite diverse. Implementation of waste, water and energy management strategies appear more geared to general environmental issues than climate change per se and is strongly driven by cost concerns. Other influential factors on hotel's response towards climate change included corporate capacity (e.g. finance, information and technology), market feedback, government leadership and legislation. Eight hotel characteristics: size, star rating, national classification, experience of extreme weather event, location, management system, target market, as well as years of trading, appear as important variables to differentiate the environmental behaviour of lodging facilities.

Chapter Three focuses on the background of the Taiwanese hotel sector's response to climate change, including environmental issues, government policies, and business engagement. This research also reports on climate change phenomena, such as higher temperature, seal level rise, and an increase of extreme weather events, that have affected the operation of Taiwanese tourism businessess. Public sector actions appear limited with respect to either regulating the carbon emission of lodging facilities or encouraging mitigation and adaptation management in the hotel industry. It concludes that the results

of existing research on the environmental behaviour of Taiwanese hotel businesses corresponds closely to the findings of international literature although there are significant gaps in knowledge of the Taiwanese situation.

Chapter Four introduces the survey method used in this research. There were five parts of the survey questionnaire, including the perception, attitude, influential factors, and actions of Taiwanese hotel respondents in response to environment and climate change, as well as the features of participant's company. Overall, 270 Taiwanese hotel respondents answered this email-based questionnaire survey, representing a 10% response rate. The chapter also notes the particular issues associated with the categorisation and definition of the size of a lodging facility which is an important issue given both the comparability of research results and the extent to which size has been recognised as an influential feature in the environmental practices of hotels in the international literature.

Chapter Five presents the findings of the survey. In summary, Taiwanese hotel respondents highly acknowledge the existence of climate change, but rarely relate this phenomenon to their daily business operations. Their attitude towards corporate responsibility, government policy and green marketing in response to climate change was also examined, although acknowledgement of their own hotel's contribution to climate change was limited. In addition to waste management, energy-saving practice, and the offer of local-produced cuisine, the level of environmental implementation of Taiwanese hotels was relatively limited. There were also low compliance rates with existing environmental policy, although there was awareness of environmental schemes.

Chapter Six analyzes the relations between hotel characteristics and their environmental behaviour. The factors of size and extreme-weather-event experience were identified as the more significant variables to differentiate hotel response to environment and climate change. Large hotels or lodging facilities with experience of multiple extreme weather events were more proactive with respect to their

environmental actions. Finally, Chapter Seven summarizes the key findings of this research, discusses the prospective contributions and issues, and argues for the application of the results of this study in the fields of climate change research, benchmarking development, education and training, government regulation and policy, and hotel management.

Chapter 2

A Review of Hotel Industry Environmental Practices and Response to Climate Change

The hotel sector is not only one of the most vulnerable industries to climate change due to its vast investment in fixed assets (Kyriakidis & Felton, 2008; Simpson et al. 2008; Gössling 2010), but is also the second largest tourism industry sector with respect to its carbon emissions with the accommodation sector accounting for nearly one-quarter of tourism industry's carbon emissions because of the high growth in hotel establishment and its energy-intensive nature (UNWTO & UNEP 2008). The WEF (2009) estimates that, even allowing for greater energy efficiencies, carbon emissions from accommodation carbon are forecasted to reach 728 $MtCO_2$ by 2035. According to the WEF (2009) the global growth rate in emissions is about 3.2% per year, but the increase of Asia-Pacific region is well above the global average and will likely be responsible for 40% of all accommodation emissions in 2035. In order to further understand the relationships between the accommodation sector and climate change, the following chapter will illustrate the environmental contributions of the hospitality industry and government policy with respect to hotel management and climate change, as well as the response of the accommodation sector to climate change impacts.

Hotel Contribution to Climate and Global Environmental Change

The accommodation sector appears as a significant contributor to climate change and environmental deterioration as a result of its consumption of resources and contributions to waste. For example, the average energy use of hotels was up to 130 MJ (36 kWh) per night with 20.6 kg of carbon emissions (UNWTO & UNEP 2008). However, there is significant variability between countries and hotel types while analysis is complicated by the adoption of different measures and methodologies. Nevertheless, the energy usage of Asian hotels, such as in Hong Kong and Singapore, appears higher than other regional lodging facilities, except to the Canadian hotels (Table 2.1). Analyzed by hotel standard, the high-end

Hong Kong hotels also had more energy spending than similar European hotels (Table 2.2). The long-hour use of air-conditioning service is usually considered as the key reason for the intensive consumption pattern in Asian hospitality industry (Deng & Burnett 2000; 2003; Priyadarsini et al. 2009).

The water usage of hotel ranges between 84 and 2,000 liters (l) per tourist per day, or up to 3,423 l per bedroom per day (Gössling et al. 2012). Asian accommodation providers are also identified as heavy water users with Taiwanese hotels consuming an average 902 litres per night (Table 2.3). Gössling et al. (2012) argued that the consumption of water and the energy embodied in providing that the liquid and solid waste of lodging facilities also contribute to climate change and environmental problems, especially with respect to ecosystem and water quality. In the case of Hong Kong hotels, hotels generated more than 12 million m^3 of sewage and 59,716 tons of sold waste in 2003 at an environmental cost of HK$128 million (Chan 2003).

Table 2.1: Energy use and carbon emissions in the accommodation sector (analyzed by countries)

Country	Energy Use		CO_2 Emissions	Reference
	kWh/Guest Night	kWh/ m^2	Kg/Guest night	
Hong Kong		564		Deng & Burnett 2000
Singapore		427		Priyadarsini et al. 2009
Fiji	9		2	Becken 2005
Europe	77	306		Ecotrans 2006
		305-330		Hotel Energy Solutions 2011b
Italy-Sicily			9.17	Beccali et al. 2009
Canada-Ottawa		689		Zmeureanu et al. 1994
New Zealand	43	159		Becken et al. 2001
Scandic Hotel [chain hotel]			1.4	Scandic Hotel 2012

Table 2.2: Energy use in the accommodation sector, analyzed by hotel standard

	Type of Hotel	Average of Energy Consumption		Reference
		kWh/Guest Night	kWh/m^2	
Europe	Hotel	77	306	Ecotrans 2006
	2 Star Hotel	96	300	
	3 Star Hotel	84	324	
	4 Star Hotel	78	358	
	5 Star Hotel	75	315	
Hong Kong	3 Star Hotel		506	Deng & Burnett 2003
	4 Star Hotel		597	
	5 Star Hotel		566	
Vietnam	2 Star Hotel		101	Trung & Kumar 2005
	3 Star Hotel		143	(Electricity only)
	4 Star Hotel		141	

Table 2.3: Water use in the accommodation sector

		Average Water Consumption		Reference
		Liter/Guest Night	m^3	
Europe	Average	394		Ecotrans 2006
	2 Star Hotel	454		
	3 Star Hotel	424		
	4 Star Hotel	335		
	5 Star Hotel	594		
Spain	Average	541		Tortellam & Tirado 2011
	3 Star Hotel	516		
	4 Star Hotel	548		
	5 Star Hotel	701		
Vietnam	2 Star Hotel		4	Trung & Kumar 2005
	3 Star Hotel		5	
	4 Star Hotel		4	
Hong Kong	Average		4.5	Deng & Burnett 2002
	3 Star Hotel		3.3	
	4 Star Hotel		4.1	
	5 Star Hotel		5.1	
Taiwan	Average	902		Lin & Lee, 2008
Barbados	Average	678		Perch 2000
Zanzibar, Tanzania	Average	685		Gössling 2001
Chain Hotel	Scandic Hotel	202		Scandic Hotel 2012

Public Policy

Government policy with respect to climate change, as well as broader environmental policy settings, are regarded as significant in adaptation and mitigation efforts because of their influence on the regulatory environment that affects business decision-making and their capacity to engage with and respond to particular government interventions (Hall 2013, 2014b).

The development of supposedly more environmentally friendly forms of tourism since the 1980s, such as ecotourism, green tourism, or sustainable tourism, has arguably encouraged governments to engage more in tourism related environmental policy and regulation (Hall 2011). Although the success of public sector interventions are still questioned (Hall 2013), the marketing value of relevant policies has nevertheless been significant even if the pursuit of green brand value has sometimes overwhelmed the pursuit of environmental protection (Fennell 2008; Zhang et al. 2009). Nevertheless, the issue of climate change has potentially forced the sustainability debate in tourism to operate at a more concrete level because of its concentration on the flows of energy, emissions and materials (Scott & Becken 2010; Scott 2011). Indeed, there is an urgent demand to distribute responsibility to the international tourism sector, including achievable timeframes and quantitative goals, in order to manage climate change impacts in next few decades for a desired or potential sustainable tourism future (Scott 2011; Scott et al. 2012).

A range of policy instruments and measures, which are designed to mitigate and adapt to climate change impacts on the basis of sustainable development goals, have been proposed by researchers (Bramwell 2005; Fennell 2008; Mason 2008; Becken & Clapcott 2011; Scott et al. 2012) and international tourism organizations (UNEP & UNWTO 2005, 2012; UNWTO & UNEP 2008; WTTC 2010, OECD & UNEP 2011). Nevertheless, the policy progress of international organisations with an interest in tourism as well as national governments with specific respect to tourism and climate change has been rather slow. Instead, greater success has been achieved in implementing more traditional environmental resource

management strategies for more defined policy areas, e.g. water, energy and natural environment, as well as pollution, waste, and greening initiatives, that may also have benefits with respect to emissions reduction or adaptation (OECD & UNEP 2011). Although some tourism policies have started to focus on evaluating climate change impacts on tourism industry and initiating profit-protection strategy under the threat of substantial environmental change, the legislative enforcement to reduce carbon emissions is still absent (Becken & Clapcott 2011; Jiang et al. 2013; Tervo-Kankare & Saarinen 2013; White & Buultjens 2013). Following a review of the policy settings of 18 member countries, the OECD and UNEP (2011) argued that national tourism authorities lacked a comprehensive solution to climate change, a finding which is also supported by more recent research (Becken et al. 2011; Becken & Clapcott 2011). This situation also reflect's Cooper and Hall's (2012) suggestion that there is a need to differentiate between the setting of tourism specific policies and public policies that affect tourism as many government tourism organisations lack both the legislative and regulatory capacity to act as well as a loosely structured policy network in which sectoral interests may be greater than that of the industry as a whole. In such a situation, Bramwell (2005) suggested that neither education nor encouragement via sustainable policy measures are effective in drawing tourism stakeholders' commitment and actions, while tourism business may also have different understanding of environmental information and need long periods of time to accept policy changes.

In relation to hospitality management business response to climate and environmental change, Asian government tourism agencies generally appear to have less awareness, capacity, and willingness to undertake proactive actions, since there appears to be a belief that such changes would potentially risk arrivals of long-haul visitors or imported products (UNEP & UNWTO 2012; see also Scott et al. 2012 on opposition to European aviation levies). Voluntary instrument appears to be the most popular climate policy measure in the regional public sector. For example, "green hotel" schemes have been promoted in Thailand (Green Leaf Foundation 2013), Japan (Eco Mark Office 2013), India (Ministry of Environment & Forests 2013), Singapore (Singapore Environment Council 2013), Taiwan (EPA nd), Hong Kong and China

(Green Council 2013; National Green Hotel Association 2013). In China, 1,778 lodgings participate in the Green Hotel Initiative, accounting for 12.6% of the hotel industry (Wu & Shi 2011). Some governments have also designed educational programs, covering the topics of environmental management systems, resource conservation, disaster management, and carbon footprint reduction, for local hotel staff and management (Ministry of Environment, Energy and Water, Maldives 2007b; Ministry of Tourism and Civil Aviation, Maldives 2007; Duhaylungsod & Mendoza 2009; Philippines Today 2009; Ministry of Tourism, Government of India 2011; Ministry of Tourism Arts & Culture, Maldives 2012). A Zero Carbon Resort programme has been promoted in Puerto Princesa, Philippines (Matias 2011). In addition, "Green Hotel award" schemes have been adopted to encourage the environmental performance of lodging facilities in Indonesia (Republic of Indonesia 2011), and for resorts in the Maldives (Ministry of Environment, Energy and Water, Maldives 2007b). Such initiatives may be undertaken in cooperation with international organisations. For example, the Thai Ministry of Tourism and Sports, Thailand, established the public-private partnership project "The Program for Energy Efficiency in Kho Khao and Kho Lak (PEEK)" with the UNWTO for assisting Andaman coast hotels to reduce GHG emissions and energy costs by energy-saving technologies (UNWTO 2011).

Tourism specific law and policy at various scales of governance has only just started to address climate change mitigation and adaptation issues in the region. For instance, the Indian Ministry of Tourism (2011) initiated Guidelines for the 'Approval of Hotel Projects' to encourage the implementation of the eco-friendly and energy saving measures in the hospitality industry. The Maldives's tourism law has provided for further regulation of new coastal resort development by implementing mandatory environmental impact assessment requirements (UNEP 2005). In the Guidelines of Tourism District Committee in Humla, Nepal, local government has required new establishments to provide climate-strengthened facilities (Roman & McEvoy 2010). However, mandtory measures remain limited in the Asian context. There is an absence of climate change regulations to facilitate the involvement of tourism and hospitality industry in mitigation and adaptation actions. In such a situation, the role of

tourism business becomes even more important in responding to environment and climate change issues.

Hotel Business Response to Environment

This section provides a general overview of hotel business response to environment. It refers to studies in 26 countries, including the Asian countries of China, Japan, Hong Kong, Taiwan, Malaysia, and Vietnam. Interestingly, hotel manager characteristics do not appear to infleunce environmental management activities (Mensah & Blankson 2013). The environmental behaviour of hotel businesses are further analyzed on the basis of previous hospitality literature, especially the themes of environment management, energy and water conservation, environmental performance, green hotel scheme, sustainable strategy and CSR (Myung et al. 2012).

Attitude

Previous studies have discussed the environmental attitude of hotel business in relation to issues of corporate responsibility, environmental policy, and green marketing. In addition to macro lodging facilities (Haastert & de Grosbois 2010), hotel respondents seemed to understand the negative impacts of their operation on environment (Hobson & Essex 2001; Prayag et al. 2010), but had a low willingness to undertake responsibility for their hotel's actions (Hobson & Essex 2001; Vernon 2003; Kasim 2009; Prayag et al. 2010; Roman et al. 2010). A number of studies indicate that hotels expect government leadership via financial and educational support to enable environmental measures (Hall & Clayton 2009; Jarvis & Pulido Ortega 2010; Ruhanen & Shakeela 2012), rather than legislative intervention (Thomas & Vanel 2008). On the other hand, they often doubt the credibility of self-described "green tourism" businesses (Lansing & De Vries 2007; Pizam 2008; Rahman et al. 2012), and the maturity of the green travel market (Schubert et al. 2010; Hotel Energy Solutions 2011; Zografakis et al. 2011; Millar et al.

2012).

Overall, hotel businesses tended to recognize their influence on the environment (Hobson & Essex 2001; Bohdanowicz 2005, 2006a, 2006b; Wan 2006; Kasim 2009; Prayag et al. 2010; Ustad 2010), except for cases of micro lodging facilities (Vernon et al. 2003) and some European hotels (Leslie 2001; Ayuso 2006; Maleviti et al. 2010). It has been observed that some micro-hospitality businesses tend to attribute tourism related environmental deterioration to mass tourists instead of themselves (Vernon et al. 2003). In contrast in Greece, study participants mainly thought that the lodging facilities in natural or environmentally sensitive locations were the major contributors (Maleviti et al. 2010, 2012). In her European research, Bohdanowicz (2006b) suggested that such attitude difference is likely related to the cultural background of hotel management respondents. The degree of environmentally responsibility among hotel companies appears highly variable (Vernon 2003; Kasim 2009), with chain-affiliated and large lodging operators being the most proactive (Bohdanowicz 2005).

Hotel business attitudes towards government environmental policies often appear contradictory. They often expected government to take responsibility for environmental problems, including climate change (Hobson & Essex 2001; Prayag et al. 2010; Roman et al. 2010), but had relatively low support for environmental initiatives, such as carbon taxes, carbon offset schemes, and carbon trading schemes. Opposition is possibly due to cost concerns (Belle & Bramwell 2005; Hall 2006) or knowledge deficiency (Dodds et al. 2008). Hotel businesses, especially small companies, often anticipate that government will provide education with respect to climate change science and strategy, as well as financial subsidy (Hall & Clayton 2009; Jarvis & Pulido Ortega 2010; Ruhanen & Shakeela 2012). In some cases, tourism companies that claim a willingness to implement climate change strategy at corporate level, often appear opposed to government intervention at the operational scale (Thomas & Vanel 2008).

A common element in many studies was the low level of trust towards so-called green hotels and the

size of the green market in the hospitality industry. Respondents provided several reasons as to why a "green hotel" is often more of a marketing ploy rather than a solid environmentally friendly operation: (1) some hotels may use the title without meeting environmental requirements or receiving authoritative accreditation, especially since a universally-credited green standard for tourism and hospitality industry is still absent; (2) hotel enterprises, especially in developing countries, may gain a green reputation at the expense of public welfare (Lansing & De Vries 2007; Pizam 2008; Rahman et al. 2012); (3) the content of a hotel's green marketing or CSR report is often not regulated or accredited by credible organizations, including national governments (Grosbois 2013; Sloan et al. 2013). Although the emergence of green customers is noted in several studies (Laroche et al. 2001; Graci & Dodds 2008; Bergin-Seers & Mair 2009), statements such as 'tourists choose their hotel according to its "environmental friendly image"' (Zografakis et al. 2011: 1327), are usually questioned or disregarded by hotel companies (Leslie 2001; Zografakis et al. 2011). This is especially because hotel managers tend to believe that the green attributes of hotels are considered by most customers after price, location, and quality of service (Schubert et al. 2010; Hotel Energy Solutions 2011; Millar et al. 2012).

Influencing Factors

Overall, tourism and hospitality research on environment management, green initiatives, and sustainability, acknowledged some 23 factors which are influential on hotel business' behaviour in response to environment. Key motivations identified are usually out of profit, marketing, leadership, and regulation concerns, such as cost reduction (Enz & Siguaw 1999; Leslie 2001; Céspedes-Lorente et al. 2003; Sloan et al. 2004; Bohdanowicz et al. 2004; Bohdanowicz 2005; Ayuso 2006; Wan 2006; Bohdanowicz 2006b; Kasim 2007a; Graci 2009; Dodds & Holmes 2011); public relation and reputation (Hobson & Essex 2001; Chen 2004; Ayuso 2006; Chang 2006; Park 2009; Ustad et al. 2010; Tortellam & Tirado 2011; Nicholls & Kang 2012a); competitive advantage (Chen 2004; Wan 2006; Ustad et al. 2010); the owner's or senior manager's personal values and beliefs (Tzschentke et al. 2004, 2008a; Ayuso 2006;

Calvache & Evra 2008; Park 2009; Yang 2010; Garay & Font 2012; Teng et al. 2012); parent company's policy (Álvarez Gil et al. 2001; Chan & Wong 2006); corporate social responsibility policy (Graci & Dodds 2008); government policy and regulation (Leslie 2001; Revilla et al. 2001; Chan & Wong 2006; Wan 2006; Kasim 2007a; Graci & Dodds 2008; Bonilla-Priego et al. 2011; Shah 2011; Chou et al. 2012; Kučerová 2012); and government incentive (Yang 2010; Coles & Zschiegner 2011; Dodds & Holmes 2011). With the exception of CSR policy, the above motivations have been acknowledged, albeit sometime only briefly, in the Asian hotel literature (see also Chapter 3).

The key barriers for hotel companies with respect to the environment are usually related to their capacity limits, such as financial resources (Stabler & Goodall 1997; Vernon et al. 2003; Bohdanowicz 2006b; Chang 2006; Hung & Lai 2006; Kasim 2007a; Calvache & Evra 2008; Chan 2008; Mcnamara & Gibson 2008; O'Neill & Alonso 2009; Ustad et al. 2010; Dodds & Holmes 2011; Lebe & Zupan 2012); staff availability and expertise (Chang 2006; Erdogan & Baris 2007; Chan 2008; Graci 2009); technology and supplier availability (Tzschentke et al. 2008b; Ustad et al. 2010; Chou et al. 2012; Kasim & Ismail 2012); current information (Kasim 2009); existing building structure and facility (Mcnamara & Gibson 2008; Park 2009; Ustad et al. 2010); and time availability (Hobson & Essex 2011), with the last two concerns being only rarely addressed in research on the Asian accommodation sector. Other factors, including customer demand (Revilla et al. 2001; Hung & Lai 2006; Kasim 2007a, 2009; Chou et al. 2012; Kasim & Ismail 2012); employee loyalty (Kasim 2007a); stakeholder pressure (Kasim 2007a; Graci 2009; Chou et al. 2012; Kasim & Ismail 2012); risk management (Hall 2006); industry leadership (Graci & Dodds 2008); and climate change concern (Hall 2006; Saarinen & Tervo 2006; Saarinen et al. 2012), are found as being less significant. There is even confusion as to whether the importance of environment concern has been growing in the hotel business, with some studies suggesting it has (Chen 2004; Chang 2006; Ustad et al. 2010; Garay & Font 2012), while others have the opposite observation (Hobson & Essex 2001; Erdogan & Baris 2007; Calvache & Evra 2008).

Factors that influence the differences of perception within the accommodation sector with respect to the importance of undertaking environmentally friendly activities appear associated with their operational size (Kirk 1995, 1998; Tzschentke et al. 2004, 2008a; Ayuso 2006; Wan 2006; Ateljevic 2007; Calvache & Evra 2008; Kasim 2009; Park 2009; Chan 2011; Coles & Zschiegner 2011; Dodds & Holmes 2011; Hobson & Essex 2011; Garay & Font 2012; Nicholls & Kang 2012a; Teng et al. 2012); location (Kirk 1995; Nicholls & Kang 2012a); years of trading and building status (Chang 2006; Tzschentke et al. 2008b); management system (Kirk 1995, 1998; Álvarez Gil et al. 2001; Chan & Wong 2006; Wan 2006; Calvache & Evra 2008; Graci & Dodds 2008; Nicholls & Kang 2012a), as well as experience of extreme weather events (Hall 2006; Morrison & Pickering 2012). These factors are now discussed in more detail.

Cost Reduction

Cost saving has been recognized as the primary motivation for hotel business to conduct environmentally friendly practices (Enz & Siguaw 1999; Leslie 2001; Céspedes-Lorente et al. 2003; Sloan et al. 2004; Bohdanowicz et al. 2004; Bohdanowicz 2005; Ayuso 2006; Wan 2006; Bohdanowicz 2006b; Kasim 2007a; Graci 2009; Dodds & Holmes 2011). Indeed, a number of examples have illustrated the financial rewards from the adoption of some environmental practices (Graci & Dodds 2008). For example, it has been found that the American lodging industry could save US$745 million per year by reducing energy consumption by 10% (Energy Star 2012). Recycling, energy- and water-saving measure are found to be the most popular cost-reduction tools, which are relatively important for lodging facilities under a range of business pressures including global recession, intense competition, tight cash flow, higher power expenditure, and falls in tourist numbers in a post-disaster period (Revilla et al. 2001; Kasim 2007a; Deloitte 2008; Graci & Dodds 2008; Ortega 2010; Nelson 2010; Corgel & Lane 2011; Kučerová 2012).

Customer Demand

It has been suggested that more hoteliers would go green if there is a stable and significant customer demand (Yang 2010), but the hospitality industry, especially small and medium businesses, has been found to be little motivated by market factors in their environmental implementation (Revilla et al. 2001; Hung & Lai 2006; Kasim 2007a, 2009; Haastert & de Grosbois 2010; Chou et al. 2012; Kasim & Ismail 2012). The main argument of such businesses is that customers actually prioritize price, comfort, and convenience ahead of environmental concern in their purchasing decisions (Bohdanowicz & Martinac 2003; Vernon et al. 2003; Wan 2006; Kasim 2007a; Scanlon 2007; Tzschentke et al. 2008b; Rahman et a;. 2012). Although some companies sensed a potential sale increase of green-certified products, they admit the level of total customer demand is still not strong (Rowe & Higham 2007). Nevertheless, Kirk (1998) found that Edinburgh chain-affiliated hotels were encouraged to implement environmental management by market feedback so as to enhance customer satisfaction. Canadian tourism stakeholders also perceived consumers were starting to have a higher awareness of climate change in addition to environmental consideration (Dodds & Graci 2009).

Perception gaps with respect to the environment between tourism business and customer were also found to exist due to poor communication (Cunningham 2005; Schubert et al. 2010; Marshall et al. 2011; Han et al. 2011). For example, tourists may have a high interest in renewable energy that is contrary to hoteliers' knowledge (Dalton et al. 2008). Nevetheless, tourism businesses that neglect customers' environment interests can be educated to adjust their purchase behaviour after perceiving visible positive attributes of environmental practices, which is especially important for the adoption of novel measures, such as carbon offsetting programme (Wearing et al. 2002; Dodds et al. 2008; Andereck 2009; Kim & Heesup 2010; Schubert et al. 2010; Han et al. 2011). In the case of Japanese lodging operators, Cunningham (2005) found that consumers would be more willing to purchase some green hotel products when they fully understood the significance of the efforts made by businesses and receive clear information about the use of environmental savings. Poor tourist demand for hotels that engage in

environmentally practices may also result from misinformation because customers may think green hotels are more expensive (Millar & Baloglu 2011), or that there is no green tourism product available (Masau & Prideaux 2003). Overall, tourism companies may overlook the potential size of the green market or disregard changes in tourist behaviour.

Employee Loyalty and Public Relations

Although some studies have indicated that staff had low willingness to conduct green practices because of extra work loadings and low added-value for themselves (Kasim 2007a), the chain-affiliated hoteliers are keen to consider the employee factor as an incentive to go green (Kirk 1998; Nicholls & Kang 2012a). They perceived that there was an enhancement of employee satisfaction and loyalty while team members recognized their contribution to public welfare and benefited from their cost-saving actions (Kirk 1998; Graci & Dodds 2008). On the other hand, the improvement of public relations and reputation are found in several studies to be the major advantage for hoteliers to involve in sustainable practices or green initiatives (Hobson & Essex 2001; Chen 2004; Ayuso 2006; Chang 2006; Park 2009; Ustad et al. 2010; Tortellam & Tirado 2011; Nicholls & Kang 2012a). However, hotelier's use of environmental activities as a public relations measure varies with their operational size and/or management system. In general, large or chain-affiliated accommodation providers are more likely to have higher recognition of public relations benefit from environmental practices (Kirk 1995, 1998; Wan 2006).

Competitive Advantage

The creation of competitive advantage is also one of the important drivers for hotel business to go green (Chen 2004; Wan 2006; Ustad et al. 2010). Hoteliers, especially with large and chain affiliated properties, are likely to strategically engage in green practices in order to develop niche markets and profitability, and transfer operational savings into cost competitiveness in the long-term (Kirk 1998; Enz & Siguaw

1999; Bansal & Roth 2000; Tzschentke et al. 2004; Manaktola & Jauhari 2007; Graci & Dodds 2008; Kasim 2009; Sloan et al. 2009; López-Gamero et al. 2010; López-Gamero et al. 2011a; Nicholls & Kang 2012a). However, Bonilla-Priego et al. (2011) indicated that Spanish certified hotels did not perceive such benefits from their environmental practices, neither did Greek four-five star hotels (Maleviti et al. 2010) nor Egyptian accommodation operators (Dief & Font 2010).

Stakeholder Pressure

The influence of stakeholders with respect to environmental initiatives mainly depends on their power with respect to tourism businesses, environmental issues, and financial income, especially in the situation of interest conflicts (Álvarez Gil et al. 2001; Céspedes-Lorente et al. 2003). Although stakeholders, such as local communities, tour operators, investors, and NGOs, have sometime lead progress on green issues, some research has argued that stakeholder's commitments are limited, resulting in a low level of awareness of environmental responsibility among hotel operators (Kasim 2007a; Graci 2009; Kasim & Ismail 2012). This has also been argued in the case of Taiwanese restaurant managers (Chou et al. 2012). However, other research has identified the importance of stakeholder impact. For instance, the community has had effecst on the large, chain-affiliated, and urban hotels (Kirk 1995; Nicholls & Kang 2012a), as well as tourism operators in climatic vulnerable areas. For example, water use by ski resorts may be restricted by local residents (Morrison & Pickering 2012). Pressures from tour operators are rather significant because of their strong purchasing power on hotel rooms. For instance, TUI, one of the important European tour operators, contracted over 7,000 hotels to participate in its sustainable classification system (Ayuso 2006; Sigala 2008; Peeters et al. 2009). In addition, there is an emergence of the "green" Investor, such as a bank or insurance company, that requires hoteliers to have an appropriate policy to avoid or reduce environmental risk (Manaktola & Jauhari 2007). The last measure potentially becoming increasingly important in areas subject to high magnitude weather events, water security, and/or vulnerable to sea level rise or loss of climate-related tourism resources, such as

snow (Scott et al. 2012).

Government Policy and Regulation

Government policy has been found to be influential on hotelier's environmental decision-making (Leslie 2001; Revilla et al. 2001; Chan & Wong 2006; Wan 2006; Kasim 2007a; Graci & Dodds 2008; Bonilla-Priego et al. 2011; Shah 2011; Chou et al. 2012; Kučerová 2012). Tzschentke et al. (2004) observed that the accommodation sector would be highly motivated to conduct green measures if there is a potential increase in environmental tax, such as a landfill tax or climate change levy. International chain hotels appear more likely to take proactive actions since they have come to regard legislative change with respect to the environment and climate change as inevitable in the future (Graci & Dodds 2008).

On the other hand, some studies have argued that hotel respondents have not perceived strong governmental enforcement of environmental policies (Ayuso 2006; Kasim 2007a; Sloan et al. 2009; Maleviti et al. 2010). This is because environmental policy, especially relating to climate change regulation, is rather weak, unsupervised, or inactive in many countries (Carter et al. 2004; Becken 2005; Graci & Dodds 2008; Dodds & Graci 2009; Kasim 2009; Jarvis & Pulido Ortega 2010; Dief & Font 2010; Kasim & Ismail 2012; Gössling et al. 2013). Also, poor promotion of environmental regulation and policy has been an issue, often resulting in the low awareness of tourism industry (Kasim 2007a; Graci 2009). It is also noted that some factors, including administrative boundaries, the overlapping paper work between legislative agencies, or a lack of support from local municipal authorities, have made hotel operators hesitate to comply with environmental policy (Vernon et al. 2003; O'Neill et al. 2009). Overall such research highlights the importance of understanding the particular governance context, including with respect to both the nature of intervention and the scale at which governance operates, within which environmental activities and climate change adaptation and mitigation measures are being

enacted (Hall 2014b).

Government incentive schemes are an important catalyst in hotelier's and tourism businesses environmental decision-making (Saarinen et al. 2012). Monetary benefits, such as tax reductions or subsidies for environmentally friendly technologies, are encouraging for small lodging facility that usually struggles with access to capital (Coles & Zschiegner 2011; Dodds & Holmes 2011). Becken (2005) further argued it would be a barrier for the accommodation sector to respond to climate change without such measures. The availability of incentives is also a consideration of Taiwanese Eastern hotels in applying for the Green Hotel label (Yang 2010).

Environment and Climate Change Concerns

While some research has suggested that environmental concerns are a low priority for hotel businesses (Hobson & Essex 2001; Erdogana & Baris 2007; Calvache & Evra 2008), the clear existence of some lodging facilities' interest in environment protection and resource conservation is also acknowledged (Chen 2004; Chang 2006; Ustad et al. 2010; Garay & Font 2012). Bohdanowicz (2006b) suggested that cultural background is an explanation for differences in perception of the importance of environmental concerns, but Kasim (2009) argued that explanations for different positions on the environment lay with hotel's understanding of the relationship between environmental risk and operational revenue. For example, even if recognised as an important issue, climate change is apparently out of most tourism companies' concern in their daily or short-term routines or environmentally responsible operations. The main argument is that tourism business, including small hotel operators, usually project climate change as a long-term process or even uncertain phenomenon. Therefore, climate change is not important to their short-term plans, ranging from the next season to the following three years (Hall 2006; Saarinen & Tervo 2006; Saarinen et al. 2012). Although Saarinen and Tervo (2006) point out that tourism businesses would often only take actions when perceiving climate change as an evident and immediate

phenomenon. Morrison and Pickering (2011) proposed that operators are more likely to transfer the risk and responsibility to a third party. However, large tourism operators appear to be increasingly treating climate change seriously in their corporate strategies. One website-content analysis revealed that 27 of the 150 largest hotels in the world had addressed “mitigation of climate change” in their environmental goals, and 18 of them reported the related performance (de Grosbois 2012).

Owner or Senior Manager's Personal Value and Belief

It has been observed that the degree of ethical commitment, responsible attitude and environmental knowledge of the owner or senior management is likely to enhance environmental performance in their hotels (Álvarez Gil et al. 2001; López-Gamero et al. 2010; Yang 2010). Some research suggests that the success of environment management and carbon reduction in lodging facilities, especially of small or independent hotels, is mainly determined by the senior manager’s ethical value towards sustainability (Tzschentke et al. 2004, 2008a; Ayuso 2006; Calvache & Evra 2008; Park 2009; Garay & Font 2012; Teng et al. 2012). For example, one Taiwanese study indicated “owner or top manager’s personal value and belief” as the key reason for local hotels’ involvement in environmental initiatives (Yang 2010). Sampaio et al. (2012) also suggested that green engagement would reinforce the ethical value of small hotel owners, since this action may make participants feel “good” about themselves and therefore create a virtuous cycle of action and response.

CSR and Parent Company’s Policies

For som ehotel operations the parent company’s policies are extremely influential on the adoption of environmental practices and initiatives. This is especially evident in the case of chain-affiliated hotels (Álvarez Gil et al. 2001; Chan & Wong 2006). For instance, 120 Scandic branch hotels achieved Swan eco-label requirements (a Nordic environmental labelling and certification programme) and conduct

resource consumption report in the chain-wide SIR (Sustainability Indicator Reporting) system in order to comply with parental company's sustainable strategy (Scandic Hotel 2012). From a long-term perspective, Graci and Dodds (2008) also emphasized the importance of corporate social responsibility (CSR) policies on the green decision-making of individual hotels. Mackenzie and Peters (2012) argued this factor is relatively more important for large hotels, which can forsee the marketing value of CSR in their environmental actions.

Capital Investment

Capital investment has been regarded as a barrier for the hospitality industry to go green because hotel businesses often project such actions to expensive technology, high implementation and maintenance costs, and a long-term-payback (Stabler & Goodall 1997; Vernon et al. 2003; Becken 2005; Bohdanowicz 2006b; Chang 2006; Hung & Lai 2006; Kasim 2007a; Calvache & Evra 2008; Chan 2008; McNamara & Gibson 2008; O'Neill & Alonso 2009; Ustad et al. 2010; Dodds & Holmes 2011; Lebe & Zupan 2012). Indeed, large amount of investments are not likely affordable for small hoteliers with existing properties, which are often short of financial capacity (Hobson & Essex 2001; Tzschentke 2004; Cunningham 2005; Chan 2008; Chan 2011; Garay & Font 2012; Rahman et al. 2012; Scott et al. 2012). In addition, the payback period of environmental investment is another concern for hotel managers since they look for quick financial performance, estimated as less than one year for small hotels or less than three years for large ones (Trung & Kumar 2005; Graci 2009). A majority of Croatian hotel respondents even thought sustainable measures had no impact on life cycle costs of lodging facilities (Peršić-Živadinov & Blažević 2010). However, it needs to be emphasized that the accommodation sector may neglect some environmental practices with rapid returns. For example, investment in a key card system of energy control in a room can be paid off within 70 days (Chan 2009).

Existing Building Structure and Facilities

Existing building structure and facility can also affect a hotel's green actions. When the implementation of environmental practices involved in a large-scale physical refurbishment hoteliers are likely to withdraw their engagement for financial and operational reasons (McNamara & Gibson 2008; Park 2009; Ustad et al. 2010). Hotel operators usually think it is uneconomical to reconstruct old buildings (Chang 2006; Tzschentke et al. 2008b). In addition, they are often not interested in upgrading hotel facilities if it involves complicated government regulations and bureaucratic procedures (Graci 2009). In addition, lodging operators, which only have a short-term rental contract, are lowly motivated to renovate the hotel building for environment protection (Bohdanowicz 2005).

Corporate Capacity: Time, Staff, Technology and Suppliers

Hotel business, especially macro-size lodging facility, often attributes a lack of corporate capacity, such as time, staff, technology and suppliers, as their reason to withdraw from environmental actions or not participate in the first place (Haastert & de Grosbois 2010). The implementation of green practice is often considered as time-consuming, since it not only requires a time period to establish, but also needs a continuous process to maintain the results (Ustad et al. 2010). Small hoteliers are likely to consider time shortage as a significant problem while introducing environmental measures (Jarvis & Pulido Ortega 2010; Hobson & Essex 2011). Chain-affiliated hotel managers also indicate that their schedule is too tight to organise environmental plans (Calvache & Evra 2008). In addition, inadequate human capacity has been an issue for the tourism industry in not undertaking environmental actions (Chang 2006; Scott et al. 2012). In a hotel business, it is rare to have an environmental specialist due to the low availability of qualified personnel and human resource budget (Becken 2005; Erdogana & Baris 2007; Chan 2008; Graci 2009). This issue is relatively serious for small lodging business, whose workforce is mainly comprised of short-term and temporary employees and low-environmental-skill managers (Ateljevic 2007; Chan 2011).

In addition, existing hotel enterprises perceive a difficulty in gaining the hardware requirements for environmental practices. In general, lodging facilities do not equip themselves with environmentally friendly technology in their existing buildings (Ustad et al. 2010; Scott et al. 2012). When hotels look for green suppliers, there is often a problem of availability, especially for remote hotels (Tzschentke et al. 2008b; Kasim & Ismail 2012). Some hotel operators even challenge the value of so-called green products in the supply chain (Chou et al. 2012), resulting in a lower willingness of hoteliers to engage in green purchase.

Current information

Hoteliers, especially small lodging operators, often attribute a lack of information as part of reasons for their poor environmental performance (Kasim 2009). In the Malaysian context Kasim (2007a) found that lodging operators may not have a clear understanding about the significance of environmental issues, while Vernon et al. (2003) found that Cornish hoteliers are likely to have a poor knowledge of government environmental policy. A number of hotel operators may still have doubts about the existence of anthropogenic climate change. The uncertainty of climate change projections and a dearth of regionally based understandings of climate change's influence on tourism, have affected the willingness of tourism and hospitlity entrepreneurs and businesses to undertake long-term responsible actions (Becken 2005; Hall 2006; Saarinen & Tervo 2006; Scott & Becken 2010; Turton et al. 2010; Saarinen et al. 2012). Tourism and hospitality stakeholders may well become more demanding for appropriately scaled technical information, including carbon emission assessment, local vulnerability analysis, the cost-benefit data of environmental investment, as well as education materials of mitigation and adaption practices. Unfortunately, such information is not generally available yet in most jurisdictions especially at a sectoral or regional level (Becken 2005; Dodds & Graci 2009; Jarvis & Pulido Ortega 2010; Morrison & Pickering 2012).

Risk Management

In the New Zealand context Hall (2006) argued that some tourism business has gradually adopted adaptation measures for the reason of risk management. He showed that accommodation operators with experience of "concrete" high magnitude weather events were more likely to perceive the importance of risk management through adaptive measures. For example, resort operators may adopt the use of fire-proof material in buildings after wildfire events (Graci & Dodds 2008). In the case of Australian Alps, tourism stakeholders also actively engage in fire management for the increasingly frequent bushfires (Morrison & Pickering 2012).

Industry Leadership

In addition to ethical concerns, some hotels commit to environment management in order to assume a leadership position in the hospitality industry. These hotels are often advanced in self-regulatory measures and the implementation of environmental management systems, which not only help them to avoid remedial costs for the potentially stricter environment policies in the future, but also contribute to their social value with a reputation reward, including in some cases a green award from an external body. Also, they actively participate in formulating environmental policy and regulation in order to create the benefits for publics, industry and their own company (Graci & Dodds 2008).

Actions

Previous research has explored the implementation of environmental practices in the global hospitality industry, mainly via the use of surveys and interviews (Myung et al. 2012). Internationally, hotel business have gradually engaged in environmental strategy, energy-, waste-, and water- management, carbon

offset programmes, green purchasing, environmental education, local conservation and community involvement, environmental incentives, as well as adaptation of hotel product, marketing and position, which directly or indirectly meet the aims of climate change mitigation and adaptation. The following section summarizes hotel enterprise's environmental involvement based on international literature and discusses the implications of lodging facility's environmental performance. The relationships between hotel characteristic and their environmental implementation are also analyzed.

Environmental Policy

Environmental policy is the ideal foundation to drive lodging operators' sustainable performance. Nevertheless, most research showed less than half of the hotel respondents had a written environmental policy (Table 2.4). This is usually explained by arguments that hoteliers generally do not perceive its necessity and often misinterpret its significance. For example, some hotel managers may oversimplify the meaning of environmental policy (Kirk 1995), and concentrate on the strategies, which aim at creating safe, healthy, clean, and green environments (Mensah 2006). Nicholls and Kang (2012a) suggested that a hotel's adoption of environmental policy is associated with its room size and star rating. The first relationship is at odds with Kirk's (1998) observations, but the latter is supported by the case of Ghana lodging facilities (Mensah 2006). Ustad (2010) indicates that hotels with green certifications are more likely to have a written environmental policy, often because there is a requirement of such certification.

Table 2.4: Examples of research on the adoption of a written environmental policy in the hotel industry

Country	Hotel Sample	% adopting a written environmental policy	Source
U.K.	106	41%	Brown 1996
	85 (Edinburgh)	22%	Kirk 1998
	42 (London)	19%	Knowles et al. 1999
	417 (Southwest England)	25%	Coles & Zschiegner 2011
Sweden	224	57%	Bohdanowicz 2005
Poland	124	4%	Bohdanowicz 2005
Turkey	40 (Ankara)	10%	Erdogan & Baris 2007
U.S.A.	217 (Michigan)	16%	Nicholls & Kang 2012a
Ghana	52 (Accra)	58%	Mensah 2006
China	37 (Macao)	30%	Wan 2006
Taiwan	152 (East Taiwan)	41%	Yang 2010
New Zealand	94	97%	Ustad 2010

Note. Adapted after Nicholls and Kang (2012a)

Environmental Target, Benchmarking, and Control

Establishing environmental targets and indicators is popular with environmentally-proactive hotels, especially large hotel groups, which may equipoed with an information system to record and monitor their overall consumption of energy, and water, as well as the production of waste and their carbon footprint (Bonilla Priego et al. 2011; Font & Walmsley 2012). For example, Hyatt has adopted an online system called Hyatt ecoTracking to follow up greenhouse gas emissions, and the resource usage of group hotels (Hyatt 2013). The report is often presented in monetary value instead of technical units, such as kWh, MJ, and m^3, in order to help hotel managers efficiently control environmental cost (Chan 2005) or the so-called operational cost. Although some Taiwanese tourist hotels conduct an energy audit on a monthly basis (Teng et al. 2012), such environmental information is rarely collected in the hospitality industry (Chan 2005; Wan 2006; Erdogan & Tosun 2009; Charara et al. 2011), especially for small-size or low star-rating hotels (Radwan 2010; Jarvis and Pulido Ortega 2010). In addition to the problem of poor data availability, Chan (2012) further advised the issue of having weak or single-dimension benchmarking standard. In general there are great difficulties in drawing comparisons between different hotels because of the use of different performance measures – *assuming they measure environmental*

performance at all, and the lack of clear baseline indicators.

Environmental Management System

An Environment Management System (EMS) is a management tool to monitor and assess the successes and failures related to environmental and social issues, identify problems and improve the performance based upon internal information (The Tour Operators' Initiative and Center for Environmental Leadership in Business 2003). In general the accommodation sector's awareness and adoption of EMS appears limited (Leslie 2001; Zografakis et al. 2011). Even in a study of certified green hotels in New Zealand, only half of respondents applied this practice (Ustad et al. 2010). The major difficulties are to integrate environmental management into all hotel departments and to adopt a long-term vision in a hotel's EMS plan instead of focussing just on immediate benefits (Bonilla Priego et al. 2011). Kučerová (2012) indicated that large hotels are more likely to adopt EMS in the case of Slovakian hotels. Another trend is the design of a tailored-made environment program in chain-affiliated hotels (Chan & Ho 2006). Hsieh (2012) reported up to 40% of the top 50 hotel groups initiated their own projects, such as "Earth Guest" by Accor, "Reduce, Reuse, Recycle" program by Marriott, and "EARTH (Environment Awareness & Renewal at Taj Hotels)" programme by the Taj Hotel Group, in order to reinforce the hotel group's image and market position.

Environmental Certification

Hundreds of green schemes, either issued by national governments, such Leadership in Energy and Environmental Design (LEED) (U.S.); Quasi-NGOs, like the Green Leaf Program (Thailand); supranational governments, like EU Ecolabel; NGOs, like Green Key, or private companies, like Green Globe and ISO 14001, are applicable to the tourism industry (Bohdanowicz 2006b). Green certification has been used as a management or marketing approach to acknowledge lodging facility's environmental performance,

especially in the areas of energy, water, and waste management (Green Hotel Association 2009; Bowman 2011). However, many of them lack criteria and benchmarking to make objective evaluation (Claver-Cortés et al. 2007; Houlihan-Wiberg 2009).

Overall, a low percentage of hotels receive environmental certification (Table 2.5). According to International Organization for Standardization (ISO), nearly 600 hotels had ISO 14001 certifications by 2005, accounting for 0.05% of the 110,000 certified organizations worldwide (ISO 2006). From the regional perspective, only 1% of hotels were eco-labeled in Europe, where is usually perceived as an environmentally advanced area (Bohdanowicz et al. 2004). Hotel managers usually attribute their inactions to the high application costs and renewal expenses. For example, it costs Euro 1,500-3,500 for eco-label certification, and Euro 3,500-7,500 for ISO 14001 or EMS certification (Ayuso 2006). Another factor is a low confidence in financial return from gaining the eco-label (Lebe and Zupan 2012). Other known obstacles include complicated and time-consuming procedures; the inapplicability of certification criteria in the context of local or national regulations; insufficient knowledge; and lack of support from customer, government, and hospitality association (Rivera 2002; Bohdanowicz et al. 2004; Claver-Cortés et al. 2007; Kasim 2007; Rowe & Higham 2007; Jarvis et al. 2010; Carasuk 2011). Small-sized, independent, rural, and budget hotels are often more restrained by those barriers than large, chain-affiliated, urban, and luxury lodging facilities (Sasidharan et al. 2002; Rivera 2004; Bohdanowicz 2006b; Kasim 2007; Rowe & Higham 2007; Carasuk 2011; Nicholls & Kang 2012a). Some factors, such as economic incentives, competitive advantage, public relations and image, supplier pressure, government sponsorship, legislative enforcement, legitimacy of green certification, as well as hotelier's recognition of corporate social responsibility (CSR) and environmental concern, are considered as important drivers to encourage lodging operators' investment in green certification (Sasidharan et al. 2002; Bohdanowicz et al. 2004; Rivera 2004; Jarvis et al. 2010; Bowman 2011; Carasuk 2011; Shah 2011). Tseng et al. (2012) suggested that new hotels are more active in environmental schemes, such as green building labels, since their application is relatively cheaper and easier, especially not involving in the problems of

building reconstruction.

Table 2.5: Examples of research on hotel participation in green certification

Country	Sample	% Adopting Green Certification	Reference
U.K.	42 (London)	36%	Knowles et al. 1999
Sweden	224	26%	Bohdanowicz 2005
Greece	91	2% (ISO 14000)	Nikolaou et al. 2012
	32 (Crete)	9%	Zografakis et al. 2011
Poland	124	0%	Bohdanowicz 2005
Croatia	200	0% (ISO 14000)	Peršić-Živadinov & Blažević 2010
U.S.A.	217 (Michigan)	12% (Environmental Certification) 3% (LEED)	Nicholls & Kang 2012a
Costa Rica	164	<10% (Costa Rican Certification for Sustainable Tourism)	Rivera 2002

Note: Adapted after Nicholls & Kang (2012a).

Environmental Manager

Although designating a manager with specific environmental responsibility may facilitate sustainable performance at a corporate level, the implementation rate is rather low in the hotel industry, with less than 30% of hotel respondents establishing this position according to current research (Table 2.6). While high cost may restrict specific employment (Bohdanowicz 2006b), this task may be shared by administrative staff, department managers (e.g. engineering, kitchen and marketing), or taken by the CEO (Bicknell & Mcmanus 2006; Bohdanowicz 2006b; Pan 2009). However, these approaches usually result in an operational dilemma since the participants usually lack of interest, time or management resources to complete this extra work (Pan 2009).

Table 2.6: Examples of research on hotel designation of an environmental manager

Country	Sample	% Designating Environmental Manager	Source
U.K.	417 (Southwest England)	20%	Coles & Zschiegner 2011
Sweden	224	28%	Bohdanowicz 2006b
Poland	124	16%	Bohdanowicz 2006b
China	37 (Macao)	14%	Wan 2006
Taiwan	152 (East Taiwan)	21%	Yang 2010

Energy Saving Measures

Easy energy-saving measures have been popular in the hospitality industry since energy costs often account for the largest part of a hotel's operational expenses (Becken 2005; Scott et al. 2012). There is a high potential to decrease energy usage in hotel businesses, potentially up to 20% of heating consumption, 30% of cooling, 70% of hot water, and 60% of lighting (Hotel Energy Solution 2011b). This situation may explain why 77% of surveyed hotels have conducted energy-saving practices in Spain (Garay & Font 2012). Other research also indicates a high implementation rate in high star-rated (Ali et al. 2008) or chain-affiliated hotels (Nicholls and Kang 2012a; Rahman et al. 2012). Well recognised approaches include green building, energy-efficient facilities, renewable and alternative energy use, and energy-saving education.

It is estimated that a green property, such as a LEED-certified building, could reduce 26% of energy usage and 33% of carbon emission (U.S. Green Building Council 2012). Energy Star (2012) suggested 'A 10 percent reduction in energy costs is equivalent to increasing RevPAR by $0.60 for limited service hotels and by more than $2.00 for full-service hotels'. In the green renovation project of Hong Kong Walt Disney Resort, 20% of energy consumption and 6000 tons of CO_2 emissions per year could be saved as a result of improving environmental efficiencies (Becken & Hay 2007). However, the adoption rate of green building is relatively low in the accommodation sector. For example, only 91 lodging facilities out of 47,000 hotels in America received LEED certifications by 2011 (Energy Star 2012; USGBC 2012). Barriers may exist in terms of stakeholder coordination, strict and complicated green property regulations, and the incapacity to change existing building structures (Butler 2008; Teng et al. 2012).

Research suggests that overall, cost-free or cheap energy-saving measures, such as using energy-efficient bulbs, cleaning and maintaining air conditioning facilities, and turning off power when not needed, had

high level of popularity worldwide (Table 2.7). On the other hand, expensive energy-saving technology is less introduced in the lodging facility (Becken 2005; Coles & Zschiegner 2011; Becken 2012; Nicholls & Kang 2012a), except the ones with top manager support (López-Gamero et al. 2011b). Also, hotels, especially in hot and humid Asian countries, are not keen to shorten air-conditioning service for not effecting customer comfort (Deng & Burnett 2000; Priyadarsini et al. 2009).

Although the benefit of renewable and alternative energy, has been evidenced with respect to environment, marketing, and finance (Gössling et al. 2005; Dalton et al. 2008, 2009a, 2009b; Hotel Energy Solutions 2011b; Scott et al. 2012), its implementation rate is generally low in the hotel industry, with the exception of some European lodging facilities (Leslie 2001; Nikolaou et al. 2012) and chain affiliated hotels (Hotel Energy Solutions 2011b) (Table 2.8). This is because many hoteliers, especially small lodging operators, disregard their impacts on environment (Dalton et al. 2007), have no access to renewable technology (Nepal 2008), or perceive this practice as an expensive and long-term-payback investment (Mensah 2006; Dodds & Graci 2009; Park 2009; Zografakis et al 2011), for example, like taking 5.5 to 18 years to balance the cost of solar hot water system (Becken 2012). Other reasons include the bureaucratic procedures of government; the restraint of existing buildings; a lack of information, technological expertise, supplier, government incentive, customer demand; and space for facility installation (Becken 2005; Karagiorgas et al. 2006; Hotel Energy Solutions 2011b; Nelson 2010; Zografakis et al 2011). Hotels have also argued that the adoption of renewable energy is impractical from an operational perspective (Dalton et al. 2007; Hotel Energy Solutions 2011b, Zografakis et al 2011; Tseng et al. 2012). For example, the scale of wind energy is too big for a single hotel to afford, but a solar system is insufficient to support the demand of a large hotel (Becken 2005; Ali et al. 2008). Therefore, there is a high anticipation of hotels on government's upcoming subsidy or cheaper renewable energy (Chan et al. 2013).

Table 2.7: Examples of research on hotel implementation of energy saving measures

Country	Sample	% of cleaning & maintaining AC facility	% turning off power in time	% using energy-efficient bulbs	% using electricity key Card	% using energy control system	Source
UK	64 (Plymouth)						Hobson & Essex 2001
Sweden	224			76%			Bohdanowicz 2006b
Greece	91			79%	81%	31%	Nikolaou et al. 2012
	32 (Crete)	78%					Zografakis et al 2011
Poland	124			70%			Bohdanowicz 2006b
U.S.A.	166		75%	77%			Rahman et al. 2012
New Zealand	94				98%		Ustad et al. 2010
Jordan	80		41%		9%		Ali et al. 2008
Ghana	52 (Accra)			94%			Mensah 2006
Iran	69 (Mashhad)			90%		60%	Aminian 2011
China	37 (Macao)		3%	7%		11%	Wan 2006
Taiwan	152 (East Taiwan)	94%	>60%	90%	55%	>60%	Yang 2010

Table 2.8: Examples of research on hotel implementation of green energy, transport and education

Country	Sample	% using renewable alternative energy	% encouraging green & public transport	% offering energy-saving education / incentives	Source
U.K.	64 (Plymouth)		59%		Hobson & Essex 2001
	230 (Lake District)	80%			Leslie 2001
Sweden	224			40%	Bohdanowicz 2006b
Greece	91	52%			Nikolaou et al. 2012
Spain	394 (Catalonia)	30-45%			Garay & Font 2012
Poland	124			23%	Bohdanowicz 2006b
Croatia	200	0%			Peršić-Živadinov & Blažević 2010
Slovenia	63	4%		82%	Lebe & Zupan 2012
Australia	70	9%			Dalton et al. 2007
Jordan	80	10%			Ali et al. 2008
Ghana	52 (Accra)	8%			Mensah 2006
China	37 (Macao)			6%	Wan 2006

Some hotels have engaged in promoting energy conservation in transport and education programmes, including encouraging visitors, suppliers, or staff to use green vehicles and public transport, or placing 'energy-saving" reminders in the guest rooms (Becken 2005), since it is believed environmental communication could effectively enhance stakeholder's green awareness and actions (Han et al. 2010). For example, Accor informs its worldwide guests and staff about energy conservation within its practice guide in seven languages as well as providing a DVD "Together More Responsible" in eight languages (Hotelnews 2007). However, hotel's implementation of such practices was generally low (Table 2.8), except for one UK survey suggested that over half of hotel respondents encouraged the use of public transportation (Leslie 2001). Indeed, in many instances, many hoteliers avoid using education, such as "energy-saving" or "air-conditioning saving" leaflets, since they try not to place pressure on room guests who come for luxury services (Beckon 2005; Bohdanowicz 2006b; Kučerová 2012).

Waste Management Measures

Recycling, retreatment and reduction have been common approaches in hotel's waste management (Table 2.9). Many hoteliers conduct recycling practice on a regular basis (Coles & Zschiegner 2011; Dodds

& Holmes 2011), although they pay more attention on recycling solid waste than food, soap and shampoo waste (Mensah 2006; Park 2009; Peršić-Živadinov & Blažević 2010; Radwan et al. 2010; Aminian 2011). Nicholls and Kang (2012a) found small and medium hotels are more likely to engage in recycling than large lodging facilities, but Erdogan and Baris (2007) suggested that high star-rating hotels had better implementation. Overall, the level of involvement is mostly driven by cost incentive (Sloan et al. 2004), waste disposal regulation (Erdogan & Baris 2007), and environmental policy (Park 2009; Lebe & Zupan 2012). Some national accommodation sectors had a lower performance in waste management, as the examples from Poland, Ghana and Turkey (Bohdanowicz 2006b; Mensah 2006; Erdogan & Baris 2007). The key factors of poor waste management are often attributed to high capital investment, a lack of waste collectors, unawareness of law requirement, low availability of facility, information, and time, as well as legislative restraint, such as sanitary law and animal-by-product regulation (Leslie 2001; Bohdanowicz 2006b; Mensah 2006; Erdogan & Baris 2007; Radwan et al. 2010).

Table 2.9: Examples of research on hotel implementation of waste management measures

Country	Sample	% recycling waste	% pre-treating waste water	% reducing the use of disposable packages	Source
U.K.	42 (London)	67%			Knowles et al. 1999
	64 (Polymouth)	52%		16%	Hobson & Essex 2001
Sweden	224	80%		>50%	Bohdanowicz 2006b
Spain	394 (Catalonia)	88%			Garay & Font 2012
Poland	124	31%		>50%	Bohdanowicz 2006b
Slovenia	63		56%		Lebe & Zupan 2012
New Zealand	94	>80%			Ustad et al. 2010
U.S.A	217 (Michigan)	65%		21%	Nicholls & Kang 2012a
	191	88%			Park 2009
Ghana	52 (Accra)	17%			Mensah 2006
Turkey	40 (Ankara)	17%	33%		Erdogan & Baris 2007
Iran	69 (Mashhad)	>70%	40%		Aminian 2011
China	37 (Macao)	78%			Wan 2006
Taiwan	152 (East Taiwan)	95%		49%	Yang 2010

Substantial debate often exists about hotel production of chemical and hazardous waste (Kasim 2007b). Even though a majority of Michigan hotels said they have adequate disposal measures (Nicholls & Kang

2012a), other research indicated there is a lack of waste re-treatment or audit in the accommodation sector (Erdogan & Baris 2007; Kasim 2009; Peršić-Živadinov & Blažević 2010). Hoteliers' inaction may result from their low awareness of hazardous waste (Erdogan & Baris 2007; Peršić-Živadinov & Blažević 2010), or reluctance to invest in treatment technology (Trung & Kumar 2005), which is more evident in the case of small accommodation providers (Becken 2005). Legislative enforcement is considered as an effective push factor to encourage hotels' engagement with waste management practices. For example, coastal lodging facilities in Vietnam were more aware of wastewater management due to the revision of the environmental law (Trung & Kumar 2005).

Some hotels tried to consume less material in order to reduce waste and related cost, activities include reducing the use of disposable package, adopting durable and reusable products, and purchasing bulk and refillable packages (Bohdanowicz 2006b; Peršić-Živadinov & Blažević 2010; Radwan et al. 2012). Nicholls and Kang (2012a) observed small lodging facilities are more active than large hotels in this aspect. However, the general adoption rate is still moderate in the hotel industry (Table 2.9), mainly as a result of hygiene and customer concerns (Radwan et al. 2012).

Water Management Measures

The water costs of lodging facilities, especially those of upscale and international chain hotels, may be significant due to the presence of water-intensive services and infrastructure, including laundry, kitchen, spa, golf course, and swimming pool (Deng & Burnett 2002; Bohdanowicz 2006b; Bohdanowicz & Martinac 2007; Deyà Tortella & Tirado 2011). For example, a swimming pool may add 60 liters of water consumption per guest night (Hamele & Eckardt 2006). For hotels under the threat of drought events during peak periods of demand, water conservation becomes even more important (Kelly and Williams 2007; Tortellam & Tirado 2011). Therefore, according to the relevant international research, water-saving measures have had high levels of adoption by hotel business (Table 2.10), with the notable

exception of Turkish hotels (Erdogan & Baris 2007). Industry-wide practices include the reuse of towels and liens and investment in low-flow showers and toilets (Park 2009; Aminian 2011), although a wider range of water conservation measures is often seen in the chain-affiliated or high-star-rating hotels (Peršić-Živadinov & Blažević 2010; Rahman et al. 2012). In general, this action is driven by cost factors (Sloan et al. 2004; Jarvis & Pulido Ortega 2010), but other factors, such as senior management leadership (Cashman & Moore 2012), customer demand, capital investment, government incentives (Charara et al. 2011), government policy and adoption of environmental responsibility measures (Emmanuel & Spence 2009), were also acknowledged.

2.10: Examples of research on hotel implementation of water management measures

Country	Sample	% adopting water-saving measures	% reusing liens and towels	% applying low-flow shower and low-flush toilet	Source
U.K.	417 (SW England)	60%	>50%		Coles & Zschiegner 2011
Sweden	224	>70%	71%		Bohdanowicz 2006b Bohdanowicz et al. 2004
Spain	394 (Catalonia)	77%			Garay & Font 2012
Poland	124	>70%	64%		Bohdanowicz 2006b Bohdanowicz et al. 2004
Slovenia	63	25%			Lebe & Zupan 2012
U.S.A.	217 (Michigan)		>80%		Nicholls & Kang 2012a
	191	>90%	96%		Park 2009
New Zealand	94		>79%	>64%	Ustad et al. 2010
Ghana	52 (Accra)		74%	67%	Mensah 2006
China	37 (Macao)	78%		3%	Wan 2006
Taiwan	152 (East Taiwan)		73%	>58%	Yang 2010

Carbon Offsetting

Carbon offset programme have been introduced to the accommodation sector for the purpose of balancing the carbon dioxide emissions of hotels and attract green tourists (Zeppel & Beaumont 2013). For example, Leading Hotels donated US$50 cents per room to Sustainable Travel International for neutralizing their guests' energy consumption (Kyriakidis & Felton 2008). Some hotels also provide

carbon-neutral packages for customers to purchase, such as the URBN Hotels & Resorts, a boutique hotel company based in Shanghai (Ernst & Young 2008). Nevertheless, the implementation of carbon offset programmes is still negligible in the hotel industry. Even in the cases of environmentally-certified tourism and hotel business in Australia, the participation rate in carbon offsetting was less than one-third (Zeppel & Beaumont 2013). A key reason that often attributed to hotel's limited awareness and knowledge of carbon offset schemes, is their low confidence in customer interest in such programmes (Dodds et al. 2008; Gössling et al. 2009b). Zeppel and Beaumont (2013) added that the low level of implementation of such programmes by tourism businesses, especially small companies, was partly due to its voluntary nature and extra cost. Scott et al. (2012) suggest that future successful adoption of carbon offsetting needs to be based on credible, valid, and adequate methods of calculating, compensating and communicating carbon emissions of tourism products.

Green Purchasing

Green purchasing is mainly addressed in three aspects of the hotel industry, the adoption of local produced and seasonal food, environmentally friendly and green label product, and use of green suppliers (Table 2.11). The potential benefits of serving local and seasonal food include enhancing the authenticity of customer experience (Sims 2009), contributing to the local economy (Leslie 2001) and, importantly, potentially reducing the carbon footprint of the whole production process (Scott et al. 2012; Hall & Gössling 2013). Nicholls and Kang (2012a) noted that small hotels are more likely to invest time and effort in local produce. However, its adoption rate is relatively low in the accommodation sector, e.g. 26% of Turkish hotels (Erdogan & Baris 2007), since lodging operators highly concerned about the price, availability, ongoing supply, and quality of such products (Leslie 2001; Nummedal and Hall 2006; Kučerová 2012; Leslie 2013). It is often difficult to promote green products to lodging enterprises because hoteliers tend to prioritize price and quality factors ahead of environmental concerns in their purchasing decisions (Wan 2006; Radwan et al. 2010). For example, they may associate recycled goods

with high price and low quality (Radwan et al. 2012). The hospitality industry also hesitates to use organic products because of concerns over higher prices, and its quantity, variety and quality (Kasim & Ismail 2012; Nicholls & Kang 2012a). Bohdanowicz (2006b) suggest that implementation rates could be improved if there is a high availability of suppliers, although order size may assist in establishing a green supply chain. Indeed, the negotiation power of an international hotel group, like Marriott International with an annual $10-billion purchase order, is much higher than than that of small and medium sized hotels (Baker 2009; Kirkwood & Walton 2010).

Table 2.11: Examples of research on hotel implementation of green purchasing

Country	Samples	% adopting local-produced and seasonal food	% purchasing environmentally friendly, or green label products	% working with environmentally responsible supplier	Source
Sweden	224		46%		Bohdanowicz 2006b
Spain	394 (Catalonia)		30-45%	30-45%	Garay & Font 2012
Poland	124		15%		Bohdanowicz 2006b
Croatia	200			4%	Peršić-Živadinov & Blažević 2010
U.S.A.	191		72%		Park 2009
Turkey	40 (Ankara)	26%			Erdogan & Baris 2007
Taiwan	152 (East Taiwan)	45%	28%		Yang 2010
Iran	69 (Mashhad)		>70%		Aminian 2011

Environmental Education, Community Involvement, Incentives and Marketing

Recent international research showed over half of hotel respondents had environmental education programs in place, with the notable exception of Turkish and Slovenian studies (Table 2.12). Nicholls and Kang (2012) indicated that large or chain-affiliated hotels are more likely to use education to encourage environmentally responsible behaviour of staff and customers. Employee training is usually in a form of meeting or workshop to instruct corporate environmental policy, systems and procedures; while pamphlets and DVDs are popular for guest communication, e.g. Fairmont Hotels and Resorts' brochure *Making a Difference Together: Fairmont's Commitment to Environmental Stewardship* (Bohdanowicz 2006; Mensah 2006; Aminian 2011; Radwan et al. 2012). In addition, some hotel groups display the real-time carbon emissions of a lodging facility for educational purposes (Kyriakidis & Felton 2008).

Although lodging operators have gradually improved their support of local conservation and community activities (Sloan 2004; Mensah 2006), the level of hotel involvement was still low in some regions (Leslie 2001; Wan 2006). Chain affiliated hotels are one of the most active players in such programs. For instance, Fairmont's Eco-Innovation Signature Project, which emphasizes "thinking globally and acting locally", is aimed at assisting coral reef protection in Hawaii, and deforestation program in Kenya (Fairmont Hotels & Resort 2013). The application of environmental incentives is not always successful. While nearly 60% of hotel respondents said they have engaged in this measure according to one Chinese survey (Wan 2006), one American study reported that none of the surveyed hotels provided financial incentives to encourage employee's environmental efforts because it was not judged to be affordable, especially for small-sized lodging facilities (Radwan et al. 2012). Scanlon (2007) argued that chain-affiliated hotels are more likely to acknowledge the benefits of supporting local activities, including higher staff participation and environmental performance, which is evidenced in Hyatt Gainey's bottle recycling programme.

Table 2.12: Examples of research regarding to hotel's implementation of environmental education, community involvement, incentives and marketing

Country	Sample	% providing environmental education	% supporting community or conservation project	% offering incentives for environmental measures	% adapting hotel's products, marketing and positioning	Source
Ghana	52 (Accra)	>70%	70%			Mensah 2006
Iran	69 (Mashhad)	75%				Aminian 2011
Turkey	40 (Ankara)	>15%				Erdogan & Baris 2007
Slovenia	63	33%				Lebe & Zupan 2012
China	37 (Macao)	59%	22%	59%		Wan 2006
Malaysia	27(Penang)	50%				Kasim 2007a
Taiwan	152 (East Taiwan)	64%	55%		11%	Yang 2010
Fiji	25				<50%	Becken 2005

Environment and climate change concerns have been push factors to make hotels adjust their product, marketing and position in two ways. First of all, hotel operators may strengthen their environmentally friendly image and promote eco-concept products in order to attracting visitors who are willing to jointly mitigate climate change and environmental impacts in their consumption process (Bicknell & Mcmanus 2006). Chung and Parker (2010) showed that the occupancy rate of a green room could be 17% higher than that of conventional suite. Accomodation providers that have experienced a shorter peak season or lower appeal for regional attractions because of climate change, e.g. snow resorts, may also be keen to design weather-guaranteed product or alternative guest activities in order to lessen their revenue loss and create opportunities (Bicknell & Mcmanus 2006; Saarinen & Tervo 2006; Scott et al. 2012).

The Environmental Performance of the Accommodation Sector: An Overview

Information on environmental performance, defined in terms of a hotel's achievement of environmental targets, covering the outputs of activities, processes, hardware and services, is rarely collected in the hospitality industry. Therefore, much research turned to study the range of environmental activities that hotels were involved in or the level of implementation of environmental measures (Bohdanowicz 2006; Gautam & Singh 2010; Oreja-Rodríguez & Armas-Cruz 2012; Mensah & Blankson 2013). Driven primarily by financial incentives, hotels generally had better environmental performance in energy-, waste-, and water-related measures (Vernon et al. 2003; Haastert & de Grosbois 2010; Ustad et al. 2010). Size, service standard and management system, which mainly decide a lodging facility's financial, human resource, purchasing, technical, and planning capacities, are key influential factors on a hotel's green actions. In general, large, high-star rating, and chain affiliated hotels have better implementation of environmental practices (Alvarez Gil et al. 2001; Hobson & Essex 2001; Céspedes-Lorente et al. 2003; Mensah 2006; Scott & McBoyle 2007; Tarí et al. 2010; Turton et al. 2010; Rahman et al. 2011; Shah 2011; Ruhanen & Shakeela 2012). However, the positive correlation between the number of rooms in a hotel

and environmental performance was not found in all research (Rivera 2004; Rahman et al. 2012). Mensah and Blankson (2013) proposed the effects of hotel size and standard are more evident than the chain affiliation in a study of hotels in Ghana. It has also been observed that small-size hotels, that accounting for the majority of the hotel industry, including 90% of European hotel rooms (Hotel Energy Solutions 2011a), are likely to conduct simple and cost-saving practices in energy, water and waste management on a regular basis (Kasim 2009; Dodds & Holmes 2011). There is therefore substantial potential for small hotels to achieve success both in environmental and financial performance if it has strong and committed leadership (Alberto Aragón-Correa et al. 2008; Dief & Font 2012; Garay & Font 2012).

It has also been argued that the environmental performance of a hotel is associated more with their chain membership than their size or rating standard (Dief & Font 2012; Rahman et al. 2012). Indeed, apart from perhaps receiving pressure from head office to go green, chain-affiliates can take advantages of economic purchasing scale and centralized management resources, including information on environmental practices, green training manual, consultancy services, green marketing, and knowledge transfer from successful branch hotels, (Alvarez Gil et al. 2001; Hotel Energy Solutions 2011; Shah 2011; Chen & Chang 2012; Rahman et al. 2012). Rivera (2004) suggests a contrasting perspective that high standard hotels are more likely to pursue a superficial green image, rather than undertake solid environmental works, which may even apply in the case of green certified hotels. His survey of lodging facilities in Costa Rica noted those hotels were reqired to do a lot of paperwork for certification without necessarily undertaking technical improvements. In their study from south-west England, Coles and Zschiegner (2011) also noted there was no significance difference in climate change mitigation between hotels with membership of a green network and those who were not.

Some research found the significance of other variables, such as a hotel's age and target market in influencing a lodging facility's environmental performance. Álvarez Gil et al. (2001) pointed out newly

built hotels would achieve better results because the design of novel facility is usually more efficient and environmentally friendly (see also Calvache & Evra 2008). Hotels that target leisure tourists were also found to have higher level of implementation of environmental practices in order to meet visitor's expectation towards an environmentally friendly environment, especially in mountain or coastal areas (Alonso-Almeida & Rodríguez-Antón 2011). Carsen et al. (2011) suggested that rural hoteliers are more likely to have greater sustainable performance because of their commitments to the local environment and lifestyle. However, this has not necessarily been found in other research on rural hospitality businesses (Hall 2006). Dief and Font (2012) also suggested the international market oriented hotels, especially ones that receive more West European visitors, are more likely to adopt environmental practices, although Kasim (2004) proposed that Malaysian hoteliers generally did not perceive demands to be green from their foreign room guests in his study of Penang Island. It is clear that local context and culture, together with international connectedness and the nature of the market for individual properties also play a major role in hotel's adoption of environmental practices. Thus, those issues reinforce the importance of undertaking further research in locations.

Hotel Business Response to Climate Change

Since the mid-2000s, the UNWTO and UNEP (2008) (see Table 1.8) along with other organisations has been promoting mitigation and adaptation actions for the accommodation sector in relation to climate change (Scott et al. 2012; Zeppel & Beaumont 2013). These have often been in the form of public-private partnerships that offer information on climate change, environmental policy and green technology, as well as more proactive environmental measures. For example, the Hotel Energy Scheme designed energy management solutions for European small-scale lodging facilities (Scott et al. 2012). WWF built a partnership with Fairmont Hotels & Resort to reduce the hotel group's absolute carbon emission based on their Global Climate Savers Program (Green Lodging Industry 2008). The American Hotel and Motel Association (AHMA)'s Green Guru Project is leading climate change adaptation in U.S. hotel businesses

(AHMA 2012). The International Tourism Partnership (ITP) has also initiated a Hotel Carbon Measurement Scheme with the participation of 15,000 hotels (ECO Hotel News 2013). However, little is known about climate change response from the hotel perspective (Jarvis & Pulido Ortega 2010), except for the more general knowledge concerning their environmental activities and attitudes as discussed in the previous sections of this chapter. Only a relatively small number of studies have specifically examined climate change mitigation and adaptation of hotel business (Table 2.13), even as part of broader research on the environmental behaviours of the accommodation sector (Scott et al. 2012).

Becken (2005) conducted a mail survey of 25 small island resorts in Fiji, indicating that local tourism operators, generally with experiences of more than one high magnitude weather event, were aware of climate change related impacts of cyclones, heavy rainfall and flooding, seashore erosion, water and electricity security, coral reef loss and bleaching. Fiji resort respondents have adapted to climate change by having insurance, climate-proof building design, and water storage, in order to respond to increased in the frequency and magnitude of cyclones as well as the effects of sea level rise. The mitigation of carbon emissions has been undertaken by adjusting generator size, developing a “light-off” habit, and using energy-efficient bulbs, although this has primarily arisen from cost concerns. Tree planting programmes have been widely adopted by local hotel businesses, while the potential of on-site renewable energy, such as solar energy and wind power, is overlooked. The key barriers for Fiji resort respondents are the deficiency of information, government incentive, and finance resource. In a similar small island study, Belle and Bramwell (2005) investigated the response of tourism policy makers and tourism managers, including seven hoteliers out of 19 tourism industry representatives, to climate change in Barbados. They showed that Barbadian tourism operators have recognized the existence of climate change, particularly as a result of its impacts on coastal resources and sea level. Hotel developers have started to plan for new establishments at a safe distance from storm surges and sea level rise related impacts. Even though Barbadian tourism business is concerned with the potential change of tourist flow arising from climate change effects on the tourism system, they hesitated to call for

government intervention and preferred more reserved policies of increasing public awareness.

Table 2.13: Examples of research on hotel business responding to climate change

Study Area		Topic	Method	Sample
Europe	Spain	The impact of climate change on small hotels in Granada, Spain with respect to planning and development (Jarvis & Pulido Ortega 2010)	Interview	11 small hotel owners and managers
	UK	Results of the SWCCIP Tourism Group's Tourism Business Survey (Cheng 2010)	Questionnaire	240 tourism companies in South West
		Climate change mitigation among accommodation providers in the South West of England (Coles & Zschiegner 2011).	Questionnaire Interview	417 hotels 18 Hotels
Oceania	Australia	Australian Ski Resorts and their response to climate change (Bicknell & Mcmanus 2006)	Interview	3 Ski Resorts
		Perceptions of climate change impacts, adaptation and limits to adaption in the Australian Alps (Morrison & Pickering 2013)	Interview	16 tourism stakeholders
	New Zealand	New Zealand tourism entrepreneur attitudes and behaviours with respect to climate change adaptation and mitigation (Hall 2006)	Interview	43 rural tourism entrepreneurs in the Bay of Plenty and Otago regions
Africa	Botswana	Tourism industry reaction to climate change in Kgalagadi South District, Botswana (Saarinen et al. 2012)	Interview	7 tourism operators in Kgalagadi, South Botswana
Small Island	Barbados	Policy maker and industry perspectives on climate change in Barbados (Belle & Bramwell 2005)	Interview Questionnaire	14 tourism stakeholders 19 tourism companies
	Fiji	Harmonising climate change adaptation and mitigation in tourist resorts in Fiji (Becken 2005)	Questionnaire	25 accommodation providers (21.6% response rate)

Hall (2006) reported the response of 43 small accommodation providers towards global environmental change, including climate change, in two rural areas of New Zealand based on a longitudinal semi-structured survey. In general, government agencies are considered as a more credible channel of climate change information, nevertheless mass media (radio, television and newspapers) had high popularity as information sources. Local respondents thought climate change as a long-term issue rather than their short-term priority or a cause of seasonal change, and were involved more in adaptation

measures, such as water conservation and bio-security controls. However, these were often not out of climate change concern. Government regulation was also consistently opposed by lodging participants if it would result in additional business costs. Hall (2006) also noted that the attitude and actions of small accommodation providers that had been adversely affected by extreme weather events or rely heavily on nature resources for their product offerings, were more proactive in implementing environmental measures than other operators.

Bicknell and Mcmanus (2006) interviewed three Australian ski resorts, and found a continued positive attitude towards tourism development with them being keen to regard long-term climatic phenomenon in terms of climate variability rather than climate change. Nevertheless, respondents had gradually transformed their resorts to all season businesses and had invested in snowmaking technology in order to meet customer demand and were therefore confident about their adaptive capacity. More recent stakeholder research has argued that Australian ski resorts have been active in adaptation measures under higher recognition of climate change threats (e.g. less snow and tourist arrivals, drier summer and more frequent fire events) (Morrison & Pickering 2013). Snow making has became a common adaptation measure, followed by year-round tourism and fire management, but its development is shadowed by technology limits, water scarcity, high energy cost, and social conflicts.

In Africa, Saarinen et al. (2012) interviewed Botswana tourism operators to climate change, with over half of the respondents coming from the accommodation sector. Most participants recognized climate change impact at the general environment level rather than the tourism industry or their business in the past five years, but predicted a negative effect, particularly from extreme weather events and wildlife loss, on future tourist flow. The research showed than an adaptation strategy was absent among respondents, although they agreed to take actions if necessary and expected more government support in finance, technology, public transport, communication, and marketing.

Jarvis and Pulido Ortega (2010) examined the impact of climate change on small hotels in Granada, Spain, via a qualitative survey. A majority of hotel respondents indicated their awareness of climate change, including higher temperatures, less snow, and extreme winter weather. They agreed it had impacts on the local tourism industry, but not on their specific business. Formal environmental measures were little adopted by small hotel participants, apart from waste reduction, energy and water saving that were all motivated by financial benefits and cost reduction rather than environmental concern. Barriers, such as capital investment, time and staff availability, customer demand and government support, were highlighted. Nevertheless, the small hotel respondents perceived their environmental response as a learning process and expressed willingness to undertake proactive actions to manage climate change if information was clear and there was coordinated support from the public sector, including ith respect to environmental measures and economic returns. In a British survey, covering 71% of 240 tourism participants from accommodation sectors in the South West region (nearly 60% responses were from small lodging operators), extreme weather events, like heavy rainfall, snow and ice, were identified as major climate change phenomena on the basis of respondents' negative experiences (Cheng 2010). Over half of participants were concerned about the impact of extreme rainfall events on their future business and perceived their responsibility and willingness to adapt to climate change, ranking as a medium to high business priority. However, similar to the research of Hall (2006) and Tervo-Kankare and Saarinen (2013), their current actions were relatively limited. In Cheng's (2010) research, the Environment Agency was considered as a more credible information source than a domestic tourism organization or network. Coles and Zschiegner (2011) identified that easy (in terms of low-skilled, reliable and affordable) mitigation measures, like waste recycling, loft insulation, and efficient boilers, were more popular with South West hotel respondents, but the level of implementation was not related to their participation in a tourism network.

Summary and Conclusion

This review of previous research has revealed elements of the environmental behaviour of the global accommodation sector in the face of climate change issue and identified factors that may contribute to developing a systematic structure for exploring hotel business response to environmental challenges including that of climate change. It indicated that the awareness of hotel respondents of the implication of climate change on accommodation businesses is likely associated with their experience of extreme weather events, such as the examples of Fiji (Becken 2005), New Zealand (Hall 2006) and the United Kingdom (Cheng 2010), as well as the sensitivity of their core resources to climate change, as in the case of small islands (Becken 2005; Belle & Bramwell 2005) and ski resorts (Bicknell & Mcmanus 2006), especially when such phenomena has immediate and tangible impacts on hotel business. The attitude of hotel business towards proactive governmental intervention is often rather reserved (Belle & Bramwell 2005; Hall 2006), and is also reflected in their limited actions (Saarinen et al. 2012), particularly in small hotels (Cheng 2010; Jarvis et al. 2010).

Overall, “easy” mitigation measures (e.g. waste recycling, and energy saving), that are usually covered in more general environmental practices, were more common in the hospitality industry (Becken 2005; Jarvis et al. 2010; Coles & Zschiegner 2011), while adaptation practices were often addressed in the aspects of water saving (Becken 2005; Hall 2006) and climate-proofing activities (Bicknell & Mcmanus 2006; Morrison & Pickering 2013). With respect to information and knowledge needs, hotel respondents prioritised short-term and area-focus analysis in relation to climate change, market orientation, and corporate business development (Bicknell & Mcmanus 2006; Cheng 2010; Jarvis et al. 2010), while government agencies are generally perceived as a more credible information source than the popular mass media (Hall 2006; Cheng 2010). The influential factors on hotel’s response towards climate change were usually related to the overall corporate capacity (e.g. finance, information and technology), government leadership and legislation, and market feedback (Becken 2005; Jarvis et al. 2010; Saarinen et al. 2012).

Chapter 3

A Review of Taiwanese Hotel Industry Environmental Practices and Response to Climate Change

Taiwan is the 22nd highest carbon emitter worldwide with an annual production of 28.9 billion metric tones and is ranked as one of the top ten countries vulnerable to climate change (Environmental Protection Administration [EPA] 2010a; Germanwatch 2010; Hou 2010). Taiwan is therefore a good example of the position of Asian developing economies with respect to climate change (Doe et al. 2010; Cruz et al. 2007).

In the last hundred years, Taiwan's climate, which is highly influenced by land-sea contrasts in temperature, local terrain features, and the East Asian monsoon, has experienced higher average temperatures, greater unevenness in rainfall distribution, and an increase in the frequency and intensity of extreme weather events, such as typhoons, heatwaves and dust storms (Hsu et al. 2007; EPA 2009; Taiwan Central Weather Bureau 2009; NCDR 2011). The annual mean temperature has increased by 0.8^0C and Taiwan's summer has also become longer, with more than 28 days of temperatures over 30^0C per year (Chen, 2008). For cities, the combination of climate change and heat island effects has led to an increase of average nightime temperatures, while the average sea temperature of the north and south coasts has risen by 1.1^0C and 0.9^0C respectively (Chen 2008). Sea level is predicted to increase 16 cm by 2030, and 50 cm by 2050 (EPA 2010a). The increased intensity and variability of rainfall has resulted in more flooding, landslides, and regional drought events (Tung & Lin 2008; EPA 2009; Taiwan Central Weather Bureau 2009). However, no study has specifically sought to estimate the contribution of tourism to climate change in Taiwan, or the impacts of climate change on tourism despite tourism becoming increasingly important to the Taiwanese economy. This chapter therefore seeks to review and contextualise the relationship between climate change and tourism, and the accommodation sector in particular, in Taiwan. It first outlines some of the already recognised implications of climate change and

high magnitude weather events on Taiwanese tourism and hospitality before examining the accommodation sector and its significance, government policy, and previous research on the Taiwanese hotel sector and environmental and climate change initiatives.

The Effects of High Magnitude Climatic Events and Climate Change on the Taiwanese Tourism Industry

The Taiwanese tourism industry is already highly affected by climatic events. For example, the tourism industry was estimated to have lost NTD$ 10.4 billion revenue and 750,000 tourists in 2009 because of the damage caused by Typhoon Morakot (The Japan Times 2009). Seventeen hotels were damaged by Typhoon Morakot with a loss of NTD$137 million (Taiwan Tourism Bureau [TTB] 2009a). The typhoon was responsible for NT$2.2 billion worth of tourism infrastructure damage in central and southern Taiwanese destinations, including Alishan National Forest Recreation Area and Chihpen hotspring resorts (Wang 2011), and decrease of at least NT$50 billion of tourism income (National Policy Foundation 2009). Lushan hotspring area was even forced to close in 2012 after a series of typhoon events. Table 3.1 provides examples of impacts of high-magnitude and climate change attributed events on Taiwan's tourism Industry that have been identified via a content analysis of Taiwanese media and government and industry reports in addition to relevant research literature. They are organised with respect to different types of tourism locations and activities that are significant in the Taiwanese context.

The operational expenses of Taiwanese lodging businesses are predicted to grow with the rise of average temperatures (Liberty Times 2007a, 2009a). From a 25^{o}C base figure, it is estimated that an increase of one degree would cause an increase in electricity consumption of 0.806 Kwh/m^{2} (Su 2000). From a regional perspective, eastern Taiwan and offshore islands, including Penghu, Green Island, Lanyu (Orchid Island), Kinmen, Matzu, Turtle Island, and Little Liuqiu, which mainly rely on tourism for their economies, become more vulnerable to climate change. For instance, the peak season of the offshore islands has been disturbed by typhoon events due to the frequent closure of transport links (Penghu Daily News

2008; East Rift Valley National Scenic Area 2012).

Table 3.1: Examples of impacts of high-magnitude and climate change attributed events on Taiwan's tourism Industry

Type of Tourism	Example	Source
Urban	• Taipei tourism business is facing a higher air-conditioning cost for the longer and hotter summer.	Liberty Times 2007a, 2009a
	• Taipei tourism industry is threatened by a rise of half meter sea level by 2070, likely losing 430 thousands people and USD 1395.5 billion assets	China Times 2007a
Hotspring	• Beitou resorts were short of hotspring water due to the 2003 drought event.	Taipei Water Department 2003
	• Beitou resorts lose 30% of visitors per year because of the warmer winter, recession and competition.	China Times 2007b
	• Lushan hotspring area: - 2004 July flood caused damage to 8 hotels, and a loss of 90% visitors and TW$100 million tourism income - 2008 Typhoon Sinlaku caused a loss of 36 hotels and TW$175 million tourism income - 2008 Super Typhoon Jangmi caused further damages; the resort area was closed in 2012.	Liberty Times 2004; Taiwan Panorama 2009; Water Resource agency 2011; Nantou County Government 2012
	• Ku Kuan hotspring area lost one hotel and over 90% revenue in July 2004 due to flood	BCC 2004
	• Chihpen hotspring hotels lost TW$100 million incomes in Aug. due to 2009 Typhoon Morakot	East Rift Valley National Scenic Area 2012; Economic Daily News 2009; Wang 2011
	• Baolai hotspring area had nearly 20 hotels damaged due to 2009 Typhoon Morakot	
Forest & Mountain	• "Maple zone" in Aowanda National Forest Recreation Area, closed for two years due to 2008 Typhoon Sinlaku	Aowanda National Forest Recreation Area 2012
	• Alishan National Forest Recreation Area closed for 9 months with a loss of NT$1 billion income and 300,000 tourists per month due to 2009 Typhoon Morakot.	National Policy Foundation 2009
Lake & River	• Sun Moon Lake area lost 80% of hotel bookings due to 2008 Typhoon Sinlaku.	Now News 2008
Coast	• Kending hotel industry lost over NTD$30-40 million due to 2003 Typhoon Dujuan	Liberty Times 2003
	• Higher sea temperature is likely to cause 70%-80% coral bleaching and 30% coral death in Kending	ETtoday 2007
Small Island	• Penghu Island lost 2000 visitors and NTD$200 million income for transport close due to 2008 Typhoon Sinlaku.	Penghu Daily News 2008
	• The coral coverage of Liuqiu, Lanyu (Orchid Island), and Green Island was down to 20%, 18%, and 45% respectively in 2009 due to typhoon events.	China Times 2009; Liberty Times 2009b

The implications of climate change are evident and pressing, including a rise in average temperatures of 1.4~2.9 ^{o}C by 2100 (NSTCDR 2011); a sea level rise of 50cm by 2050 (EPA, 2010a); an increase of heat

wave, typhoon, and heavy rainfall events; and greater threats to biodiversity, water supply, public health and safety by 2100 (Dai 2007; ETtoday 2007; Hsiao 2007; Central News 2008; Li 2008; Tseng et al. 2009; NCDR 2011). There is therefore no room to neglect the environmental challenges facing Taiwan's tourism industry. For example, mountain areas that have substantial domestic based tourism economy and account for 73% of Taiwan's area, are seriously threatened by flooding and landslide damages as a result of predicted increases in the frequency of high-magnitude typhoon events (NSTCDR 2011). Over one hundred hotspring sites, particularly those in over-developed destinations, are facing a problem of a spring water shortage (Taipei Water Department 2003; Chang 2006; Lee et al. 2009). Importantly, Taipei, known as the tourism gateway city with a receipt of 82% of international tourists in 2011 (TTB 2012c), is at a risk of losing 430,000 people and USD 1395.5 billion assets, if the sea level rises a predicted half meter by 2070 (China Times 2007a). The following section discusses the hospitality industry and provides further background on Taiwanese tourism business response to climate change, which is rarely covered in international reviews of relevant literature (Myung et al. 2012).

The Taiwanese Tourism and Hospitality industry

Taiwan's tourism industry, which has experienced significant fluctuations in visitor numbers since its opening in the 1950s, is currently undergoing a period of rapid development with a target of 10 million international visitors by 2016 (Office of President, Taiwan 2012). The first peak of Taiwan inbound tourism was achieved in 1989 with the arrival of two million tourists, but the market started to retreat after China joined competition for the international Chinese market in particular (Lin & Hemmington 1997). From 2002, the TTB was authorized to lead business growth with a series of marketing campaigns, including 'the Doubling Tourist Arrivals Plan', 'Tour Taiwan Years 2008-2009', 'Medium-term Plan for Construction of Major Tourist Sites 2008-2011, 'Top-notch Tourism Plan 2009-2015', and 'Project Vanguard for Excellence in Tourism 2009-2012' (Kim et al 2006; Ministry of Transportation and Communications 2008; TTB 2010a). However, the turning point in Taiwanese tourism was the 2008

direct air-link policy between Taiwan and China that included direct links between Kinmen, Matsu, and Xiamen (Airey & King 2011). Since Mainland China became the largest source of international tourists, Taiwan's inbound tourism has been growing continuously (TTB 2012a) (Table 3.2). In 2011, over six million international tourists visited Taiwan with a growth of 64% since 2007, which contributing a total of US$110.65 billion of tourism income (TTB 2012a). The Taiwanese hospitality industry, consisting of 2,622 standard hotels and 107 tourist hotels as of 2012, is a significant contributor to the tourism and national economies. It accounted for nearly 80% of tourism employment and generated NTD$46.53 billion in 2011 (TTB 2013h).

The development of the modern period of Taiwanese hotel business started from 1945 with 483 lodging providers established in the first decade. The Taiwan government lead the expansion of tourist hotel establishments until 1980 when a stronger role was established for private capital along with investment incentives (e.g. tax reduction), and conditional urban land-use allocations for accommodation services. However, the growth in the number of tourist hotels halted due to economic recession and room oversupply issues. Encouraged by a recovery in tourism numbers, iconic international chain hotels, such as Hyatt, Hilton, Sheraton, Westin, Regent, and the Nikon hotel groups, subsequently joined Taiwan market from 1990 on with a contribution of renovating management skills, human resources, and service standards (Wang 2006; Cai 2009). Taiwanese chain hotels have more advantages of management know-how, marketing resource, purchasing power, loan credit and capital than independent hotels, which are usually locally owned and family-operated businesses (Wang 2003; Wang 2006). Johnson and Vanetti (2008) also noted the financial strength of Asian chain hotels, while some Taiwanese studies have suggested that chain hotels have greater cost efficiency (Hu et al. 2010; Chen & Chang 2013). From 1993, resort hotels have rapidly developed in coast, mountain, and hotspring destinations in order to accommodate the increasing numbers of domestic tourists (Hsiao 2007).

Table 3.2: The index of inbound visitors and tourism income in Taiwan

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
No. of inbound visitors ('000 visitors)	2 624	2 831	2 978	2 248	2 950	3 378	3 520	3 716	3 845	4 395	5 567	6 087	7 311
Annual visitor expenditure (US$ billions)	3.738	4.335	4.584	2.976	4.053	4.977	5.136	5.214	5.936	6.816	8.719	11.06	11.77
Tourism GDP (% Total GDP)	2.41%	2.74%	2.62%	2.11%	2.40%	2.20%	2.26%	2.16%	2.94%	3.28%	3.78%	4.63%	4.40%

Source: Taiwan Tourism Bureau 2009c, 2010c, 2013g

However, the climate change responsibilities of the hotel industry are also increasingly being acknowledged. The hotel industry is estimated to produce 450,000 tons of carbon emissions per year on the basis of its energy usage of 2,621 GWh, about 1% of national consumption (Huang 2011; Wang 2012). Table 3.3 summarizes the available data on energy usage and carbon emission in Taiwan's accommodation sector. The table highlights the intensive carbon emission nature of international tourist hotels (28.9 kg/guest night), whch are over four times that of bed and breakfasts (6.3 kg/guest night). The Taiwanese hotel industry also consumes the highest amount of water (902 litre/guest night) in comparison with that of other countries (see Table 2.10). A national study further indicated that the water use of hotel guests is actually 3.3 times that of a Taiwanese resident (Water Resource Agency 2013). Given potential problems of water shortage as a result of climate change, there are increasing demands for Taiwanese hotels to improve their water consumption (EPA 2010a).

Table 3.3: Energy consumption and carbon emissions in the Taiwan accommodation sector

Type of Hotel	Energy Use (kWh/ m^2yr)	Electricity Use (kWh/ m^2yr)	CO_2 Emissions (Kg/Guest night)	Source
International Tourist Hotel	280	205.9	23.8-28.9	Bureau of Energy 2011;
Standard Tourist Hotel	238	233.7	19.2	Wang 2012;
Standard Hotel	186		12.5	Huang 2011
(Hotel Enterprise)				Tsai et al. 2014
B & B	144		6.3	

Government Policy

The role of the main Taiwan government agency responsible for tourism, the Taiwan Tourism Bureau (TTB), is quite ambiguous with respect to climate change issue because it is positioned more as a marketing-oriented organization in search for higher visitor numbers (Ministry of Transportation and Communications 2012). In fact, the bureau has continued to promote some fragile destinations, such as Chinese tourists' "must-go" attraction, the Alishan National Forest Recreation Area, instead of supporting land recovery after a series of disaster damages (CommonWealth Magazine 2011). Thus, perhaps it is not surprising that the Taiwanese government and the TTB took 112th place in the global

ranking of environmental governance and regulations (WEF 2012), while sustainable planning for tourism is absent (TTB 2013a).

The major contribution of the TTB with respect to environmental regulation has been to establish a legal framework called *The Statute for the Development of Tourism* to govern hotel business compliance with environmental regulations of other civil departments, primarily the *Basic Environment Act*, *Air Pollution Control Act*, *Resource Recycling Act*, *Waste Disposal Act*, *Water Pollution Control Act*, and *Wildlife Conservation Act*. In addition, it enforces lodging operators to meet their insurance obligations stated in hotel management regulations (e.g. *Regulations for the Administration of Hotel Enterprises*, *Regulations for the Management of Home Stay Facilities*, *Regulation for the Management of Tourist Hotel Enterprises*), like purchasing the 'Human bodily injury or death' insurance up to NT$ 2 million per person, and the 'Loss of or damage to property' insurance up to NT$ 2 million per accident, which indirectly prepares hotel business' adaptive capacity to climate extremes (Ministry of Justice 2010). Hotels that are seriously damaged by weather extremes, can also apply for exceptional subsides from the TTB to compensate expenses with respect to property tax, loans, and interest (TTB 2009b, 2011, 2012d). To encourage the hotel sector's voluntary engagement in green practices, the bureau provides certain incentives, including paying full certification fees and 50% of consultancy and inspection costs for eco-label applicants (TTB 2009b, 2012d). In addition, the TTB gives extra scores for hotel's adoption of green building and environmental initiatives in the evalation of star-Rating Hotel Appraisal, although this only accounts for a maximum of 4% of the hotel performance (TTB 2013b).

According to Taiwan's *Master Plan on Energy Conservation and GHGs Emission Reduction*, the government has set a goal of achieving the 2000 carbon emission level in 2025 (214 million tons), but there is a lack of a detailed target or strategy for industries, including tourism and hotel businesses (Bureau of Energy 2012). The Bureau of Energy is the key department to facilitate hotel's low carbon behaviour. The *Energy Management Law* requires tourist hotels with a central air-condition system with

an annual energy consumption of over 800 kW to adopt an energy monitoring system, energy-saving plan, and energy management specialist (Ministry of Justice 2010). Recently, the amended *Regulations for Identified Energy Users that are Required for Energy Conservation* further prohibited tourist hotels to have air-conditioner leakage, to use incandescent lamps, and to set up indoor temperature over 26℃, with a fine of NT$20,000 to NT$100,000 if they break the regulations (Bureau of Energy 2013a, b). In order to encourage low-carbon purchase in the hotel industry the Bureau of Energy has been promoting a *585 Incandescent Replacement Program* and financial incentives such as *Sponsorship Directions of Providing Preferential Loans for Enterprises Purchasing of Energy-Saving Equipment for the Banks* and *Regulations Governing Application of Tax Credit to Companies Purchasing Equipment or Technology Used for Energy Saving Purposes or Employing New and Clean Energy* (Bureau of Energy 2013a, b). Accommodation providers that spends over NT$600,000 for energy-saving facilities per year, can also claim tax credits of up to 15% of equipment cost and 10% of technology fees (Bureau of Energy 2002; 2008). As of the time of writing, the EPA's *Energy Conservation Agreement* was supported by 21 hotel groups (Yang 2008; EPA 2010b, 2013). The Taiwanese Government has also formulated a *Green House Gas Reduction Act (draft)*, *Energy Tax Act (draft)*, and GHG energy efficiency standards, but these policies are mainly aimed at energy intensive industries instead of the service sector (Chou & Liou 2012).

A wide range of green labels have been initiated by Taiwanese governments, these include the Green Building Label of the Ministry of Interior, an Energy-Saving Label by the Bureau of Energy, a Water-Saving Label by the Water Resource Agency, and a Green Mark and Carbon footprint label by Environmental Protection Administration (EPA) (Table 3.4), which provide environmentally friendly options in hotel's development plan and purchasing decision. The establishment of a Green Hotel Label was a milestone of Taiwan government to acknowledge hotel business's environmental performance. The EPA announced the Green Hotel scheme after the 2008 Green Hotel Contest, and in 2012 subsequently revised the regulation to classify green hotels into gold, silver, bronze levels. In order to encourage hotel's participation, the EPA made the green hotel products applicable for *The Government Procurement Act*

and the *Green Procurement Promotion Plan*. It not only prioritises certified hotels in the public sector's purchasing list, but also allows them to charge an extra 10% of government's bidding price (EPA 2008a, 2008b, 2009, 2012c).

Table 3.4 summarizes the policies of Taiwanese governments that affect hotel management initiatives and responses toward climate change and environment. The focus of Taiwanese governments is to strengthen hotel's mitigation actions, especially with respect to environment protection, ecological conservation, energy saving and carbon reduction, while the adaptation strategy is rarely addressed in the public sector except for hotel accident insurance purchase. There is little coordination of the policies that affect the tourism and hospitality sector, the majority of which come from non-tourism agencies. The policies, a mixture of regulation, certification, and financial incentives, are governed by different agencies, many of whose missions do not coincide with that of tourism and hotel management. Therefore, the policy settings of the tourism and environmental and climate change relationship appear weak in Taiwan since there is no concrete goal, clear delegation, detailed plan, and/or achievable time-frame to lead tourism and hotel business in climate change mitigation and adaptation, although this issue is gradually being addressed internationally (Peeters et al. 2009; Gössling 2010; Scott et al. 2012).

Table 3.4: Summary of Taiwan's policies with respect to climate change and environment

Categories	Instrument	Authority	Policy Name
Regulatory Instrument	Law	Tourism Bureau	● *Statute for the Development of Tourism* ● *Regulations for the Administration of Hotel* ● *Regulations for the Management of Home Stay* ● *Regulation for the Management of Tourist Hotel*
		Forestry Bureau	● Regulations governing management, operation and coordination of forests located within national parks or designated scenic areas ● Regulations governing the establishment and management of forest recreation areas
		Council of Agriculture	● *Wildlife Conservation Act*
		Ministry of Interior	● *National Park Law* ● Directions for Energy Saving of Building on Hotel and Restaurant
		Bureau of Energy	● *Energy Management Law* ● *Renewable Energy Development Act* ● Sustainable Energy Policy
		Energy Conservation and GHGs Emission Reduction Promotion Council	● National Action Plan on Energy Conservation and GHGs Emission Reduction
		Environmental Protection Administration	● *Basic Environment Act* ● *Air Pollution Control Act* ● *Resource Recycling Act* ● *Waste Disposal Act* ● *Marine Pollution Control Act* ● *Water Pollution Control Act*
	Licenses, Permits, Consents & Standards	Tourism Bureau	● Star-rating Hotel Appraisal Plan
		Ministry of Interior	● Green Building Label
		Bureau of Energy	● Energy-Saving Label
		Water Resource Agency	● Water-Saving Label
		Environmental Protection Administration	● Green Hotel Label ● Green Mark ● Carbon footprint label
Financial Incentive	Grants & Loans	Bureau of Energy	● Sponsorship directions of providing preferential loans for enterprises purchasing of energy-saving equipment for the banks
	Subsidies &Tax Incentives	Tourism Bureau	● Certification subsidies for tourism industry ● House tax subsidies, special loan and interest subsidies for damaged hotels in extreme weather events
		Bureau of Energy	● Regulations governing application of tax credit to companies purchasing equipment or technology used for energy saving purposes or employing new and clean energy
Voluntary Instruments	Argument & Persuasion	Bureau of Energy	● 585 Incandescent Replacement Program ● Voluntary Energy Conservation Agreement
		Environmental Protection Administration	● Voluntary CO_2 emission registration

Source: Ministry of Transportation and Communication (2008); Taiwan Tourism Bureau (2008, 2009c, 2011, 2012d); Bureau of Energy (2002, 2008); Ministry of Justice (2010); Environmental Protection Administration (2009b, nd); Taiwan Architecture & Building Center (2010): Table structure after Hall (2008).

Hotel Response to Environment and Climate Change

There has been a seeming growing interest in green hotel and hospitality green marketing programmes in Taiwan. For example, reports of the 2008 Green Hotel Contest indicate increased adoption of energy-, waste-, water-related measures in green-proactive hotels, such as “hotel guest reuse of towels and linens”, “no or less use of disposable items”, “waste recycling, reuse, and retreatment”, and “energy saving measures” (Hsu 2004; Chang 2006; Hsieh 2007; Wang 2008; EPA 2008a; BCC 2010; Liberty Times 2010c). The energy savings of the nineteen contest winners ranged from TW$77,000 to TW$2.5 million per year (EPA 2008a). Over 400 hotels also joined the 2012 Green Movement Program that provided a discount, free gift, or donations for room guests who voluntarily bring their own toiletries and reuse towels and bed sheets at their overnight stay (EPA 2012a). However, since the EPA launched the green hotel scheme (see Appendix A for the scheme’s criteria), only three hotels had been awarded such status by 2012 (EPA nd).

Previous Taiwanese research has explored the formulation of green hotel certification, the implementation of environmental practices, the development of energy saving and carbon reduction indicators in the Taiwanese hotel industry, and examined local hotels that have taken actions in response to environment and climate change at some degree, especially in the fields of water and energy saving, material-use reduction and waste recycling. The environmental performance of hotels has been found to relate to the hotel’s characteristics, including accommodation classification, chain affiliation, years on trading, size and target market (Chang 2006; Yang 2010). These findings have also provided background knowledge to explain the contradictory results of hotels that utilise green hotel labelling (Table 3.5). Research has indicated that hotel respondents have high recognition of environmental practices and certifications (Wang 2005; Liao 2006), but their understanding and actions were limited (Chang 2006; Hung & Lai 2006; Yang 2010). Hotel businesses generally acknowledged potential benefits in corporate image and environment protection with great importance placed on cost reduction and competitive

advantages although they doubted its real consequences (Chen 2004; Chang 2006; Hung & Lai 2006).

Table 3.5: Examples of research on environment management in the Taiwanese hospitality industry

Topic	Method	Sample
The concept and exploration of green hotels among tourist hotel managers (Shen & Won 2001)	Questionnaire	33 tourist hotel managers
Establishing the environment management system for green hotel auditing (Chen 2004).	Delphi Method	20 tourism stakeholders
Constructing a mechanism for green hotel certification (Wang 2005)	Interview SWOT Analysis AHP Analysis	35 tourism stakeholders
Hotel managers' perception of green hotels and ecolabels (Hung & Lai 2006)	Interview	9 hotel and B&B operators in Penghu
The attitude, behaviour and pleasure of owners in developing green B&B (Liao 2006)	Questionnaire	57 B&B operators
Hospitality personnel cognizance, attitude and behaviour toward practice of green productivity (Yang et al. 2007)	Questionnaire	321 hotel staff
Hotel manager's cognition, attitude and behaviour with respect to green hotels (Wu 2009)	Questionnaire	296 hotel managers
The benefits and barriers of implementing environmental management in hotels (Chen 2010)	Interview	15 managers in international tourist hotels
The factors influencing Eastern Taiwan hotel's adoption of green hotel label (Yang 2010).	Questionnaire	152 hotel respondents in Eastern Taiwan
The participation and willingness of hotel Industry with respect to green hotel concept (Chen 2012)	Interview	6 hotel managers
Barriers to international tourist hotel tactics on energy conservation (Chou 2012)	Questionnaire Interview	90 hotel staff 20 hotel staff
Green practices in the restaurant industry from an innovation adoption perspective (Chou et al. 2012).	Questionnaire	245 restaurant owners, chefs, and managers
Developing hotel industry energy conservation and carbon reduction indicators (Teng et al. 2012)	Case study of tourist hotels	18 hotel experts
Energy saving and carbon reduction management indicators for natural attractions (Horng et al. 2013)	Case study	17 tourism stakeholders

Implementation barriers, such as capital investment, customer demand and government regulations, are commonly identified in the relevant Taiwanese literature. Most hotels appear concerned about their investment in environmental facilities and green products, which are often regarded as expensive. For example, the price of sewage equipment could be as high as TW$10 million for an accommodation operation the scale of an international tourist hotel (Lin 2009). When hoteliers are not certain about the financial return of environmental investment, capital input then becomes a key barrier to go green, especially in recessionary periods (Chang 2006; Liao 2006; Yang et al. 2007; Chen 2010; Yang 2010; Lin 2012). In addition, Taiwanese hotel managers have low confidence in the size of green market and the

change of customer behaviour. Accordingly, they hesitate to conduct environmentally friendly measures in order to avoid consumer complaints (Wang 2005; Hung & Lai 2006; Liao 2006; Chen 2010; Yang 2010). This response also corresponds to the finding of customer research that suggests that price is more important than environment protection for Taiwanese room guests (Chen 2003; Yeh et al. 2003; Hsu 2004; Kung & Tseng 2004). Hsieh (2006) confirms that Taiwanese customers have low willingness to compromise their comfort in compliance with environmental measures available during their hotel stay. One of the possible reasons for this response is that consumers often think that such approaches are mainly for hotel's cost-saving purpose rather than their environmental benefits (Wong 2005). In contrast, other Taiwanese studies have argued that environmentally friendly consumers are more likely to book green lodging facilities in order to support a hotel's environmental practices, even to the point of being wiling to pay a higher price for such products (Chen 2003; Yeh et al. 2003; Hsieh 2006; Wang 2008). Yet other research proposes that customers generally had poor perceptions and awareness of green marketing campaigns, green hotel labels and hotel environmental practices (Hsu 2004; Kung & Tseng 2004; Lin 2012).

Governmental regulation is also found as an influential factor in restricting Taiwanese hotels' environmental actions (Wang 2005; Yang et al. 2007; Lin 2012; Yang 2012). For instance, the application of the green hotel label is involved with multiple regulations and regulators, including the TTB, Department of Health, Bureau of Energy, Ministry of Interior, and EPA. It has been suggested that rules are too complex to follow, and that some regulations are actually contradictory. For example, the Green Hotel standard requires applicants to use large bulk containers for toiletries, but this is against health and sanitation regulations (Liao 2006; Yang et al. 2007). On the other hand, Taiwanese hotels have been found to have a high expectation of receiving government assistance, including financial incentive, environmental information and training, consultancy services, green marketing, and provision of a cheaper green product (Chang 2006; Yang 2010; Chen 2012). Some research has also addressed the problem of employee capacity in implementing hotel environmental programmes and identified a lack of

an adequately large workforce to take on extra loading for environment protection activities (Chang 2006) and a lack of staff support to go green (Chen 2010).

Taiwanese hotel's implementation of environmental programmes are also not well balanced in comparison to environmental management system standards, since easy and cheap practices, that are mostly connected to climate change mitigation, were overwhelming dominant in the Taiwanese hotel industry. Environmental practices, such as energy saving, material-use reduction, and waste management were especially popular (Shen & Wan 2001; Chen 2004). Their key features being that they are either easy, cheap, or profitable (Hung & Lai 2006), or are a regulation-requisite (Chang 2006; Yang 2010). On the other hand, Taiwanese lodging facilities had low implementation levels for establishing environmental policies (Chen 2004; Chang 2006; Yang 2010), employing an environmental manager or establishing a department (Yang 2010), managing hazard waste (Yang 2010), engaging in green purchase (Liao 2006; Yang 2010), and installing on-site renewable energy systems (Chen 2004; Liao 2006; Hsu 2008; Chou 2012). Liao (2006) suggested that the price, quality and availability of green products have been issues for local hotel business. Similarly, high cost was found as a problem for lodging facility to install on-site renewable energy system (Chen 2004; Liao 2006; Hsu 2008; Chou 2012).

Tsai et al. (2014) demonstrated an approach to calculate carbon emissions of Taiwanese hotels, and proposed to mitigate such production by improving energy-use efficiency, accommodating more guests in the same room or encouraging the stays of low-carbon lodging facilities, such as B&B, and standard hotels. The last two methods seemed reasonable from a mathematical viewpoint. However, concerning that tourists mostly look for comfort in their hotel stay, and there is a limitation of room space for bed facilities, it is actually hard to extend guest numbers in one room, except via the establishment of dormitories. Furthermore, it is also arguable that if government just promotes certain types of accommodation providers, since this would run against the principles of a competitive market. Thus, it is suggested promoting the consumption of low-carbon rooms in the hotel industry overall, rather than

in particular kinds of lodging facilities.

Taiwanese hotels had higher levels of implementation with respect to water management, including encouraging overnight guest to reuse towels and linens and using water-saving faucet and toilet (Chang 2006; Chen 2010; Yang 2010). In addition, Chang (2010) observed an increase in green promotion activities, such as offering discounts or free gifts for room guests who book online, bring their own toiletries, take public transport to hotels or agree to reuse bed linens and towels. For example, 435 hotels participated EPA's Green Movement Program, which generated the participation of 180,000 visitors in 2012 (EPA 2013). In addition, the green-concept product is becoming a selling point for some hotels. For example, the Regent Hotel introduced locally-produced and organic cuisines after several food risk events (Beta-adrenergic agonists found in beef imports, and a series of pesticide scandals), which contributing a growth of 15-20% food and beverage income (Commercial Times 2012). In a potential sign of adatation to climate change, some local hotels have started to re-position their products. For instance, some hotspring resorts designed "cool-theme" packages to cope with the hotter and longer summer, such as offering an 18^{o}C cold spring and free icy dessert (Apple Daily News 2011b).

Summary and Conclusion

This chapter has provided an overview of the relatively weak position of the Taiwanese hospitality industry in the face of climate change challenges. The growth in the frequency and magnitude of weather extremes, average temperature increases, and sea level rise, are projected to affect Taiwanese hotels in all regions of the mainland as well as on the small islands. However, at the time of writing, there is little evidence of government actions to directly deal with tourism business environmental problems, especially at the aspect of climate change adaptation. Even more ironically, the known environmental policies, such as the green hotel scheme, is poorly adopted by local hotel companies, while government, led by the TTB, has been rapidly increasing the growth of inbound visitor and hotel

numbers between Taiwan and China since 2008. In such an imbalanced situation, it is not surprising that Taiwan hotel businesses were found to be heavy users of energy and water resources when compared to other international studies (see Chapter 2).

The chapter also discussed previous research, which is strongly dominated by graduate studies, on the importance of environmental issues to Taiwan hotel industry, their current strategies and viewpoint towards environmental schemes. Similar to international findings, Taiwanese hotels have higher involvement in “easy”, economical, and legally required practices, such as resource saving, material-use reduction and waste recycling. The environmental performance of hotels generally varies with the hotel’s characteristics, including accommodation classification, chain affiliation, years of trading, size and target market. Taiwanese hotels have often questioned the benefits of environmental management measures, and magnified their disadvantages, even if they acknowledged their limited understanding of such changes. On the other hand, Taiwanese hotels appear more open to environmental policies that potentially increase profit margins, especially if financial support is available, such as the Green Movement Program, or the promotion of locally produced and organic foods, in order to attract a green market.

Chapter 4

Method

As noted in Chapter 1 this thesis examines the response of Taiwanese hotels to climate change. The research therefore aims to help close the substantial knowledge gap with respect to Taiwanese hotels understanding of and reaction to the implications of climate change as well as related environmental management processes that were discussed in Chapter 3, as well as relate the study's findings of Taiwanese hotels to the broader international literature (Chapter 2). As Chapter 1 indicated this study contributes not only to an improved understanding in a Taiwanese context with respect to tourism business response to climate change but, given the relative lack of literature, also in the broader Asian context. Thus, this baseline study of Taiwanese hotels is designed to answer:

(1) How do Taiwanese hotels perceive the impacts of climate change?

(2) What role do business social and environmental policies and actions, including green marketing initiatives, play in hotel response to climate change?

(3) What is the level of implementation of UNWTO and UNEP (2008)'s recommended climate change measures for tourism business by Taiwanese accommodation establishments? (see Table 1.8 for an outline of the specific UNWTO-WNEP [2008] measures for accommodation establishments). The influential factors for their involvement including attitudes, barriers, motivations, and perceptions for Taiwanese hotels to enact climate change and environment practices are also explored.

In order to provide a firm basis of methodological comparison with the previous international literature on environmental studies of the accommodation sector (Tzschentke et al. 2004, 2008; Bohdanowicz et al. 2005; Mensah 2006; Bohdanowicz 2007; Kasim 2007a, b, 2009; Scanlon 2007; Jarvis & Pulido Ortega 2010; Myung et al. 2012), this thesis conducted a baseline survey to examine the response of Taiwanese hotels towards environment and climate change with respect to four main dimensions, including perception, attitudes, motivations, and influencing factors on environmental and climate change

practices. It is the first known study to exploring the extent to which the hotel sector meets the specific recommendations of the UNWTO-UNEP (2008) with respect to accommodation sector measures in relation to climate change. Overall, 270 hotel participants answered this email-based questionnaire survey of the total population of Taiwanese hotels, reflecting a response rate of approximately 10%.

Survey Target Population

The target population of this research was the senior management of the population of 2,729 Taiwanese hotels (as of 2012) who were requested to answer the survey on behalf of the hotel. The Taiwanese accommodation sector provides a basis for international comparison with respect to a number of variables that have been identified in the international literature (Chapter 2), especially at the levels of between physical and service standards of accommodation; between chain and non-chain hotels; between large and small hotels; between new and old hotels; and between nature and urban-based hotels.

The Taiwanese hotel industry consists of 2,622 standard hotels and 107 tourist hotels. According to the classification standard of Taiwanese hospitality industry, which is mainly based on the number of rooms and the nature of the facilities available to guests (Table 4.1), a standard hotel is regulated to equip with guest room, lobby, reception, bathroom, and storage room (TTB 2013c), and a tourist hotel is defined as a lodging facility with over 30 guest rooms and no less than nine amenities (TTB 2010b). In 2011 the average characteristics of a standard hotel was that it operated with 41 rooms, 15 employees, and had a 44% room occupancy rate. In contrast a tourist hotel had an average of 239 rooms, 238 staff and a 68% room occupancy rate (TTB 2013f). Northern Taiwan is the highest hotel-dense area with a share of 40% of all hotels, followed by Southern Taiwan (28%), Central Taiwan (21%), Eastern Taiwan (8%), and offshore islands (3%) (TTB 2012a) (Table 4.2). The TTB introduced the star-rating system, which ranks hotel standards by their service and hardware quality, to the hospitality industry in 2008 (TTB 2012e; see

also Chapter 6) (Table 4.3). At the time of conducting this research, 276 lodging facilities were awarded with star hotel status, including 17 one-star hotels, 84 two-star hotels, 90 three-star hotels, 24 four-star hotels and 61 five-star hotels (TTB 2013e).

Table 4.1: The classification standard of Taiwanese hotels

Standard	Standard Hotel	Tourist Hotel	
		Standard	International
Guest Room	●	●	●
Number		＞30 rooms	＞30 rooms
Space – Single room		≥10 ㎡	≥13 ㎡
Double Room		≥15 ㎡	≥19 ㎡
Suite room		≥25 ㎡	≥32 ㎡
Facility			
Lobby	●	●	●
Reception	●	●	●
Bathroom	●	●	●
Storage Room	●	●	●
Restaurant		●	●
Conference venue		●	●
Café		●	●
Bar			●
Banquet hall			●
Swimming pool			●
Gymnasium			●
Shop			●
Safe deposit box		●	●
Satellite TV receiver		●	●

Source: Derived from TTB (2010b, 2013c)

Table 4.2: Regions of Taiwan

Region	Governed Areas
Northern Taiwan	Taipei, Ilan, Taoyuan, Hsinchu
Central Taiwan	Miaoli, Taichung, Nantou, Changhua, Yunlin, Chiayi
Eastern Taiwan	Hualien, Taitung
Southern Taiwan	Tainan, Kaoshiung, Pingtung
Offshore Islands	Green Island, Lanyu, Kinmen, Penghu, Matsu

Source: TTB (2013i) Taiwan Map. http://go2taiwan.net/taiwan_map.php.

Table 4.3: Criteria for star rating accreditation

Criteria \ Hotel Ranking	1 Star Hotel	2 Star Hotel	3 Star Hotel	4 Star Hotel	5 Star Hotel
Building & Space Design	★	★★	★★★	★★★★	★★★★★
Lobby & Reception Area	★	★★	★★★	★★★★	★★★★★
Restaurant	★	★★	★★★	★★★★ (>2 high-end restaurants)	★★★★★ (>2 high-end restaurants, 2 café, and 2 banquet hall)
Toilet & Bathroom	★	★★	★★★	★★★★	★★★★★
24-hour Hotel Service	★	★	★	★★	★★★
Business Center			★	★★	★★★

Source: TTB (2012e)

Tourist hotels make a substantial economic and environmental contribution. Although only accounting for about 4% of Taiwanese hospitality industry by number, tourist hotels have a high value with respect to inbound tourism, with their accommodation services being chosen by 40% of international visitors to Taiwan (TTB 2013h), as well as in economic income, with the revenue of the hotels being approximately NT$5 billion in 2011 (TTB 2013j) (see also Chapter 3). However, tourist hotels are significant carbon emitters in the accommodation sector. For instance, most of top 50 intensive energy users in the hospitality industry are tourist hotels (Taiwan Green Productivity Foundation 2010). The carbon emission of international tourist hotels (28.9 kg/guest night) is also estimated as being over four times that of bed and breakfasts (6.3 kg/guest night) (Tsai et al. 2014). Twenty-three of the tourist hotels are also members of international chains and account for 40% of revenue in the tourist hotel sector (see Table 4.4).

Table 4.4: Profile of international chain hotels in Taiwan

Tourist Hotel	International Chain	Global Environment Policy	No of Rooms	Total Revenue (NTD)
Hotel Royal Taipei	Nikko Hotels International		202	582,867,029
Grand Hyatt Taipei	Global Hyatt Corporation	yes	865	2,446,115,843
Evergreen Plaza Hotel, Tainan	Evergreen International Hotel		197	432,702,840
Evergreen Laurel Hotel (Keelung)	Evergreen International Hotel		144	139,471,981
Evergreen Laurel Hotel (Taichung)	Evergreen International Hotel		354	618,171,300
Evergreen Resort Hote l(Jiaosi)	Evergreen International Hotel		231	621,435,731
The Landis Taipei Hotel	Landis Hotels & Resorts		209	498,921,589
Hotel Landis China Yangmingshan	Landis Hotels & Resorts		50	93,358,434
Tayih Landis Tainan	Landis Hotels & Resorts		315	576,738,478
Far Eastern Plaza Hotel, Taipei	Shangri-La Hotels and Resorts	yes	420	1,712,157,902
Far Eastern Plaza Hotel, Tainan	Shangri-La Hotels and Resorts	yes	336	611,661,143
Grand Formosa Regent Taipei	Regent Hotels & Resorts (Carlson Hotels Worldwide)	yes	569	2,885,932,223
Gloria Prince Hotel	Price Hotels & Resorts		220	371,443,126
Nice Prince Hotel	Price Hotels & Resorts		245	338,996,548
Sheraton Taipei Hotel	Sheraton Hotels & Resorts (Starwood Hotels & Resorts)	yes	692	2,559,432,961
Sheraton Hsinchu Hotel	Sheraton Hotels & Resorts (Starwood Hotels & Resorts)		386	698,896,502
Four Points by Sheraton Chung Ho, Taipei	Sheraton Hotels & Resorts (Starwood Hotels & Resorts)	yes	126	161,742,851
The Westin Taipei	Westin Hotels & Resorts (Starwood Hotels & Resorts)	yes	288	1,262,801,729
Radium-Kagaya International Hotel	Kagaya Hotel Group		70	253,372,779
Novotel Taipei Taoyuan International Airport	Accor Group		360	412,600,459
Le Meridien Taipei Hotel	Starwood Hotels & Resorts		160	1,122,791,557
W Taipei	Starwood Hotels & Resorts		405	1,201,134,020
Sub-Total			6,844	19,602,747,025
% of Tourist Hotel Total			25,349	50,021,462,263

Source: TTB (2012a; 2013j)

Survey Questions

In order to ensure the comparability of this research with previous studies of hotels and the environment (Chapters 2 and 3), an eight page survey was developed (Appendix B). Questions were grouped is grouped into four main parts, which gauged the perceptions, attitudes, actions, and influencings factors of Taiwanese lodging facilities with respect to environment and climate change concerns. As well as examining the adoption of conventional environmental practices aimed at reducing negative environment impacts within the accommodation sector (Myung et al. 2012), the actions section also integrated specific questions with respect to Taiwanese hotels' implementation of the UNWTO and UNEP's (2008) recommended measures in climate change mitigation and adaptation. Where appropriate and possible questions were developed for the survey instrument that could be compared with the results of previous research. Tables 4.5, 4.6, and 4.7 below outline the question categories and the particular domestic and international research publications that informed the writing of specific questions in the survey.

Perception

Previous research has implied or suggested that hotel survey respondents' perceptions of climate change impacts, especially at corporate level, were associated with the credibility of the information source, the experience of extreme weather event and climate change phenomena, as well as its relation to tourism resources (Becken 2005; Belle & Bramwell 2005; Hall 2006; Cheng 2010; Saarinen et al. 2012; Morrison & Pickering 2013). Thus, this section is designed to understand how Taiwanese hotel respondents: (1) obtain climate change information with a multiple-selection question, ranging from mess media, governmental agencies, NGOs, publications, to internal channels; (2) recognize the effect of multiple extreme weather events on their hotel's location in the previous five years; (3) acknowledge the existence of climate change (or not); (4) perceive the potential impacts of climate change on their hotel's

location in the next five and twenty years; and (5) perceive climate change impacts on the national tourism industry, hotel's region and hotel's business, in the past and next five years. The last three questions are evaluated on the five-level Likert scale and were undertaken to see if there were any scalar differences with respect to how climate change was perceived.

Table 4.5: Questions on the perception and attitude of tourism and hotel businesses in response to environment and climate change

Category	Question topic and related source literature
Perception	• Information source of climate change (Hall 2006; Saarinen & Tervo 2006) • Recognition of climate change existence (Belle & Bramwell 2005; Bicknell & Mcmanus 2006; Tervo 2007; Tervo & Saarinen 2007) • Awareness of climate change phenomena (Becken 2005; Belle & Bramwell 2005; Bicknell & Mcmanus 2006; Saarinen & Tervo 2006; Tervo 2007; Tervo 2008; Hall & Clayton 2009) • Awareness of climate change impacts at national, regional and corporate levels (Belle & Bramwell 2005; Bicknell & Mcmanus 2006; Hall 2006; Saarinen & Tervo 2006; Lee & Hung 2007; Tervo 2008; Hall & Clayton 2009; Cheng 2010; Jarvis & Pulido Ortega 2010)
Attitude	• Contribution of hotel business to environment (Hobson & Essex 2001; Leslie 2001; Vernon et al. 2003; Bohdanowicz 2005; Ayuso 2006; Bohdanowicz 2006a; 2006b; Wan 2006; Kasim 2009; Prayag et al. 2010; Maleviti et al. 2010; Ustad 2010) • Contribution of hotel business to climate change (Tervo & Saarinen 2007; Saarinen & Tervo 2010) • Hotel's responsibility to respond to environment and climate change (Hobson & Essex 2001; Vernon 2003; Bohdanowicz 2005; Kasim 2009; Prayag et al. 2010; Roman et al. 2010) • Government's responsibility to respond to environment and climate change (Hobson & Essex 2001; Vernon 2003; Hall & Clayton 2009; Kasim 2009; Jarvis & Pulido Ortega 2010; Prayag et al. 2010; Roman et al. 2010) • Environmental policy to respond to climate change (Belle & Bramwell 2005; Hall 2006; Thomas & Vanel 2008) • Willingness to implement climate change strategy at corporate level (Thomas & Vanel 2008) • The hotel which claims to be 'green' is only using it as a marketing ploy (Lansing & De Vries 2007; Pizam 2008; Rahman et al. 2012) • It is not possible to be both profitable and environmentally friendly (Sloan et al. 2004; Rodríguez et al. 2007) • Customers are not interested in whether a hotel is environmentally friendly or not (Leslie 2001; Schubert et al. 2010; Zografakis et al. 2011)

Attitude

The environmental attitude of a hotel is examined from the aspects of corporate responsibility,

relationship to government policy, and the role of green marketing (Table 4.5). Again drawing on international research for comparability, this section applied a group of five-level Likert scale questions to investigate the intensity of hotel respondents' attitude towards (1) including climate change as part of their accountability in responding to environment problems and the extent to which it influences voluntarily changes in daily operation; (2) attitude towards government intervention in response to climate change impacts, including the current environmental policies and prospective climate change schemes, such as carbon taxes, carbon offsetting and carbon trading; (3) attitudes towards green marketing, and its role in influencing the reputation of green hotels, the profitability of environmental practices, and changes in consumer purchasing behaviour due to environment and climate change concerns.

Action and Influencing Factors

In order to examine hotel actions with respect to climate change mitigation and adaptation, this section used 32 climate change and environmental related measures identified in the global hotel literature (Table 4.6), identified influencing factors in adopting such measures (Table 4.7), as well as UNWTO and UNEP's (2008) recommended approaches (see Table 1.8). As Chapters 2 and 3 noted previous studies have generally agreed that "easy" approaches to environmental impact in terms of energy-, waste-, and water- management were popularity for cost-saving and legislative reasons (Section 2.3 of survey). Nevertheless, several recent studies on hotel and climate change observed the increasing importance of adaptation practices in hotel businesses, such as climate-proofing activity (Bicknell & Mcmanus 2006; Morrison & Pickering 2013). Other issues identified as significant for the implementation of more advanced climate change measures were corporate capacity (e.g. finance, information and technology), government leadership and legislation, and market feedback (Becken 2005; Jarvis et al. 2010; Saarinen et al. 2012).

Table 4.6: Questions on the actions of tourism and hotel businesses in response to environmental and climate change

Category	Question topic and related source literature
Mitigation Measures	• Environmental policy (Brown 1996; Kirk 1998; Knowles et al. 1999; Bohdanowicz 2005; Mensah 2006; Wan 2006; Erdogan & Baris 2007; Yang 2010; Coles & Zschiegner 2011; Nicholls & Kang 2012a) • Environmental target, benchmarking, and control (Chan 2005; Wan 2006; Erdogan & Tosun 2009; Radwan 2010; Jarvis & Pulido Ortega 2010; Bonilla Priego et al. 2011; Charara et al. 2011) • Environmental management system (Leslie 2001; Ustad et al. 2010; Bonilla Priego et al. 2011; Kučerová 2012) • Environmental certification (Knowles et al. 1999; Rivera 2002; Bohdanowicz 2005; Peršić-Živadinov & Blažević 2010; Zografakis et al 2011; Nicholls & Kang 2012a; Nikolaou et al. 2012) • Environmental manager (Bohdanowicz 2006b; Wan 2006; Yang 2010; Coles & Zschiegner 2011) • Energy-saving building design (Butler 2008; Teng et al. 2012) • Reduction of air-conditioning service (Deng & Burnett 2000; Priyadarsini et al. 2009) • Energy control system (Wan 2006; Ali et al. 2008; Ustad et al. 2010; Yang 2010; Aminian 2011; Nikolaou et al. 2012; Rahman et al. 2012) • Energy-efficient appliances (Bohdanowicz 2006b; Mensah 2006; Wan 2006; Yang 2010; Aminian 2011; Nikolaou et al. 2012) • Maintenance of air conditioning (Yang 2010; Zografakis et al. 2011) • Renewable and alternative energy (Leslie 2001; Mensah 2006; Dalton et al. 2007; Ali et al. 2008; Peršić-Živadinov & Blažević 2010; Garay & Font 2012; Lebe & Zupan 2012; Nikolaou et al. 2012) • Green vehicle and public transportation (Hobson & Essex 2001) • Energy-saving education and incentives (Becken 2005; Bohdanowicz 2006b; Wang 2006; Kučerová 2012; Lebe & Zupan 2012) • Carbon offset project (Dodds et al. 2008; Gössling et al. 2009b) • Waste recycling (Knowles et al. 1999; Hobson & Essex 2001; Bohdanowicz 2006b; Mensah 2006; Wang 2006; Erdogan & Baris 2007; Park 2009; Ustad et al. 2010; Yang 2010; Aminian 2011) • Hazardous waste pre-treatment (Erdogan & Baris 2007; Aminian 2011; Lebe & Zupan 2012) • Material-use reduction (Hobson & Essex 2001; Bohdanowicz 2006b; Yang 2010; Nicholls & Kang 2012a) • Local produced and seasonal food (Erdogan & Baris 2007; Yang 2010) • Environmentally friendly and green label products (Bohdanowicz 2006b; Park 2009; Yang 2010; Aminian 2011; Garay & Font 2012) • Environmentally responsible supplier (Peršić-Živadinov & Blažević 2010; Garay & Font 2012)
Adaptation Measures	• Water-saving practices (Bohdanowicz et al. 2004; Bohdanowicz 2006b; Mensah 2006; Wan 2006; Park 2009; Ustad et al. 2010; Yang 2010; Coles & Zschiegner 2011; Garay & Font 2012; Lebe & Zupan 201) • Environmental education (Mensah 2006; Wan 2006; Erdogan & Baris 2007; Kasim 2007a; Yang 2010; Aminian 2011; Lebe & Zupan 2012) • Community and conservation (Mensah 2006; Wan 2006; Yang 2010) • Environmental incentive (Wan 2006; Scanlon 2007; Radwan et al. 2012) • Adaptation of hotel's product, marketing and position (Becken 2005; Bicknell & Mcmanus 2006; Yang 2010; Morrison & Pickering 2012) • Hotel establishment in low climate-risk location (Becken 2005; Belle & Bramwell 2005) • National and international network (Erdogan & Baris 2007)

Table 4.7: Questions on the factors that influence tourism and hotel business response to environmental and climate change

Category	Question topic and related source literature
Influential factor on hotel's implementation of environmental actions	• Cost reduction (Enz & Siguaw 1999; Leslie 2001; Céspedes-Lorente et al. 2003; Sloan et al. 2004; Bohdanowicz et al. 2004; Bohdanowicz 2005, 2006b; Ayuso 2006; Hung & Lai 2006; Wan 2006; Kasim 2007a; Graci 2009; Jarvis & Pulido Ortega 2010; Dodds & Holmes 2011) • Public relation and reputation (Hobson & Essex 2001; Chen 2004; Ayuso 2006; Chang 2006; Park 2009; Ustad et al. 2010; Tortellam & Tirado 2011; Nicholls & Kang 2012a) • Competitive advantage (Chen 2004; Wan 2006; Ustad et al. 2010) • Owner or top manager's personal value and belief (Tzschentke et al. 2004; Ayuso 2006; Calvache & Evra 2008; Tzschentke et al. 2008a; Park 2009; Yang 2010; Garay & Font 2012; Teng et al. 2012), • Employee Loyalty ((Kirk 1998; Graci & Dodds 2008; Nicholls & Kang 2012a) • Parental company's policy (Álvarez Gil et al. 2001; Chan & Wong 2006) • Corporate social responsibility policy (Graci & Dodds 2008), • Government policy and regulation (Leslie 2001; Revilla et al. 2001; Chan & Wong 2006; Wan 2006; Kasim 2007a; Graci & Dodds 2008; Bonilla-Priego et al. 2011; Shah 2011; Chou et al. 2012; Kučerová 2012) • Government incentive (Chang 2006; Yang 2010; Coles & Zschiegner 2011; Dodds & Holmes 2011; Chen 2012; Saarinen et al. 2012) • Capital investment (Stabler & Goodall 1997; Vernon et al. 2003; Becken 2005; Bohdanowicz 2006b; Chang 2006; Hung & Lai 2006; Kasim 2007a; Calvache & Evra 2008; Chan 2008; Mcnamara & Gibson 2008; O'Neill & Alonso 2009; Ustad et al. 2010; Dodds & Holmes 2011; Jarvis & Pulido Ortega 2011; Lebe & Zupan 2012), • Staff availability and expertise (Becken 2005; Chang 2006; Erdogan & Baris 2007; Chan 2008; Graci 2009; Chen 2010) • Technology Availability (Ustad et al. 2010; Scott et al. 2012) • Supplier Availability (Tzschentke et al. 2008b; Chou et al. 2012; Kasim & Ismail 2012) • Current information (Kasim 2009) • Existing building structure and facility (Mcnamara & Gibson 2008; Park 2009; Ustad et al. 2010) • Time availability (Hobson & Essex 2001; Jarvis & Pulido Ortega 2010;) • Customer demand (Revilla et al. 2001; Hung & Lai 2006; Kasim 2007a, 2009; Jarvis & Pulido Ortega 2010; Chou et al. 2012; Kasim & Ismail 2012) • Employee loyalty (Kasim 2007a) • Stakeholder pressure (Kasim 2007a; Graci 2009; Chou et al. 2012; Kasim & Ismail 2012) • Risk Management (Hall 2006) • Industry leadership (Graci & Dodds 2008) • Climate change concern (Hall 2006; Saarinen & Tervo 2006; Saarinen et al. 2012) • Environment concern (Hobson & Essex 2001; Chen 2004; Chang 2006; Erdogana & Baris 2007; Calvache & Evra 2008; Ustad et al. 2010; Garay & Font 2012)

The survey also integrates the recommended climate change measures by UNWTO and UNEP (2008: pp.11-12) with respect to hotel mitigation of climate change (Table 1.8). Some of these recommendations overlap with actions already recognised in the literature, e.g. setting targets and

benchmarking, apply certification; installation of devices that permit heating, cooling and lighting only when the room is occupied; use of energy efficient appliances; awareness-raising among customers on recycling; while others are unique to the UWTO-UNEP (2008), e.g. Integrating sustainability and customer comfort; development of a network of climate change focal points in the accommodation sector to promote activities proposed in the Davos Report and Declaration; development of links with international policies (e.g., Clean Development Mechanism), cooperation and standards. Overall, this section explored four dimensions of hotel's climate change actions, including (1) the level of implementation of 32 climate change actions and measures in the Taiwanese hotel industry (Table 4.6); (2) the importance of 23 factors identified in past literature that influence such actions (Table 4.7); (3) hotel's awareness and adoption of environmental policies and initiatives; (4) the multiple ways of communicating environmental performance with hotel staff.

Environmental Behaviours

Hotel sector environmental behaviour appears substantially associated with characteristics of the lodging facility, such as size, location, target market, chain affiliation, star rating, years of trading and experience of extreme weather events (Table 4.8). Hotel scale is a very significant variable in previous studies of hotel's environmental behaviours (Sections 2.3 & 2.4 of the survey), especially because of issues of capacity constraints (e.g. finance, workforce, and time), business vision, market confidence, and knowledge levels (O'Neill & Alonso 2009; Burgin & Hardiman 2010; Jarvis & Pulido Ortega 2010; Hotel Energy Solutions 2011a). Previous research has suggested that small hotels, which representing the majority of global hotel industry, are more likely to engage in simple and cost-saving measures, as their environmental investment greatly relies on leadership and government incentive (Dodds & Holmes 2011; Hotel Energy Solutions 2011a; Garay & Font 2012; Nicholls & Kang 2012a). However, this has not been substantially explored in a Taiwanese context. Furthermore, research has suggested that with a higher level of strategic concerns with respect to reputation, competitiveness, and stakeholder support, large

hotels are more proactive in integrating environmental management systems and policies into their daily operations (Kirk 1998; Kučerová 2012; Nicholls & Kang 2012a). Nevertheless, there is a clear need for a more robust analysis of hotel size than has hitherto been the case.

Although previous research has focused on hotel scale to explore the environmental behaviour of large and small lodging facilities, there is no internationally- acknowledged criterion for hotel size (Rahman et al. 2012). Overall, at least of eight definitions have been applied, mainly based on the number of employees, rooms, and beds (Table 4.9). Staff number is one of the popular criteria (Vernon et al. 2003; Garay & Font 2012), which mainly complies with the regulations of the European Commission (2005). Room or bed capacity is also widely used due to either the nature of the national hotel industry being studied or the convenience sample design of some research (Hobson & Essex 2001; Bohdanowicz 2005; Tzschentke et al. 2008; Dalton et al. 2009a, 2009b; Jarvis & Pulido Ortega 2010; Radwan et al. 2010; Chan 2011; Nicholls & Kang 2012a; Radwan et al. 2012; Rahman et al. 2012). However, the reasons for adopting certain scales of hotel size are rarely explained in previous research (Rahman et al. 2012). Yet, given that it has been argued in prior research that size matters when it comes to hotel implementation of environmental practices (see Chapters 2 and 3), the issue of hotel size appears would appear to be a baseline research requirement for this study. Otherwise, the grey zone of these definitions may comparability of results as well well as findings and recommendations, especially as one hotel could be classified as small accommodation in one study, but labeled as a large lodging operator in another (Hobson & Essex 2001; Chan 2011; Nicholls & Kang 2012a; Rahman et al. 2012). Issues of size and their relevance for environmental and climate change adaptation and mitigation practices are examined in substantial detail in Chapter 6.

Table 4.8: Key variables affecting hotel environmental behaviour

	Large Size	Small Size	Urban Site	Rural Site	International Market	Experience of EWEs	Chain Affiliation	Star Rating	New Built
Perception									
Climate Change Impact on Business		−a		+b	+c	+d			
Attitude									
Contribution to Environment and Climate Change		−e	−f						
Influence									
Customer Demand		−g					+h		
Employee Loyalty							+i		
PR & Reputation	+j						+k		
Competitive Advantage	+l						+m		
Stakeholder Pressure	+n		+o				+p		
Government Policy							+q		
Environment Concern		−r							
Climate Change Concern		−s							
Owner or top manager's personal value and belief		+t							
Parental company							+u		
Capital Investment		+v							
Time Availability		+w							
Staff Capacity		+x							
Government Incentive		+y							
Risk Management						+z			
Action									
Environment Policy	+aa							+ab	+ac
Environmental Target, Control Benchmarking		−ad						+ae	
EMS	+af						+ag		
Environmental Certification		−ah		−ai			+aj		+ak
Green Building									+al
Energy-saving facility							+am	+an	
Green Energy		−ao					+ap		
Waste Recycling		+aq						+ar	+as

Waste retreatment		+at						+au
Less Material Use		+av						
Local seasonal food		+aw						
Water Saving						+ax	+ay	
Environmental Education	+az					+ba		
Low risk location					+bb			
Environmental Performance	+bc	−bd	+be	+bf		+bg	+bh	+bi

Notes + represents positive relations; − represents negative relations.

a. Bicknell & Mcmanus 2006; Jarvis & Pulido Ortega 2010

b. Tervo 2008; Marshall et al. 2011

c. Belle & Bramwell 2005; Tervo & Saarinen 2007; Bank & Wiesner 2011; Morrison & Pickering 2012

d. Hall 2006; Lee & Hung 2007; Hall & Clayton 2009; Cheng 2010; Helgenberger 2011; Rowell & Richins 2013

e. Vernon et al. 2003

f. Maleviti et al. 2010

g. Revilla et al. 2001; Hung & Lai 2006; Kasim 2007a, 2009; Jarvis & Pulido Ortega 2010; Chou et al. 2012; Kasim & Ismail 2012

h. Kirk 1998

i. Kirk 1998; Graci & Dodds 2008; Nicholls & Kang 2012a

j., k. Kirk 1995, 1998; Wan 2006

l., m. Kirk 1998; Enz & Siguaw 1999; Bansal & Roth 2000; Tzschentke et al. 2004; Manaktola & Jauhari 2007; Graci & Dodds 2008; Kasim 2009; Sloan et al. 2009; López-Gamero et al. 2010, 2011a; Nicholls & Kang 2012a

n., o., p. Kirk 1995; Nicholls & Kang 2012a

q. Graci & Dodds 2008

r. Kasim 2009

s. Hall 2006; Saarinen & Tervo 2006; Saarinen et al. 2012

t. Tzschentke et al. 2004, 2008a; Ayuso 2006; Calvache & Evra 2008; Park 2009; Garay & Font 2012; Teng et al. 2012

u. Álvarez Gil et al. 2001; Chan & Wong 2006

v. Hobson & Essex 2001; Tzschentke 2004; Cunningham 2005; Chan 2008, 2011

w. Jarvis & Pulido Ortega 2010; Hobson & Essex 2011

x. Ateljevic 2007; Chan 2011

y. Coles & Zschiegner 2011; Dodds & Holmes 2011

z. Hall 2006; Morrison & Pickering 2012

aa., aq., av., aw., az., ba. Nicholls & Kang 2012a; Scott et al. 2012

ab. Mensah 2006; Nicholls & Kang 2012a

ac., as., au. Chang 2006

ad. Jarvis & Pulido Ortega 2010

ae. Radwan 2010

af. Kučerová 2012

ag. Chan & Ho 2006

ah, ai, aj. Sasidharan et al. 2002; Rivera 2004; Bohdanowicz 2006b; Kasim 2007; Jarvis & Pulido Ortega 2010; Carasuk 2011

ak., al. Tseng et al. 2012

am. Nicholls & Kang 2012a; Rahman et al. 2012

an. Ali et al. 2008

ao. Mensah 2006; Dalton et al. 2007; Nepal 2008; Park 2009; Zografakis et al. 2011

ap. Hotel Energy Solutions 2011b

ar. Erdogan & Baris 2007

at. Becken 2005

ax., ay. Peršić-Živadinov & Blažević 2010; Rahman et al. 2012

bb. Belle & Bramwell 2005

bc., bf., bg. Alvarez Gil et al. 2001; Hobson & Essex 2001; Céspedes-Lorente et al. 2003; Mensah 2006; Tarí et al. 2010; Turton et al. 2010; Rahman et al. 2011; Shah 2011

bd. Kasim 2009; Jarvis & Pulido Ortega 2010; Dodds & Holmes 2011

be. Carlsen et al. 2001

bh. Chang 2006; Dief & Font 2012

bi. Álvarez Gil et al. 2001; Calvache & Evra 2008

Table 4.9: Definitions of hotel size adopted in hotel and environment studies

Criteria	Micro Hotel	Small Hotel	Medium Hotel	Small & Medium Hotel	Large Hotel	Source
No. of Employees	E<10	10 ≤E< 50	50 ≤E< 250	10 ≤ E <250	E ≥250	Vernon et al. 2003; Garay & Font 2012
No. of Rooms		R≤10	10<R≤50	R≤50	R>50	Hobson & Essex 2001; Nicholls & Kang 2012a
		R≤20				Jarvis & Pulido Ortega 2010
		R≤30				Radwan et al. 2010; 2012
		R<50				Tzschentke et al. 2008
		R<50	50≤R<150	R<150	R ≥150	Bohdanowicz 2005
		R<100			R>100	Rahman et al. 2012
				R<250	R ≥250	Chan 2011
No. of Beds				B<100	B≥100	Dalton et al. 2009a, 2009b

The stronger environmental efforts of chain-affiliated lodgings has also been identified in the literature (Hotel Energy Solutions 2011; Shah 2011; Dief & Font 2012; Rahman et al. 2012). Supported by their parental company's policies and information strategies, the managers of chain hotels have appeared more likely to foresee changes in customer behaviour, public relations value, competitive benefits, employee feedback, community expectation, and legislative requirements with respect to responding to environmental change (Kirk 1998; Álvarez Gil et al. 2001; Chan & Wong 2006; Graci & Dodds 2008). Previous research has also noted the gradual investments of such hotel chains in developing EMS template, water conservation practice, educational programs, as well as renewable and alternative energy (Chan & Ho 2006; Peršić-Živadinov & Blažević 2010; Hotel Energy Solutions 2011b; Nicholls & Kang 2012; Rahman et al. 2012).

Locational elements are also an important issue for the survey to examine as even though environmental and climate change may be a global phenomenon it is experienced in particular places. From a locational perspective, previous research has suggested that rural tourism operators are more likely to perceive climate change impacts on their business (Tervo 2008) and to have better environmental implementation than urban hoteliers, in part because the leisure customer's expectations may be different in non-urban locations (Carsen et al 2011). City hoteliers may also be keen to attribute sectoral environmental responsibilities to nature-based lodging facilities (Maleviti et al. 2010), while stakeholder

pressure is a more important factor for those hotels to go green (Kirk 1995; Nicholls & Kang 2012a). In addition, hotel enterprises that have experienced extreme weather events appear more likely to accept the likelihood of potentially adverse impacts of climate change on tourism and hospitality in the future, including with respect to seasonality (Belle & Bramwell 2005; Hall 2006; Cheng 2010; Roman et al. 2010; Rowell & Richins 2013). Previously affected hoteliers may have greater consideration of risk management in their environmental actions (Hall 2006), and may also prefer low-climate-risk location (Belle & Bramwell 2005).

Some factors appear especially significant for hotel adoption and implementation of environmental practices. For example, high-star-rated hotels, which by definition aim at providing outstanding facilities and service quality (López Fernández & Serrano Bedia 2004), are more active in waste recycling and water management (Mensah 2006; Erdogan & Baris 2007; Peršić-Živadinov & Blažević 2010; Nicholls & Kang 2012a; Rahman et al. 2012). With cost, design, technology and information advantages, new hotels are more likely to achieve higher levels of environmental performance and certification (Álvarez Gil et al. 2001; Calvache & Evra 2008; Teng et al. 2012). Hotels with large numbers of West European visitors are also likely to have better environmental performance (Dief & Font 2012).

Based on the literature noted above, this section has been designed to require respondents to identify the size (by number of employees, rooms, and beds), location, target market, chain affiliation, star rating and age of hotel property, in order to examine the relations between these variables and the environmental practices of the lodging facility (section 4.3.1, 4.3.2, and 4.3.3). Accordingly, statistical tests are applied in Chapters 5 and 6 to systematically examine if any significant relationships exist in this study.

The topic of climate change was regarded as potentially novel and complex for the Taiwanese accommodation sector, especially in terms of some of the specific terms used with respect to environment and climate change practices and concepts, therefore respondents were also asked to provide the company's name and contact information in the last part of questionnaire for following up responses from each hotel and clarifying responses if need be.

Survey Operation

A baseline survey of 2,729 Taiwanese hotels, including 107 tourist hotels and 2,622 standard hotels was undertaken. The hotel's senior manager (or their appriate representatove) was the investigation target to represent the opinion of their hotel. The survey is reasonably detailed, and took respondents approximately 30-40 minutes to complete. The first draft of questionnaire was tested with four tourist hotel managers, the chief secretary of the Taiwan Tourist Hotel Association, and the consultant of the Taipei Hotel Association. Accordingly, the official definitions of climate change schemes, such as carbon tax, carbon trading and carbon offset, were added in the official survey in order to avoid confusion among hotel respondents (IPCC 2001). A pilot study was conducted by email and follow-up calls in August and November 2010 with a response of forty-five tourist hotels. The results of the pilot study were summarized in the article 'Hospitality industry responses to climate change: a benchmark study of Taiwanese tourist hotels', published in the Asia Pacific Journal of Tourism Research in 2013 (Su et al. 2013).

The main study commenced in mid-2011 for a period of three months. This survey was initially conducted by email based on the hotel representative lists provided by the Taiwan Tourism Bureau and local hotel associations. In order to improve the response rate, postal questionnaires and telephone contacts were followed up with the assistance of the TTB and hotel associations. Overall, nearly 10% of 2,729 Taiwanese hotel managers (270 questionnaires) answered this survey. There are 251 valid responses, including 64 tourist hotels and 187 standard hotels.

Survey Analysis

The survey results were analyzed by SPSS version 20.0. The environmental behaviour of Taiwanese hotels in response to environment and climate change was firstly generalized via descriptive statistics. The relations between their environmental action and perception or between their environmental action and attitude, were examined by the Canonical Correlation Analysis. Factor Analysis was applied to extract the key variables on hotel's environmental behaviour. As in previous research, the impacts of

hotel characteristics on environmental behaviour were checked by t-test, one-way ANOVAs Analysis, Pearson Correlation Analysis, Post hoc Multiple Comparison Test, and Two-Step Cluster Analysis.

Validity and Limitation

In Table 4.10, a high level of internal reliability was identified in the groups of perception, attitude, action, and influential-factor questions, with a Cronbach's alpha score of 0.95, 0.78, 0.97, and 0.95 respectively (Cronbach's alpha coefficient > 0.7). Table 4.11, Table 4.12, Table 4.13, and Table4.14 provided a detail of reliability tests, which showed removal of any question would result in a lower Cronbach's alpha or make no differences, except for the green marketing dimension (e.g. believes the hotel which claims to be 'green' is only using it as a marketing ploy; believes it is not possible to be both profitable and environmentally friendly; believes customers are not interested in whether a hotel is environmentally friendly or not) in attitude group. Considering that removal of green marketing questions would only lead to a small improvement in Cronbach's alpha, and the "Corrected Item-Total Correlation" value was low for those items, therefore, all the questions are kept for further analysis.

Table 4.10 Reliability coefficients for perception, attitude, action, influential-factor scales

Type of Scale	Cronbach's Alpha	Cronbach's Alpha based on Standardized Items	N of Items
Perception	0.95	0.95	6
Attitude	0.78	0.79	14
Action	0.97	0.97	32
Influential Factor	0.95	0.96	23

Table 4.11 Correlation and internal consistency of perception scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item – Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Climate Change Impacts in the past 5 years					
National Tourism Industry	12.47	17.64	.79	.71	.94
Hotel's Region	12.39	17.80	.82	.85	.94
Hotel's Business	12.42	17.44	.83	.87	.94
Climate Change Impacts in the next 5 years					
National Tourism Industry	12.58	16.39	.81	.78	.94
Hotel's Region	12.49	16.36	.89	.89	.93
Hotel's Business	12.50	16.18	.88	.90	.93

Table 4.12 Correlation and internal consistency of attitude scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item – Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
My hotel					
- has an impact on the environment.	44.24	31.26	.48	.35	.76
- contributes to climate change.	44.86	32.00	.42	.33	.76
- has a responsibility to respond to the environmental impacts	43.74	33.25	.45	.41	.76
- has a responsibility to respond to climate change impacts.	43.97	32.33	.51	.49	.76
- believes government should regulate the tourism industry regarding climate change.	43.71	32.51	.51	.46	.76
- supports current government environmental policy over climate change concern.	43.70	33.50	.51	.49	.76
- supports a carbon tax	44.24	29.96	.63	.71	.74
- supports a carbon offset scheme	44.05	30.30	.67	.81	.74
- supports a carbon trading scheme	44.14	30.45	.65	.79	.74
- will implement strategies to respond to climate change even it is not required by government regulation.	43.78	34.48	.36	.33	.77
- believes the hotel which claims to be 'green' is only using it as a marketing ploy.	44.72	34.91	.15	.30	.79
- believes it is not possible to be both profitable and environmentally friendly	45.03	36.26	.05	.44	.80
- believes customers are not interested in whether a hotel is environmentally friendly or not.	44.91	36.38	.03	.30	.80

Table 4.13 Correlation and internal consistency of action scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item – Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Initiate a hotel environmental policy	77.89	1064.87	.66	.82	.97
Set up environmental targets and benchmarking	77.85	1062.10	.69	.85	.97
Implement environment management system	78.01	1053.92	.68	.82	.97
Designate a manager with specific responsibility for EMS and emission issues	78.93	1061.98	.61	.66	.97
Achieve environmental certification	78.54	1046.00	.72	.80	.97
Adapt building design for energy saving	77.93	1053.15	.66	.63	.97
Reduce the use of air conditioning	77.62	1070.11	.56	.63	.97
Frequently clean and maintain electricity facilities	77.02	1073.96	.56	.75	.97
Implement control system for heating/cooling/lighting facilities	76.99	1072.59	.59	.79	.97
Use energy-efficient appliances	77.32	1064.72	.59	.68	.97
Use alternative fuels and renewable energy	78.15	1044.26	.73	.69	.97
Encourage to use green vehicles/public transport	77.56	1049.47	.71	.70	.97
Provide locally-produced and seasonal food	77.35	1046.93	.67	.63	.97
Involve in and provide carbon offset projects	78.61	1042.70	.74	.80	.97
Implement energy-saving education/incentive	78.10	1038.24	.80	.78	.97
Integrate emission management with supply chain	78.77	1041.89	.79	.82	.97
Implement water-saving and reuse measures	77.74	1046.27	.74	.76	.97
Reduce the use of materials	77.27	1053.44	.76	.82	.97
Recycle waste & raise customer's awareness	76.91	1062.93	.65	.73	.97
Reduce/ pre-treat chemical and hazardous wastes	77.31	1047.76	.74	.74	.97
Measure/ monitor resource usage & waste production	77.49	1042.72	.78	.79	.97
Purchase fair-trade/green-label products	77.79	1043.53	.78	.77	.97
Develop an environmental code of ethics' for supplier chain	78.23	1040.92	.76	.78	.97
Volunteer for local conservation or community projects	78.03	1043.48	.78	.74	.97
Adapt hotel's products, marketing and positioning	77.58	1056.96	.69	.68	.97
Locate new establishments in low-climate-risk areas	78.58	1050.72	.64	.66	.97
Offer incentives for adaptation and mitigation measures	78.67	1039.56	.79	.82	.97
Provide C.C. & environment education	78.56	1042.75	.79	.80	.97
Involve in the C.C. network to promote activities proposed in UNWTO's Davos Report and Declaration	78.95	1046.32	.78	.88	.97
Involve in the national tourism program regarding to energy efficiency and renewable energy use	78.60	1038.75	.79	.83	.97
Involve/ comply with C.C. policies & plans	78.41	1041.67	.76	.80	.97
Develop links with international policies/ mechanism/cooperation/standards regarding C.C.	78.73	1036.43	.80	.86	.97

Table 4.14 Correlation and internal consistency of influential-factor scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item – Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Cost reduction	90.89	110.88	.52	.	.95
Customer demand	90.97	110.39	.58	.	.95
Employee loyalty	91.24	109.20	.53	.	.95
Public relations and reputation	90.94	108.46	.73	.	.95
Competitive advantages	90.98	108.83	.67	.	.95
Stakeholder pressure	91.34	108.52	.57	.	.95
Government policy and regulation	91.07	108.59	.69	.	.95
Environmental concern	91.15	108.46	.68	.	.95
Climate change concern	91.22	108.37	.63	.	.95
Owner or top manager's personal value & belief	90.94	108.77	.71	.	.95
CSR policy	91.05	106.89	.77	.	.95
Parental company's policy	91.10	107.47	.65	.	.95
Capital investment	91.00	108.81	.62	.	.95
Existing building structure	90.97	108.58	.71	.	.95
Existing facility	91.02	109.05	.69	.	.95
Time availability	91.05	107.87	.76	.	.95
Staff availability and expertise	90.94	108.34	.75	.	.95
Supplier availability	91.12	107.56	.72	.	.95
Technology availability	91.05	106.95	.77	.	.95
Government incentives	90.95	107.97	.65	.	.95
Current information	91.08	108.11	.73	.	.95
Risk management	91.05	107.49	.75	.	.95
Industry leadership	91.13	106.95	.69	.	.95

Remarks: Squared Multiple Correlations are closed to zero

The major limitation of this study is the low response rate of Taiwanese hotels. Compared with the response rate of related environmental surveys of at a least of 20% (Leslie 2001; Becken 2005; Nicholls & Kang 2012b), the response rate of this study is relatively low, even it is close to the standard of two Spanish studies (Álvarez Gil et al. 2001; Céspedes-Lorente, et al. 2003). The level of response may be because of the length of the questionnaire, respondents' unfamiliarity with the research topic, and low accessibility of the survey target (López-Gamero et al. 2011). However, given the level of support and promotion of the survey provided by the TTB and hotel associations, including in industry meetings and training sessions, as well as follow-ups in the form of emails, prepaid envelopes, and phone contacts, the response rates may be reasonable for such a census-style novel survey. The follow-up procedure, which facilitating the responses from national-wide hotels rather than environmentally-enthusiastic accommodation operators, also contributed to reduce any answering bias. In addition, it should be noted that the overall sample size is significantly larger than many of the studies reviewed in Chapter 2

and is one of the larger sample sizes for studies of hotel environmental practices in Taiwan (see Table 3.5). On the other hand, the location distribution of hotel respondents closely corresponded to that of Taiwanese hotel population, which supported the representativeness of samples (Table5.2). Thus, a 10% response rate of this study is considered as appropriate in this study.

Due to time and budget limitations, this research targeted senior managers to represent for the opinion of hotel companies. With the assistance of TTB and hotel associations, the respondents cooperated to provide the information of their position and working background while answering this questionnaire. A high percentage of hotel respondents occupy core management positions. 94% of respondents were owners, general managers, or department managers, and about 70% had worked for their current hotels for more than five years.

Ethical Considerations

This study has complied with the ethical guidelines of the University of Canterbury and the codes of intellectual property rights with respect to the conduct of research (Appendix C).

Chapter 5

Research Results

Nearly 10% of Taiwan's 2,729 hotels answered this survey, including 251 valid responses from 64 tourist hotels and 187 standard hotels (Table 5.1). The distribution of hotel respondents by location, with 54.8 % from north Taiwan, 18.3% from south Taiwan, 16.2% from central Taiwan, 6.6% from eastern Taiwan, and 4.1% from offshore islands, closely corresponded to that of Taiwanese hotel population (Table 5.2). The survey data were analysed via the application of SPSS version 20.0 with the survey results detailed and discussed below. Further analysis and discussion is undertaken in the following chapters.

Table 5.1: Response rate of this survey

	Tourist hotel	Standard Hotel	Total
No. of Taiwanese hotels	107	2622	2729
No. of Hotel Respondents	64	205	269
Valid questionnaires	64	187	251
Incomplete questionnaires	0	18	18
Responding rate %	59.8%	7.8%	9.9%

Table 5.2: Distribution of total number of hotels and hotel respondents by location

Location	Total Hotels		Hotel Respondents	
	No.	%	No.	%
Northern Taiwan	1103	40.3%	132	54.8%
Central Taiwan	580	21.3%	39	16.2%
Eastern Taiwan	217	8.0%	16	6.6%
Southern Taiwan	762	27.9%	44	18.3%
Offshore Island	67	2.5%	10	4.1%
No of Hotels	2,729	100%	241	100%

Reference: TTB 2012a

Profile of Hotel Respondents

On average hotel respondents had been trading for 16 years with an operational scale of 103 staff, 133 rooms, and 246 beds. Their target market comprises 60% domestic tourists and 40% international tourists (Table 5.3). Seventy percent of hotel respondents were independent lodging facilities while 30% had chain affiliation. At the time of conducting this research, 48 hotel participants had a star-rating assessment (16 one to three star hotels and 32 four to five star hotels) (Table 5.4). Over 60% of hotel respondents indicated that they were located in an urban area. Summer (e.g. July and August) is the peak season for the majority of participants with the notable except of hotspring hotels (Table 5.5).

Table 5.3: Profile of hotel respondents

Variable	N	Mean	Std Dev	Minimum	Maximum
No of Employees	251	102.8	155.1	1	1077
No of Rooms	251	133.0	128.9	7	688
No of Beds	224	246.1	255.9	8	1500
% of International Guest	236	40%	.309	0%	98%
% of Domestic Guest	236	60%	.309	2%	100%
Hotel age	244	16.1	14.0	1	96

Table 5.4: Summary of hotel characteristics, analyzed by hotel classification

	N	Star Rating		N	Management System		N
		1-3 Stars	4-5 Stars		Independent Hotel	Chain Hotel	
Tourist Hotel	64	6.5%	93.5%	31	43.8%	56.2%	64
Standard Hotel	187	82.4%	17.6%	17	79.7%	20.3%	177
All Respondents	251	33.3%	66.7%	48	70.1%	29.9%	241

Table 5.5: Peak season and location of hotel respondents

Location	N	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Urban	158	5.2%	10.8%	8.5%	6.7%	4.3%	4.5%	13.3%	12.8%	3.6%	11.2%	10.1%	9.0%
Hotspring	36	16.8%	16.8%	1.8%	2.7%	0.9%	5.3%	10.6%	8.0%	0.9%	5.3%	10.6%	20.4%
Coast	20	4.3%	8.7%	2.2%	2.2%	2.2%	4.3%	37.0%	28.3%	6.5%	2.2%	0.0%	2.2%
Mountain	41	5.7%	13.8%	3.3%	4.9%	4.9%	4.1%	21.1%	19.5%	8.1%	5.7%	3.3%	5.7%
Lake & River	15	4.9%	14.6%	2.4%	0.0%	4.9%	4.9%	24.4%	24.4%	2.4%	4.9%	2.4%	9.8%

Perception

Ninety-nine percent of hotel respondents have access to information on climate change (Table 5.6). About 80% of hotel business was affected by extreme weather events, especially typhoon, rainfall and flooding, in the previous five years, while nearly half of them experienced more than one kind of

weather extreme (Table 5.7). Thus, it is not surprised over 90% of hotel respondents highly agreed with the existence of climate change (see also Belle & Bramwell 2005; Bicknell & Mcmanus 2006; Chen 2012; Morrison & Pickering 2012; Saarinen et al. 2013). The most popular information channels are mess media and the Internet, followed by government (e.g. EPA, TTB), and trade publications (see also Hall 2006; Cheng 2010; Coles & Zschiegner 2011; Helgenberger 2011; Rowell & Richins 2013). Interestingly, over half of offshore island hotels stated the "customer" as one of their information sources.

Table 5.6: Information source on climate change, analyzed by region

Rank	Source	Respondents (N=251)	%	Region				
				North Taiwan (N=132)	Central Taiwan (N=39)	East Taiwan (N=16)	South Taiwan (N=44)	Offshore Island (N=10)
1	News, TV, Radio	207	82.5%	79.5%	82.1%	87.5%	90.9%	80.0%
2	World Wide Web	168	66.9%	69.7%	64.1%	56.2%	70.5%	60.0%
3	EPA	98	39.0%	38,6%	46.2%	31.2%	34.1%	40.0%
4	Tourism Bureau	76	30.3%	28.0%	33.3%	25.0%	36.4%	30.0%
4	Trade publications	76	30.3%	32.6%	33.3%	18.8%	31.8%	20.0%
6	Customers	65	25.9%	24.2%	35.9%	18.8%	15.9%	50.0%
7	Hotel & Tourism Association	64	25.5%	26.5%	17.9%	25.0%	29.5%	30.0%
8	Academic research / external reports	59	23.5%	24.2%	30.8%	12.5%	22.7%	20.0%
9	International organization	45	17.9%	20.5%	20.5%	6.2%	13.6%	20.0%
10	Bureau of Energy	37	14.7%	15.9%	10.3%	0.0%	20.5%	0.0%
11	Colleagues	33	13.1%	15.2%	12.8%	6.2%	9.1%	10.0%
12	Water Resource Agency	26	10.4%	9.1%	12.8%	12.5%	13.6%	10.0%
12	Internal reports	26	10.4%	9.8%	10.3%	0.0%	13.6%	0.0%
14	Suppliers	25	10.0%	8.3%	12.8%	6.2%	11.4%	20.0%
14	Trade shows & convention	25	10.0%	12.1%	12.8%	6.2%	4.5%	10.0%
16	Consultants	11	4.4%	5.3%	5.1%	0.0%	4.5%	0.0%
17	Ministry of Interior	10	4.0%	3.8%	5.1%	0.0%	4.5%	10.0%
18	None	2	0.8%	0.8%	2.6%	0.0%	0.0%	0.0%

Table 5.7: Experience of multiple extreme weather events in previous 5 years

	None	1 Type	2 Types	3 Types	>3 Types	Total
Respondents	55	79	65	29	23	251
%	21.9%	31.5%	25.9%	11.6%	9.2%	100%

Taiwanese hotel respondents generally thought that climate change phenomenon would be more evident in the next 20 years than in the next five, especially the occurrences of hotter summers (Table 5.8a, Table 5.8b), more frequent typhoons and extreme rainfall events (Table 5.9a, Table 5.9b). These

observations are consistent with the forecasts of National Science and Technology Center for Disaster Reduction (NSTCDR) (2011). Based on ANOVAs analysis, hotspring hotels were more sensitive to the rise of summer temperature and the increase of extreme weather events (e.g. heatwave, sand storm, and floods) in the short term than coast hotels, and they were more aware of higher winter temperature and more frequent flood events than urban hotels. Mountain hotels had higher awareness of increasing extreme rainfalls and winter temperatures than urban hotels. It corresponded to previous records that hotspring and mountain areas were specially damaged by extreme weather events, and hotspring business were decreasing due to the rise of temperature in recent years (Table 3.1). These results are also significant in that they reinforce of the role of place in influencing hotel understanding not only of the threat of climate climate change overall but specific dimensions (see also Belle & Bramwell 2005). Such information may potentially be important for the development of appropriate communication strategies.

Table 5.8a: Perception of climate change impacts (seasonal temperature) on hotel's location in the next five years, analyzed by destination

ANOVAs (Next 5 yrs)		All Res-pondents	Mountain (1)	Multi-Nature (2)	Lake&River (3)	Hotspring (4)	Urban (5)	Coast (6)	F	P-value	Post Hoc (LSD)
Spring Temperature	N	236	27	6	13	31	144	15	.56	.73	
	M	3.00	3.11	3.00	3.00	3.16	2.99	2.60			
	SD	1.12	1.25	1.41	1.08	1.24	1.05	1.30			
Summer temperature	N	247	30	7	14	31	150	15	2.36	.04	2,3,4>6
	M	4.10	3.90	4.57	4.50	4.42	4.07	3.60			4>1
	SD	1.03	1.21	.79	.76	.72	1.00	1.40			
Autumn temperature	N	235	26	6	14	31	143	15	1.40	.23	
	M	3.47	3.38	3.67	3.93	3.71	3.41	3.20			
	SD	.98	1.06	1.21	.73	.86	.99	1.08			
Winter temperature	N	239	27	6	14	31	146	15	2.67	.02	1,4>5
	M	3.14	3.81	2.50	3.07	3.52	2.96	3.20			1>2
	SD	1.37	1.27	1.76	1.14	1.55	1.32	1.27			
Sea level	N	215	27	5	13	28	127	15	.96	.44	
	M	3.17	3.04	3.40	3.08	3.54	3.13	3.07			
	SD	1.02	1.06	1.14	1.04	.79	.96	1.62			

*p<0.05

Table 5.8b: Perception of climate change impacts (seasonal temperature) on hotel's location in the next twenty years, analyzed by destination

ANOVAs (Next 20 yrs)		All Respondents	Mountain (1)	Multi-Nature (2)	Lake&River (3)	Hotspring (4)	Urban (5)	Coast (6)	F	P-value	Post Hoc (LSD)
Spring Temperature	N	233	26	7	14	30	141	15	1.15	.34	
	M	3.38	3.65	3.29	3.14	3.73	3.30	3.27			
	SD	1.16	1.20	1.50	.95	1.20	1.14	1.16			
Summer temperature	N	244	29	7	14	31	148	15	1.29	.27	
	M	4.11	4.00	4.29	4.29	4.48	4.04	4.00			
	SD	.99	1.23	.95	.73	.63	1.00	1.13			
Autumn temperature	N	237	27	7	14	31	143	15	.95	.45	
	M	3.58	3.67	3.29	3.36	3.90	3.52	3.67			
	SD	1.05	1.14	1.25	1.08	.94	1.05	1.05			
Winter temperature	N	241	26	7	14	31	148	15	1.76	.12	
	M	3.29	3.85	3.71	3.14	3.52	3.12	3.53			
	SD	1.37	1.26	1.50	1.35	1.61	1.34	1.19			
Sea level	N	229	26	7	14	30	137	15	.50	.77	
	M	3.33	3.27	3.57	3.07	3.37	3.31	3.67			
	SD	1.13	1.00	1.13	1.21	1.25	1.12	1..18			

Note: Mean based on scale of 1='lower', 3="No changes", 5='Higher'

Table 5.9a: Perception of climate change impacts (frequency of event type) on hotel's location in the next five years, analyzed by destination

ANOVAs (Next 5 yrs)		All Respondents	Mountain (1)	Multi-Nature (2)	Lake&River (3)	Hotspring (4)	Urban (5)	Coast (6)	F	P-value	Post Hoc (LSD)
Drought	N	231	26	6	13	30	141	15	2.03	.08	
	M	3.23	3.50	2.33	3.31	3.60	3.18	2.73			
	SD	1.22	1.11	1.75	.95	1.33	1.21	1.10			
Heat wave	N	236	28	6	13	31	143	15	2.29	.05	1,4>6
	M	3.44	3.64	2.67	3.15	3.87	3.43	2.87			4>2
	SD	1.22	1.19	1.63	.90	1.15	1.20	1.41			
Extreme Rainfall	N	240	28	7	14	29	147	15	3.06	.01	1,2,3.4,5>6
	M	3.94	4.32	4.57	4.07	4.10	3.86	3.20			1>5
	SD	1.08	.72	.54	.83	1.01	1.10	1.47			
Strong Wind	N	231	27	6	12	30	141	15	.54	.75	
	M	3.33	3.37	2.83	3.58	3.47	3.30	3.33			
	SD	1.05	1.18	1.60	.90	.90	1.03	1.23			
Sand Storm	N	228	26	6	13	30	139	14	2.35	.04	1,4,5>2
	M	2.96	3.08	2.00	2.92	3.30	2.97	2.43			4>6
	SD	1.08	.94	1.10	.86	1.02	1.10	1.22			
Typhoon	N	243	30	7	14	31	146	15	1.53	.18	
	M	4.05	4.37	4.57	4.14	4.16	3.92	4.07			
	SD	1.01	.77	.54	1.17	.90	1.08	.80			
Floods	N	242	29	7	14	31	146	15	N/A	.01	4>5,6
	M	3.65	3.97	3.71	3.79	4.10	3.55	2.87			
	SD	1.14	1.12	1.60	.70	.83	1.15	1.30			
Snow	N	227	29	6	13	29	135	15	1.35	.24	
	M	2.50	2.79	1.67	2.46	2.69	2.45	2.33			
	SD	1.12	1.18	1.03	1.05	1.20	1.08	1.23			

*p<0.05

Table 5.9b: Perception of climate change impacts (frequency of event type) on hotel's location in the next twenty years, analyzed by destination

ANOVAs (Next 20 yrs)		All Respondents	Mountain (1)	Multi-Nature (2)	Lake&River (3)	Hotspring (4)	Urban (5)	Coast (6)	F	P-value	Post Hoc (LSD)
Drought	N	238	27	6	13	31	146	15	.31	.91	
	M	3.53	3.44	3.33	3.77	3.68	3.53	3.33			
	SD	1.25	1.28	1.51	.73	1.30	1.26	1.45			
Heat wave	N	237	27	6	13	31	145	15	.82	.54	
	M	3.61	3.63	3.00	3.38	3.90	3.61	3.47			
	SD	1.20	1.36	1.67	1.12	.94	1.17	1.51			
Extreme Rainfall	N	243	29	7	14	31	147	15	N/A	.02*	N/A
	M	4.06	4.31	4.71	4.36	4.26	3.97	3.47			
	SD	1.01	.85	.49	.63	.68	1.07	1.41			
Strong Wind	N	236	28	6	13	31	143	15	.90	.48	
	M	3.61	3.71	3.17	3.62	3.48	3.68	3.20			
	SD	1.07	1.05	1.72	.77	1.00	1.06	1.27			
Sand Storm	N	232	27	6	13	30	142	14	1.17	.33	
	M	3.20	3.07	2.50	2.85	3.33	3.29	2.86			
	SD	1.19	1.11	1.76	1.07	1.18	1,19	1.23			
Typhoon	N	244	30	6	14	31	148	15	1.33	.25	
	M	4.23	4.43	4.67	4.29	4.42	4.12	4.27			
	SD	.90	.73	.52	.61	.67	1.00	.80			
Floods	N	242	29	7	14	31	147	14	1.10	.36	
	M	3.93	4.10	4.14	3.79	4.23	3.88	3.57			
	SD	1.08	1.01	1.46	.89	.96	1.09	1.34			
Snow	N	225	25	6	13	30	138	13	1.08	.37	
	M	2.67	2.48	1.83	2.46	2.73	2.77	2.46			
	SD	1.20	.92	1.33	.97	1.29	1.22	1.33			

*p<0.05

Note: Mean based on scale of 1='Less frequent', 3="No changes", 5='More frequent'

Table 5.10a: Perception of climate change impacts (perceived threat) on hotel's location in the next five years, analyzed by destination

ANOVAs (Next 5 yrs)		All Respondents	Mountain (1)	Multi-Nature (2)	Lake&River (3)	Hotspring (4)	Urban (5)	Coast (6)	F	P-value	Post Hoc (LSD)
Beach Shoreline	N	230	27	6	14	31	138	14	1.33	.25	
	M	2.91	2.96	2.83	2.29	2.90	2.91	3.50			
	SD	1.26	1.16	1.72	1.20	1.27	1.25	1.27			
Water Availability	N	239	27	6	14	31	146	15	.85	.52	
	M	3.55	3.81	3.00	3.36	3.74	3.53	3.27			
	SD	1.25	1.33	1.67	1.45	1.15	1.23	1.16			
Electricity Availability	N	240	28	6	14	31	146	15	1.56	1.17	
	M	3.58	3.86	3.00	3.43	3.81	3.58	3.00			
	SD	1.20	1.24	1.67	1.22	1.08	1.19	1.13			
Coral Reef	N	230	28	6	14	29	138	15	.59	.71	
	M	2.96	2.93	3.33	2.64	2.93	2.94	3.40			
	SD	1.33	1.27	1.86	1.39	1.28	1.31	1.45			
Biodiversity	N	226	27	6	14	28	136	15	.34	.89	
	M	3.20	3.22	3.33	3.07	3.29	3.15	3.53			
	SD	1.23	1.22	1.86	1.27	1.27	1.20	1.30			
Health & Safety	N	220	27	5	14	27	132	15	1.61	.16	
	M	3.41	3.63	2.80	3.29	3.52	3.45	2.80			
	SD	1.09	1.01	1.79	1.14	.98	1.07	1.27			

*p<0.05

Table 5.10b: Perception of climate change impacts (perceived threat) on hotel's location in the next twenty years, analyzed by destination

ANOVAs (Next 20 yrs)		All Respondents	Mountain (1)	Multi-Nature (2)	Lake&River (3)	Hotspring (4)	Urban (5)	Coast (6)	F	P-value	Post Hoc (LSD)
Beach Shoreline	N	235	27	6	14	30	143	15	1.11	.36	
	M	3.32	3.00	4.00	3.07	3.37	3.32	3.73			
	SD	1.28	1.17	1.58	1.27	1.33	1.28	1.22			
Water Availability	N	239	27	6	14	30	147	15	.95	.45	
	M	3.84	3.85	3.67	4.00	4.17	3.80	3.47			
	SD	1.14	1.35	1.51	.78	.99	1.11	1.36			
Electricity Availability	N	239	27	6	14	30	147	15	1.07	.38	
	M	3.84	3.89	3.67	3.79	4.23	3.80	3.53			
	SD	1.11	1.25	1.51	.89	.94	1.12	1.06			
Coral Reef	N	230	27	6	13	28	141	15	.59	.71	
	M	3.23	3.00	3.83	3.23	3.32	3.20	3.47			
	SD	1.27	1.27	1.60	1.30	1.34	1.23	1.46			
Biodiversity	N	234	27	6	14	29	143	15	.77	.58	
	M	3.43	3.41	3.83	3.86	3.59	3.34	3.47			
	SD	1.20	1.19	1.60	1.17	1.15	1.18	1.46			
Health & Safety	N	225	26	6	14	29	136	14	.45	.82	
	M	3.70	3.77	3.83	4.00	3.69	3.68	3.43			
	SD	1.07	1.14	1.60	.88	1.07	1.05	1.22			

*p<0.05 Note: Mean based on scale of 1='Less threatened', 3="No changes", 5='More threatened'

Taiwanese hotel respondents were also asked to evaluate climate change impacts on the national tourism industry, the hotel's region and the hotel's business in the past and next five years according to a five-point Likert scale of 1 ("very negative") to 5 ("very positive"). They generally perceived the slightly negative impacts of climate change on tourism industry (Table 5.11), but thought this issue is more serious at the national level than the regional or corporate aspect. Overall, participants were slightly more negative about development in the next 5 years, than in the previous 5 years (see also Saarinen et al. 2012).

Table 5.11: Perception of climate change impacts on national tourism industry, hotel's region and hotel's business in the past and next five years

		Climate Change Impacts in the past 5 years	Climate Change Impacts in the next 5 years
National Tourism Industry	N	238	228
	M	2.51	2.42
	SD	.88	1.04
Hotel's Region	N	237	229
	M	2.58	2.51
	SD	.82	.96
Hotel's Business	N	236	229
	M	2.56	2.49
	SD	.87	1.00

Note: Mean: based on scale of 1='Very negative', 3="No effect", 5='Very positive'.

Attitude

Respondents generally had positive attitudes towards hotel's responsibility, governmental policy and green marketing in response to environment and climate change based on a five-point Likert scale of 1 ("strongly disagree") to 5 ("strongly agree") (Table 5.3). The results indicate that participants recognize the impact of their hotel on the environment (mean=3.37) (see also Hobson & Essex 2001; Bohdanowicz 2005, 2006a; 2006b; Wan 2006; Kasim 2009; Prayag et al. 2010; Ustad 2010), substantially more than with respect to climate change (mean=2.72). They slightly agreed that it was hotel's responsibility to respond to environment (mean=3.85) and climate change (mean=3.62), including taking voluntary climate change measures (mean=3.80). Hotel respondents also had a moderate level of agreement with the notion that government had a responsibility to regulate the tourism industry in response to climate change (mean=3.87) (see also Belle & Bramwell 2005; Hall 2006; Dodds et al. 2008), which corresponded to the level of support for current environmental policy on climate change (mean=3.87). Although support for prospective environmental initiatives, such as carbon tax (mean=3.36), carbon trading (mean=3.45) and carbon offset schemes (mean=3.54) was relatively neutral. Hotel respondents were also slightly disagreed with the statements "the so-called green hotel is only playing a marketing ploy" (mean= 2.85); "It is impossible to be both profitable and environmentally friendly" (mean=2.54); and "customers are not interested in whether a hotel is environmentally friendly or not' (mean=2.66). The results reflect the findings of some international studies on green hotels (Lansing & De Vries 2007; Pizam 2008; Rahman et al. 2012).

Table 5.12: Attitudes towards environment, climate change, environmental regulations, and green marketing

	N	Mean	Std Dev
My hotel			
- has an impact on the environment.	250	3.37	1.00
- contributes to climate change.	246	2.72	.99
- has a responsibility to respond to the environmental impacts	250	3.85	.74
- has a responsibility to respond to climate change impacts.	250	3.62	.81
- believes government should regulate the tourism industry regarding climate change.	248	3.87	.76
- supports current government environmental policy over climate change concern.	250	3.87	.63
- supports a carbon tax	249	3.36	.97
- supports a carbon offset scheme	250	3.54	.88
- supports a carbon trading scheme	249	3.45	.89
- will implement strategies to respond to climate change even it is not required by government regulation.	249	3.80	.66
- believes the hotel which claims to be 'green' is only using it as a marketing ploy.	248	2.85	1.00
- believes it is not possible to be both profitable and environmentally friendly	249	2.54	.90
- believes customers are not interested in whether a hotel is environmentally friendly or not.	249	2.66	.97

Note: Mean: based on scale of 1='Strongly disagree', 3="Neither agree nor disagree", 5='Strongly agree'.

Influencing Factors

The survey asked hotel respondents to evaluate the importance of 23 factors identified in the international literature (see Chapter 2) on their hotel's environmental actions on a five-point Likert scale of 1 ("not very important") to 5 ("very important"). Most factors were considered as reasonably important (Mean>4) (Table 5.13), except climate change concern, employee loyalty (mean=3.97), and stakeholder pressure (mean=3.85) (see also Hall 2006; Kasim 2007a; Graci 2009; Chou et al. 2012; Kasim & Ismail 2012; Saarinen et al. 2012). The results corresponded with previous findings that hotels were less likely to adopt climate change and employee factors in their environmental decision (Chang 2006; Hall 2006; Saarinen & Tervo 2006; Saarinen et al. 2012; Scott et al. 2012). As to the influence of stakeholders, Chen (2012) noted that hotel investors in Taiwan usually do not pay attention to environmental issues. The environmental interest of Taiwanese tour operators is also likely low, since they are less pushed by green-active tourists, who are mainly from Central and Northern Europe which has a low share of the Taiwan inbound market (López-Gamero et al. 2011b).

Table 5.13: The importance of factors influencing hotel's adoption of environmental actions

Rank	Factor	N	Mean	Std Dev
1	Cost reduction	246	4.30	.63
2	Public relations and reputation	246	4.26	.61
	Owner or top manager's personal value & belief	246	4.26	.62
4	Staff availability and expertise	247	4.25	.61
5	Customer demand	246	4.22	.61
	Existing building structure	246	4.22	.63
	Government incentives	247	4.22	.74
8	Competitive advantages	245	4.20	.65
	Capital investment	246	4.20	.68
10	Existing facility	247	4.19	.62
11	CSRpolicy	246	4.14	.68
12	Time availability	247	4.13	.65
	Risk management	247	4.13	.67
14	Technology availability	247	4.12	.70
	Government policy and regulation	246	4.12	.64
16	Current information	247	4.10	.65
	Parental company's policy	244	4.10	.76
18	Industry leadership	246	4.05	.74
19	Supplier availability	247	4.04	.72
	Environmental concern	245	4.04	.66
21	Climate change concern	246	3.97	.71
	Employee loyalty	246	3.97	.76
23	Stakeholder pressure	246	3.85	.76

Note: Mean based on scale of 1='Not very important', 3="No effect", 5='Very important'

Overall, the most influential factors are "cost reduction" (mean=4.30), "Public relations and reputation", "owner or top manager's personal value and belief" (mean=4.26), "staff availability and expertise" (mean=4.25), "customer demand", "existing building structure", and "government incentives" (mean=4.24). The importance of cost savings in Taiwanese hoteliers' environmental actions, resonates strongly with findings in the international literature (Enz & Siguaw 1999; Leslie 2001; Céspedes-Lorente et al. 2003; Sloan et al. 2004; Bohdanowicz et al. 2004; Bohdanowicz 2005, 2006b; Ayuso 2006; Wan 2006; Kasim 2007a; Graci 2009; Jarvis & Pulido Ortega 2010; Dodds & Holmes 2011). Local hotels are often uncertain about the cost benefits of environmental practices (Chen 2004; Chang 2006; Hung & Lai 2006). The factors "public relations and reputation", "owner or top manager's personal value & belief", and "government Incentives", have all been recognized as significant motivators for hotel business (e.g. Chen 2004; Ayuso 2006; Chang 2006; Park 2009; López-Gamero et al. 2010; Ustad et al. 2010; Yang 2010; Tortellam & Tirado 2011; Chen 2012; Nicholls & Kang 2012a; Saarinen et al. 2012), while "staff availability and expertise", "customer demand", and "existing building structure", were considered as barriers for hotels to go green (see also Wang 2005; Chang 2006; Hung & Lai 2006; Liao 2006; Park 2009;

Chen 2010; Ustad et al. 2010; Yang 2010). Indeed, a lack of workforce and staff support has been identified as a problem for Taiwanese hotels to conduct environmental measures in other research (Chang 2006; Chen 2010). A few studies have also indicated Taiwanese hotels' low confidence in green customer demand, as they acknowledge the importance of market feedback in their environmental practices (Wang 2005; Hung & Lai 2006; Liao 2006; Chen 2010; Yang 2010). "Government policy and regulation", previously found as a key motivator for hotels' environmentally friendly behaviour in other studies (e.g. Tzschentke et al. 2004; Chan & Wong 2006; Wan 2006; Kasim 2007a; Bonilla-Priego et al. 2011; Shah 2011; Chou et al. 2012; Kučerová 2012), is only ranked as a moderate factor in this research. This may be because the Taiwanese government often promotes voluntary interventions for hospitality rather than command-and-control legislation (see also López-Gamero et al. 2011b).

These 23 factors were further grouped by the exploratory factor analysis with the steps of the principal component analysis and orthogonal VARIMAX rotation. Table 5.14 reported the results of the Kaiser–Meyer–Olkin (KMO) and Bartlett's tests. The KMO measure of sampling adequacy was 0.934 (>0.70), indicating the variables were interrelated with high share of common factors. The use of factor analysis was considered appropriate, as the significance of correlation matrix was 0.00 with a Bartlett test of sphericity Chi-square value of 4043.68. Table 5.15 suggested the sufficient explanatory power of four common factors, including capacity, environment and government forces, incentives, and hotel policy and social responsibility. The value of communalities ranged from 0.50 to 0.78, and the cumulative variance explained was about 68% (eigen values>1). The reliability of the common factors was considered as acceptable since their Alpha coefficients generally surpassed 0.8, higher than the minimum standard of 0.5. Thus, this analysis proposed to review the influential factors on hotel's environmental actions by the dimensions of capacity, external enforcement, incentive, and corporate policy. Overall, the incentive and capacity aspects, covering the top ten influential factors, were relatively more important to the Taiwanese hotel respondents. However, Table 5.16 shows that environment and government forces had the highest correlations with hotel's implementation of climate change measures, followed by the factors of corporate policy and social responsibility, as well as incentive. Suprisingly, there was no such relation from the perspective of hotel capacity on the basis of the Pearson Correaltion Analysis. It may imply hotel's environmental consideration was rather practical, benefit-oriented and

complex, but the hotel's that did take action, usually put a high priority of keeping up with environmental and government initiatives, and looked for leadership of social responsibility.

Table 5.14: KMO and Bartlett's test of exploratory factor analysis

Test	Results
Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy	0.934
Bartlett's test of sphericity Approximate Chi-square	4043.68
Df	253
Significance	0.00

Table 5.15: The results of the exploratory factor analysis

Influential Factor	Factor 1	Factor 2	Factor 3	Factor 4	Communalities
Capacity					
(R10) Existing Facility	0.82	0.05	0.21	0.23	0.78
(R5) Existing Building Structure	0.80	0.80	0.23	0.25	0.77
(R8) Capital Investment	0.72	-0.08	0.11	0.47	0.76
(R12) Time Availability	0.71	0.31	0.29	0.17	0.72
(R4) Staff Availability and Expertise	0.67	0.39	0.33	0.09	0.72
(R14) Technology Availability	0.63	0.53	0.27	0.09	0.75
(R16) Current Information	0.61	0.51	0.16	0.16	0.69
(R5) Government Incentives	0.60	0.43	0.12	0.12	0.58
(R19) Supplier Availability	0.59	0.47	0.25	0.12	0.64
(R12) Risk Management	0.51	0.38	0.14	0.51	0.68
(R2) Owner or Top manager's Personal Value & Belief	0.47	0.23	0.39	0.38	0.57
Environment and Government forces					
(R20) Climate Change Concern	0.10	0.81	0.20	0.27	0.78
(R19) Environment Concern	0.20	0.78	0.25	0.24	0.76
(R14) Government Policy and Regulation	0.38	0.46	0.40	0.21	0.55
Incentives					
(R5) Customer Demand	0.26	0.16	0.76	0.10	0.67
(R1) Cost Reduction	0.31	0.06	0.72	0.04	0.62
(R8) Competitive Advantage	0.10	0.29	0.68	0.45	0.75
(R2) Public Relation and Reputation	0.32	0.35	0.58	0.32	0.66
(R20) Employee Royalty	0.06	0.25	0.48	0.45	0.50
Corporate Policy and Social Responsibility					
(R16) Parental Company's Policy	0.30	0.16	0.17	0.80	0.77
(R11) CSR Policy	0.27	0.46	0.30	0.61	0.75
(R18) Industry Leadership	0.34	0.52	0.04	0.57	0.71
(R23) Stakeholder Pressure	0.16	0.19	0.42	0.52	0.51
Square Loadings	5.53	3.71	3.32	3.11	15.67
Variance Explained %	24.03	16.14	14.44	13.54	68.15

Table 5.16: Cross analysis – implementation of climate change measures and primary influential factors

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Pearson Correlation Analysis		Capacity	Environment & Government Forces	Incentives	Corporate Policy & Social Responsibility
Implementation of Mitigation Measures	Correlation	0.05	0.32	0.17	0.22
	P-value	0.48	0.00	0.01	0.00
	N	235	235	235	235
Implementation of Adaptation Measures	Correlation	0.02	0.35	0.04	0.27
	P-value	0.74	0.00	0.51	0.00
	N	235	235	235	235
Implementation of Climate Change Measures	Correlation	0.04	0.34	0.13	0.25
	P-value	0.55	0.00	0.05*	0.00
	N	235	235	235	235

Action

This research also surveyed Taiwanese hotels' implementation of the specific recommendations of the UNWTO and UNEP (2008) with respect to accommodation sector measures in relation to climate change on a six-point Likert scale of 0 ("no implementation), 1 ("low level of implementation") to 5 ("high level of implementation"). The results indicate that the level of environmental performance was relatively poor (Mean=2.29) (Table 5.17). Overall, hotel respondents had slightly higher levels of implementation for mitigation measures (Mean=2.48) than adaptation measures (Mean=1.86). The top ten highly-implemented practices of Taiwanese hotels were all related to climate change mitigation, but only seven of those measures are conducted at a moderate level or above (mean>3), including waste recycling (mean=3.61), maintenance of electricity facilities (mean=3.43), power control system (mean=3.38), reduction and pre-treatment of hazardous wastes (mean=3.19), adoption of domestic and seasonal food (mean=3.18), less use of materials (mean=3.15), and placement of energy-efficient appliances (mean=3.12).

Table 5.17: Level of implementation of UNWTO and UNEP (2008) recommended measures for the accommodation sector to respond to climate change

Rank	Environmental Practice	All Respondents	Level of implementation (Mean)	Std Dev
1	Recycle waste and raise customer's awareness of waste	246	3.61	1.23
2	Frequently clean and maintain electricity facilities	243	3.43	1.21
3	Implement control system for heating/cooling/lighting facilities	240	3.38	1.34
4	Reduce and pre-treat chemical and hazardous wastes	240	3.19	1.48
5	Provide locally-produced and seasonal food	244	3.18	1.56
6	Reduce the use of materials	246	3.15	1.35
7	Use energy-efficient appliances	238	3.12	1.42
8	Measure and monitor resource usage and waste production	240	2.90	1.49
9	Reduce the use of air conditioning	240	2.84	1.34
10	Encourage guest/staff to use green vehicles/public transport	240	2.82	1.53
11	Adapt hotel's products, marketing and positioning	241	2.80	1.42
12	Implement water-saving and reuse measures	239	2.70	1.51
13	Purchase fair-trade/green-label products where possible	238	2.68	1.47
14	Adapt building design for energy saving	235	2.50	1.53
15	Initiate a hotel environmental policy	231	2.46	1.30
16	Set up environmental targets and benchmarking	230	2.44	1.24
16	Volunteer for local conservation or community projects	235	2.44	1.53
18	Implement environmental management system	228	2.37	1.41
19	Implement energy-saving education/incentive for staff/ guest	233	2.24	1.55
20	Develop an environmental code of ethics' for supplier chain	226	2.18	1.58
21	Use alternative fuels and renewable energy	235	2.17	1.52
22	Involve and comply with climate change policies and plans	223	2.01	1.55
23	Involve in the national tourism program regarding to energy efficiency and renewable energy use	220	1.85	1.54
24	Provide climate change and environment education for customers and staff	234	1.81	1.43
25	Locate new establishments in low-climate-risk areas	219	1.75	1.61
26	Achieve environmental certification	220	1.74	1.49
27	Involve in and provide carbon offset projects for guests	225	1.72	1.55
28	Develop links with international policies, mechanism, cooperation and standards regarding to climate change	219	1.69	1.543
29	Offer incentives for adaptation and mitigation measures	224	1.61	1.46
29	Integrate emission management with supply chain	214	1.61	1.46
31	Involve in the climate change network to promote activities proposed in UNWTO's Davos Report and Declaration	208	1.44	1.39
32	Designate a manager with specific responsibility for environment management system (EMS) and emission issues	224	1.35	1.36
Climate Change Mesures		247	2.29	1.06
Mitigation measures		247	2.48	1.05
Adaptation measures		1.86	247	1.19

Note: Mean is based on scale of 1='low level of implementation', 5='High level of implementation'

Similar to some of the international literature (e.g., Jarvis & Pulido Ortega 2010; Coles & Zschiegner 2011; Dodds & Holmes 2011), Taiwanese hotel respondents had the highest environmental implementation in waste recycling (mean=3.61), which is mostly related to the factors of public relations and reputation (P-value=0.00; Correlation=0.39), environmental concern (P-value=0.00; Correlation=0.37), and government policy and regulation (P-value=0.00; Correlation=0.32) based on Pearson Correlation Analysis (Chang 2006; Yang 2010) (Tables 5.18 and 5.19). Chen (2012) suggested that the actions of Taiwanese hotels with respect to waste recycling were primarily driven by the 2006 waste recycling regulation. However, low-cost environmental measures, such as electricity facility maintenance (Hung & Lai 2006; Yang 2010; Zografakis et al. 2011; Becken 2012), material-use reduction (Bohdanowicz 2006b; Yang 2010), and use of energy-efficient appliances (Bohdanowicz 2006b; Mensah 2006; Yang 2010; Aminian 2011; Nikolaou et al. 2012; Rahman et al. 2012), are more popular overall. For example, one of the trends is to consume less paper products in Taiwan hotels (Shen & Wan 2001; Chen 2004).

Some mitigation approaches appeared more popular in Taiwanese hotels than other international lodging facilities, including providing locally-produced and seasonal food (Erdogan & Baris 2007). From the perspective of Taiwanese hotels, this practice actually brings the benefits of product differentiation and cost reduction, which is relatively important for hotels with a high focus on food and beverage business (Chen 2012). Some international studies have indicated that energy control systems were less used by hotels because of cost concerns (Becken 2005, 2012; Coles & Zschiegner 2011; Nicholls & Kang 2012a), but there was a comparatively higher implementation in Taiwan hotel industry (Yang 2010), that moderately relates to the factor of “governmental policy and regulation” (P-value=0.00; Correlation=0.33). The practice “reduce and pre-treat chemical and hazardous wastes”, which was a less adopted environmental measure than found in other studies (Erdogan & Baris 2007; Kasim 2009; Peršić-Živadinov & Blažević 2010), has a close relation with the factors, such as “government policy and regulation”, “environmental concern” (P-value=0.00; Correlation=0.37), and current information (P-value=0.00; correlation=0.36) based on the Pearson Correlation Analysis (see also Trung & Kumar 2005).

Table 5.18: Cross analysis - top five implemented climate change measures and influential factors

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Pearson Correlation Analysis		Recycle waste and raise customer's awareness of waste (M=3.61)	Frequently clean and maintain electricity facilities (M=3.43)	Implement control system for heating/cooling/lighting facilities (M=3.38)	Reduce and pre-treat chemical and hazardous wastes (M=3.19)	Provide local / seasonal food (M=3.18)
Cost Reduction	Correlation	.23	.22	.26	.24	.06
	P-value	.00	.00	.00	.00	.36
	N	242	239	237	236	240
Customer demand	Correlation	.23	.22	.21	.22	.07
	P-value	.00	.00	.00	.00	.28
	N	242	239	237	236	240
Employee royalty	Correlation	.19	.19	.22	.20	.00
	P-value	.00	.00	.00	.00	.97
	N	242	239	237	236	240
PR & Reputation	Correlation	.39	.35	.34	.33	.22
	P-value	.00	.00	.00	.00	.00
	N	242	239	237	236	240
Competitive advantage	Correlation	.28	.28	.28	.27	.16
	P-value	.00	.00	.00	.00	.01
	N	241	238	236	236	240
Stakeholder pressure	Correlation	.20	.11	.18	.24	.06
	P-value	.00	.08	.01	.00	.38
	N	242	239	237	236	240
Gov. Policy & Regulation	Correlation	.32	.29	.33	.37	.24
	P-value	.00	.00	.00	.00	.00
	N	242	239	237	236	240
Environmental Concern	Correlation	.37	.29	.29	.37	.17
	P-value	.00	.00	.00	.00	.01
	N	241	238	236	235	239
Climate Change Concern	Correlation	.31	.29	.25	.32	.20
	P-value	.00	.00	.00	.00	.00
	N	242	239	237	236	240
Top Manager Value & Belief	Correlation	.27	.30	.21	.28	.24
	P-value	.00	.00	.00	.00	.00
	N	242	239	237	236	240
CSR Policy	Correlation	.29	.25	.26	.28	.15
	P-value	.00	.00	.00	.00	.02
	N	242	239	237	236	240
Parental company's policy	Correlation	.24	.25	.28	.33	.26
	P-value	.00	.00	.00	.00	.00
	N	240	237	235	234	238
Capital investment	Correlation	.18	.19	.23	.21	.18
	P-value	.00	.00	.00	.00	.01
	N	242	239	237	236	240
Existing building structure	Correlation	.21	.27	.20	.23	.14
	P-value	.00	.00	.00	.00	.03
	N	242	239	237	236	240
Existing facility	Correlation	.19	.25	.19	.19	.13
	P-value	.00	.00	.00	.00	.05
	N	243	240	238	237	241
Time availability	Correlation	.24	.27	.26	.25	.14
	P-value	.00	.00	.00	.00	.03
	N	243	240	238	237	241

Table 5.18: Cross analysis - top five implemented climate change measures and influential factors (continued)

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Pearson Correlation Analysis		Recycle waste and raise customer's awareness of waste (M=3.61)	Frequently clean and maintain electricity facilities (M=3.43)	Implement control system for heating/cooling/lighting facilities (M=3.38)	Reduce and pre-treat chemical and hazardous wastes (M=3.19)	Provide locally-produced and seasonal food (M=3.18)
Staff availability and expertise	Correlation	.27	.30	.28	.33	.20
	P-value	.00	.00	.00	.00	.00
	N	243	240	238	237	241
Supplier availability	Correlation	.22	.22	.21	.23	.11
	P-value	.00	.00	.00	.00	.10
	N	243	240	238	237	241
Technology availability	Correlation	.24	.29	.26	.28	.21
	P-value	.00	.00	.00	.00	.00
	N	243	240	238	237	241
Government incentive	Correlation	.19	.18	.22	.21	.17
	P-value	.00	.01	.00	.00	.01
	N	243	240	238	237	241
Current information	Correlation	.24	.24	.18	.36	.20
	P-value	.00	.00	.00	.00	.00
	N	243	240	238	237	241
Risk management	Correlation	.27	.25	.23	.31	.20
	P-value	.00	.00	.00	.00	.00
	N	243	240	238	237	241
Industry leadership	Correlation	.22	.24	.21	.31	.16
	P-value	.00	.00	.00	.00	.02
	N	242	239	237	236	240

Table 5.19: Cross analysis - bottom five implemented climate change measures and influential factors

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Pearson Correlation Analysis		Designate a manager with specific responsibility for EMS and emission issues (M=1.35)	Involve in the climate change network to promote activities proposed in UNWTO's Davos Report and Declaration (M=1.44)	Integrate emission management with supply chain (M=1.61)	Offer incentives for adaptation /mitigation measures (M=1.61)	Develop links with international policies, mechanism, cooperation and standards (M=1.69)
Cost Reduction	Correlation	-.03	.02	.05	.05	.09
	P-value	.65	.86	.52	.43	.18
	N	220	204	210	220	215
Customer demand	Correlation	.06	-.03	.11	.01	.05
	P-value	.42	.73	.11	.94	.47
	N	220	204	210	220	215
Employee royalty	Correlation	.12	.20	.22	.16	.16
	P-value	.07	.00	.00	.02	.02
	N	220	204	210	220	215
PR & Reputation	Correlation	.09	.17	.20	.16	.24
	P-value	.20	.01	.00	.02	.00
	N	220	204	210	220	215
Competitive advantage	Correlation	.08	.01	.14	.06	.16
	P-value	.22	.94	.04	.36	.02
	N	219	204	209	220	215
Stakeholder pressure	Correlation	.19	.16	.24	.16	.19
	P-value	.01	.03	.00	.02	.01
	N	220	204	210	220	215
Gov. Policy & Regulation	Correlation	.09	.16	.17	.17	.21
	P-value	.21	.02	.02	.01	.00
	N	220	204	210	220	215
Environmental Concern	Correlation	.20	.33	.28	.31	.35
	P-value	.00	.00	.00	.00	.00
	N	219	203	209	219	214
Climate Change Concern	Correlation	.18	.27	.29	.28	.29
	P-value	.01	.00	.00	.00	.00
	N	220	204	210	220	215
Top Manager Value & Belief	Correlation	.05	.16	.15	.16	.19
	P-value	.43	.02	.03	.02	.01
	N	220	204	210	220	215
CSR Policy	Correlation	.16	.23	.29	.25	.32
	P-value	.02	.00	.00	.00	.00
	N	220	204	210	220	215
Parental company's policy	Correlation	.18	.20	.30	.23	.33
	P-value	.01	.01	.00	.00	.00
	N	218	202	208	218	213
Capital investment	Correlation	-.07	.01	.11	.04	.12
	P-value	.33	.95	.12	.61	.08
	N	220	204	210	220	215
Existing building structure	Correlation	-.12	-.01	.03	-.02	.07
	P-value	.09	.87	.65	.74	.32
	N	220	204	210	220	215
Existing facility	Correlation	-.09	-.03	.06	-.01	.09
	P-value	.18	.69	.41	.93	.17
	N	221	205	211	221	216

Table 5.19: Cross analysis - bottom five implemented climate change measures and influential factors (continued)

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Pearson Correlation Analysis		Designate a manager with specific responsibility for EMS and emission issues (M=1.35)	Involve in the climate change network to promote activities proposed in UNWTO's Davos Report and Declaration (M=1.44)	Integrate emission management with supply chain (M=1.61)	Offer incentives for adaptation /mitigation measures (M=1.61)	Develop links with international policies, mechanism, cooperation and standards (M=1.69)
Time availability	Correlation	.04	.14	.19	.15	.25
	P-value	.58	.04	.01	.02	.00
	N	221	205	211	221	216
Staff availability and expertise	Correlation	.05	.11	.16	.14	.24
	P-value	.45	.11	.02	.03	.00
	N	221	205	211	221	216
Supplier availability	Correlation	.04	.17	.14	.13	.17
	P-value	.56	.01	.04	.06	.01
	N	221	205	211	221	216
Technology availability	Correlation	.06	.23	.17	.15	.23
	P-value	.39	.00	.01	.03	.00
	N	221	205	211	221	216
Government incentive	Correlation	.01	.10	.15	.04	.15
	P-value	.90	.16	.03	.59	.03
	N	221	205	211	221	216
Current information	Correlation	.05	.22	.23	.19	.28
	P-value	.46	.00	.00	.01	.00
	N	221	205	211	221	216
Risk management	Correlation	.08	.21	.26	.22	.28
	P-value	.25	.00	.00	.00	.00
	N	221	205	211	221	216
Industry leadership	Correlation	.08	.26	.24	.24	.32
	P-value	.23	.00	.00	.00	.00
	N	220	204	211	220	215

Respondents' implementation of fundamental environment measures, such as "initiating a hotel environmental policy" (mean=2.46), "setting up environmental targets and benchmarking" (mean=2.44), and "Implement environmental management system" (mean=2.37), were actually below the average standard (see also Chen 2004; Chang 2006; Yang 2010). The results implied a low environmental commitment in the Taiwan hotel industry as compared to the results of studies in other countries (Bohdanowicz 2005; Peršić-Živadinov & Blažević 2010; Zografakis et al 2011; Nicholls & Kang 2012a; Nikolaou et al. 2012). Hotel respondents' mitigation performance was especially weak (mean<2) with respect to the aspects of environmental certification (mean=1.74), carbon offset scheme (mean=1.72), supplier emission management (mean=1.61), and appointment of environmental managers (mean=1.35). Similar to the findings of some international studies (Bohdanowicz 2006b; Wan 2006; Yang 2010; Coles &

Zschiegner 2011), the employment of an environmental manager was the lowest priority for Taiwanese hotel respondents, but its level of implementation is weakly related to the importance of stakeholder pressure, environmental and climate change concerns, CSR and parental company's policy (Table 5.20).

Adaptation measures were performed poorly (mean=1.86). The implementation of internationally popular adaptation practices (Gössling 2010; Scott et al. 2012), including adjusting hotel's products, marketing and positioning (mean=2.80); adopting water-saving and reuse measures (mean=2.70); and involvement in local conservation or community projects (mean=2.44), was limited. Slow progress in product renovation (Becken 2005; Morrison & Pickering 2012), is possibly due to factors such as high capital investment, low customer demand, and manager's unawareness of climate change impact (Bicknell & Mcmanus 2006; Morrison & Pickering 2012). However, green promotion and climate-proofing products has been addressed by some Taiwanese hotel business (Chang 2010; Apple Daily News 2011b). A Pearson correlation analysis found that the marketing-active hotels placed higher importance on public relations and reputation (p-value=0.00; correlation=0.41), environment concern (p-value=0.00; correlation=0.39), and CSR policy (p-value=0.00; correlation=0.36).

The low use of water-saving practice is likely due to the cheap cost of water (Liao 2009; Gössling et al 2012). The average of water price in Taiwan is NT\$10.72/M^3 which is three to seventeen times lower than that of European countries (Taiwan Water Corporation 2013). It has also been argued that Taiwanese hotel's actions are restricted by customer's acceptability of low water flow (Yang 2010; Chang 2013). On the other hand, Hsueh (2004) observed that offshore hotels may attribute the responsibility for water supply and saving measures to government regulation, even if a region is at a risk of water shortages. These results also reinforce the fact that the Taiwan hotel industry consumes the highest amount of water per guest night in the global accommodation sector (Lin & Lee 2008; see also Table 2.3). Some research has found a growing popularity for basic water saving practices, such as "the reuse of towels and linens" and "water-saving faucet and toilet" in local lodging facilities (Chang 2006; Chen 2010; Shen 2010; Yang 2010), but more advanced approaches, such as rainwater collection and reuse, are rarely addressed in Taiwan.

Table 5.20: Results of canonical correlation analysis

Environmental Action	C.V1	CV2	Environmental Attitude	CV1	CV2
Initiate a hotel environmental policy	0.29	0.11	has an impact on the environment.	-0.24	0.10
Set up environmental targets and benchmarking	0.32	0.16	has a responsibility to respond to the environmental impacts	-0.18	0.38
Implement environmental management system	0.37	0.13	believes the hotel which claims to be 'green' is only using it as a marketing ploy.	-0.34	0.43
Designate a manager with specific responsibility for EMS and emission issues	0.32	0.37	believes It is not possible to be both profitable and environmentally friendly.	-0.26	0.17
Achieve environmental certification	0.07	0.22	believes Customers aren't interested in if a hotel is environmentally friendly or not	-0.18	0.09
Adapt building design for energy saving	0.39	0.04	contributes to climate change	-0.03	0.48
Reduce the use of air conditioning	0.42	0.03	has a responsibility to respond to C.C.	-0.13	0.28
Frequently clean and maintain electricity facilities	0.27	0.01	believes government should regulate the tourism industry regarding C.C.	0.46	-0.04
Implement control system for heating/cooling/lighting facilities	0.23	-0.10	supports current gov. environmental policy over C. C. concern	0.49	0.21
Use energy-efficient appliances	0.32	-0.08	supports a carbon tax	0.44	0.47
Use alternative & renewable energy	0.35	0.08	supports a carbon offset scheme	0.50	0.33
Encourage green vehicles/public transport	0.31	0.04	supports a carbon trading scheme	0.43	0.47
Provide locally-produced and seasonal food	0.33	0.26	will implement strategies to respond to C.C., even not required by gov.	0.59	0.50
Involve in and provide carbon offset projects	0.36	0.38			
Implement energy-saving education/incentive	0.34	0.12			
Integrate emission management with supply chain	0.30	0.56			
Implement water-saving and reuse measures	0.10	0.07			
Reduce the use of materials	0.36	-0.12			
Recycle waste and raise customer's awareness	0.30	-0.21			
Reduce/ pre-treat chemical and hazardous wastes	0.30	-0.02			
Measure/ monitor resource usage & waste production	0.37	0.05			
Purchase fair-trade/green-label products	0.40	0.13			
Develop an env. code of ethics' for supplier chain	0.43	0.35			
Volunteer for local conservation or community	0.36	0.29			
Adapt hotel's products, marketing and positioning	0.22	0.28			
Locate new establishments in low-climate-risk areas	0.00	0.37			
Offer incentives for adaptation & mitigation measures	0.17	0.43			
Provide C.C. and environment education	0.40	0.24			
Involve in C.C. network to promote activities proposed in UNWTO's Davos Report & Declaration	0.20	0.37			
Involve in the national tourism program regarding to energy efficiency and renewable energy use	0.41	0.22			
Involve and comply with C.C. policies and plans	0.47	0.14			
Develop links with international policies, mechanism, cooperation and standards regarding to climate change	0.41	0.28			
Extracted variance (%)	5.77	2.73		13.34	11.77
Redundancy index (%)	10.76	5.73		7.18	5.61

Note. C.V. stands for canonical variable. C.C. stands for climate change.

The lowest level of adaptation actions were with respect to involvement in the climate change network to promote activities proposed in UNWTO's Davos Report and Declaration (mean=1.44), offering incentives for adaptation and mitigation measures (mean=1.61), and developing links with international policies, mechanism, cooperation and standards regarding to climate change (mean=1.69). Indeed, the low participation of hotels in environmental projects is a global phenomenon (Leslie 2001; Wan 2006; Erdogan & Baris 2007). This research found that the more enthusiastic hotels with respect to environmental measures paid attention to factors including parental company's policy (p-value=0.00; correlation=0.33), CSR policy (p-value=0.00; correlation = 0.32), environment concern (p-value=0.00l correlation=0.35), and industry leadership (p-value=0.00; correlation=0.32) (Table 5.20). It has been suggested that hotel businesses rarely invest in incentive programmes (Bohdanowicz 2006b; Wan 2006), since it is rather unaffordable given their tight budgets (Radwan et al. 2012). Another explanation is that the design of hotel incentive systems are mostly aimed at cost saving. Although it indirectly contributes to mitigate environmental impacts by reducting resource usage, hotel respondents may not link the cause and effect of those incentive programs (Chen 2012). On the other hand, Chou (2012) suggested that penalties are a more common approach than reward in the Taiwan hotel industry according to the result of one energy conservation study.

This research also conducted canonical correlation analysis to examine if a hotel's level of implementation of environmental practices is related to their environmental perception or attitude. The first hypothesis was rejected due to a lack of statistical significance ($p>0.05$). It confirmed hotel respondents generally did not connect their environmental actions with the climate change impacts of the tourism industry and hotel businesses, although they were aware of this climatic phenomenon and had experienced frequent extreme weather events. Table 5.20 presents canonical correlations between hotel's environmental actions and attitudes, including 0.732 for canonical function 1 and 0.690 for canonical function 2. Both canonical functions are found to be statistically significant ($P<0.05$), which are also supported by the results of Wilk's Lambda Test. The eigenvalues showed the dimensions of hotel's environmental attitude account for nearly half of the underlying variance in the dimensions of hotel's environmental actions. Table 5.21 reports canonical results of the dependent and independent sets for both functions. According to the first canonical function, the canonical correlations between hotel's

environmental action and attitude ranged from low to moderate. A positive relation was found between hotel respondent's supporting attitudes towards climate change policy, and their implementation of corporate, national, and international involvement, green purchase and supply chain, as well as educational program. In the dimension of hotel's environmental implementation, "involve and comply with climate change policies and plans" had the highest impact on creating this relationship, while "will implement strategies to respond to climate change, even not required by government" was found most influential in the dimension of hotel's attitude. In the second canonical function, this relation is highly contributed by "implementation of integrating emission management with supply chain" in the action dimension, as hotel's attitudes towards climate change policy and their contributions to climate change are relatively important. Above results implied the importance of educating hotel respondent's recognition towards climate change policy and sense of responsibility, which has potential to facilitate lodging operators' adoption of lowly-prioritized environmental practices.

Table 5.21: Summary of canonical correlation analysis

Canonical Function	Canonical Correlation	Canonical R^2	F Statistics	Probability	Wilk's Lambda
1	0.732	0.536	1.295	0.000	0.016
2	0.690	0.477	1.159	0.035	0.035

Hotel respondents utilised regular meetings (74.9%), training programmes (51.8%), and billboards (45.8%) to communicate environmental performance with staff based on their answers of a multiple-choice question (Table 5.22). This implies that reporting of resource consumption to staff is part of hotel's operation routine. As to the response towards environmental initiatives organized by Taiwan government (Table 5.23), the "585 Incandescent Replacement Program" was rather popular in terms of awareness rate (70%) and level of implementation (nearly 50%). On the other hand, although participants were also highly aware of the Green Hotel Label (87%), only three hotels have actually been awarded this label. These results suggest that although Taiwanese accommodation operators are reasonably aware of programmes, the degree of action is far more limited (see also Chang 2006; Hung & Lai 2006; Yang 2010). Research on hotel's low uptake of the green hotel label in Taiwan, even given a reasonable degree of intention to adopt the programme (Table 5.23), has suggested that ability to put the appropriate hardware in place is limited, because most hotels do not have space and resource to

meet the requirements of being a green facility, except when initiating a new property or conducting a refurbishment. Even if hotels do have the ability to make such efforts, the incentive of becoming a green hotel is still limited, as there is little evidence to ensure growth in the number of green tourists staying at such properties. Therefore, Taiwanese hotels prefer to apply for status under the star rating system, which also grants accessibility to the Chinese market since 2013. The tripartite administrative relationship between the EPA, TTB and local government tourism bodies, is also a barrier for hotel operators (Yang 2010; Chen 2012; Chang 2013). This phenomenon even contributes to a distrust of hotels by government (Chiang 2008).

Table 5.22: Ways of communicating environmental performance with staff

Rank		Respondents (N=251)	%
1	Regular meeting	188	74.9%
2	Training program	130	51.8%
3	Billboard	115	45.8%
4	Intranet	41	16.3%
5	Company website	30	12.0%
6	Internal publication	25	10.0%
7	None	20	8.0%
8	Others	4	1.6%

Table 5.23: Hotel respondents' awareness and adoption of environmental initiatives and policies

Environmental Initiative & Policy	Awareness			Adoption			
	N	Aware	Unaware	N	Does not plan to adopt	Has adopted	Plans to adopt
Green Hotel Label	237	87.3%	12.7%	219	28.8%	0.9%	70.3%
Certification subsidies for tourism industry	234	70.9%	29.1%	205	28.8%	13.2%	58.0%
Sponsorship directions of providing preferential loans for enterprises purchasing of energy-saving equipment	236	62.3%	37.7%	206	32.5%	15.5%	51.9%
Tax credit to companies purchasing equipment or technology used for energy saving purposes or employing new and clean energy	237	61.6%	38.4%	203	28.6%	22.2%	49.3%
585 Incandescent Replacement Program	240	69.6%	30.4%	213	18.3%	51.6%	30.0%
Voluntary Energy Conservation Agreement	234	37.6%	62.4%	191	37.7%	15.2%	47.1%
Voluntary CO_2 Emission Registration	233	31.8%	68.2%	189	48.7%	7.9%	43.4%

Policies, such as Certification Subsidies for Tourism Industry, Sponsorship Directions of Providing

Preferential Loans for Enterprises Purchasing of Energy-Saving Equipment, Tax Credit to Companies Purchasing Equipment or Technology Used for Energy Saving Purposes or Employing New and Clean Energy, were acknowledged by over 60% of hotel respondents, but their adoption rates were about 20% of respondent hotels or below. Overall, hotel respondents were well informed of the above policies, but their level of cooperation was low. "Voluntary Energy Conservation Agreements" and "Voluntary CO_2 Emission Registration" were highly neglected by Taiwanese hotel respondents, with an awareness rate of between 30% to 40%, and an application rate of less than 20%. Lai (2012) explained the success of voluntary agreement programmes in developed countries is based on participants' motivation of achieving competitiveness, meeting legislative and regulative requirements, and environment protection. However, the Taiwan accommodation sector is mainly driven by short-term economic benefits and avoidance of regulatory punishment, which has therefore led to a low adoption rate of the Taiwanese government's voluntary policies (Lai 2012).

Summary and Conclusion

This chapter reported the responses from 64 tourist hotels and 187 standard hotels in Taiwan, representing about 10% of the total number of all hotels in the local hospitality industry. Generally, hotel respondents had high awareness of climate change phenomena and climate change trends, which corresponded to the popularity of information access, hotel's intensive experience of extreme weather events, and locational factors. However, they only perceived the slightly negative impacts of climate change towards the tourism industry overall. Participants might have positive attitudes towards hotel responsibility, governmental policy and green marketing in response to environment and climate change, but rarely cooperated with or participated in the national government's current voluntary-based policies. They considered that the provision of incentives and hotel's infrastructural and financial capacities to change behaviours were the most important factors in hotel environmental decision-making. Nevertheless, the roles of environmental and government influences appeared more critical in relation to hotel implementation of climate change measures. Although respondents made more efforts on mitigation measures than adaptation, their overall environmental performance was poor. According to canonical correlation analysis, hotel level of implementation of environmental practices was more

related to their environmental attitude, especially on climate change policy and sense of responsibility, rather than to their environmental perception.

The results suggest a serious knowledge gap in hotel respondents' understanding of climate change, which is consequently attributed to the overall poor environmental performance of the Taiwanese hotel industry. First, although hotel respondents seemed to know the existence of climate change, they did not correlate the cause and effect of such phenomena with their daily operation, even if they were exposed to high risk of weather extremes and extensive information. Apparently, the available information did not provide sufficient insights with respect to climate change to encourage hotels to voluntarily change their environmental behaviours. Second, Taiwanese hotel respondents appeared to focus more on climate change mitigation. However, their absence of adaptation action is likely due, at least in part, to the lack of an adequate knowledge base. Third, the potential contribution of the public sector to assisting hotel environmental and climate change practices might be underestimated by hotel respondents after several years' experience of unsuccessful environmental projects. Improvements in the outcomes of voluntary hotel strategies therefore appears to be based, at least in part, on improving the quality of information flows between government and hotel business actors. The next chapter takes the analysis further by examining the characteristics of hotels and their environmental behaviour, especially to see whether the some characteristics, e.g. such as size or linkages to other hotels in a chain, may provide pointers to environmental performance

Chapter 6

Research Analysis: Hotel Characteristics and Environmental Behaviour

This chapter explores the relations between hotel characteristics and environmental behaviour with respect to perception, attitude, action and influential factors. As identified in previous research (see Chapters 2 and 3), nine hotel segments, including location (defined by region and type of destination), chain system, standard (defined by hotel classification and star rating system), size, target market, years of trading, and experience of extreme weather events, were analyzed by T-test, one-way ANOVAs, Pearson correlation analysis, and post hoc multiple comparison test. The results generally corresponded to previous research with small-sized hotels being less proactive in implementing environmental practices. However, the impacts of size, standard, and extreme-weather-event experience, appreared more influential on Taiwanese hotels than otherwise discussed in the international literature.

Location

According to the one-way ANOVAs analysis, regional factors are a significant variable in distinguishing hotel respondents' perception of climate change impacts (Table 6.1a, Table6.1b). On the basis of post hoc multiple comparison test, Eastern Taiwan hotels were more sensitive to the negative consequences of climate change than southern and Central Taiwan hotels (refer to Table 4.2 for regional make-up). This is likely because the selling point of hotels in Eastern Taiwan is highly related to the quality of the natural surroundings (see also Rodríguez-Antón et al. 2012). With the exception of the offshore island hotels, regional hotels showed little difference in terms of environmental attitudes and actions (Table 6.2, Table 6.4). Offshore island hotels had lower implementation of hazardous waste management and material-use reduction than other regional hotels (Table 6.4). Also, based on Post Hoc Multiple Comparison Tests, Northern Taiwan hotels were more affected by government incentives, technology and supplier availability than Eastern Taiwan hotels, and Central Taiwan hotels considered employee loyalty as a more important factor than Southern and Eastern Taiwan hotels (Table 6.3).

Table 6.1a: Perception of climate change impacts on national tourism industry, hotel's region and hotel's business in the past five years, analyzed by location

ANOVAs	National Tourism Industry (N=229)			Hotel's Region (N=227)			Hotel's Business (N=226)		
	N	M	SD	N	M	SD	N	M	SD
North (1)	127	2.42	.77	125	2.48	.74	124	2.48	.78
Central (2)	36	2.81	1.01	36	2.83	.88	36	2.72	.97
East (3)	15	2.13	.64	15	2.07	.88	15	2.13	.74
South (4)	42	2.69	1.07	42	2.85	.88	42	2.86	1.00
Offshore (5)	9	2.78	.83	9	2.67	1.00	9	2.33	1.00
F	N/A			3.93			2.92		
P-Value	0.03			0.00			0.02		
Post Hoc Test (LSD)				1<2,4 3<2,4			1<4 3<2,4		

Note: Mean: based on scale of 1='Very negative', 3="No effect", 5='Very positive'.

Table 6.1b: Perception of climate change impacts on national tourism industry, hotel's region and hotel's business in the next five years, analyzed by location

ANOVAs	National Tourism Industry (N=220)			Hotel's Region (N=220)			Hotel's Business (N=220)		
	N	M	SD	N	M	SD	N	M	SD
North (1)	120	2.28	.94	120	2.39	.88	120	2.38	.92
Central (2)	36	2.75	1.25	36	2.83	1.11	36	2.69	1.14
East (3)	14	2.14	1.10	14	2.00	.96	14	2.21	1.05
South (4)	41	2.61	1.12	41	2.66	1.02	41	2.73	1.10
Offshore (5)	9	2.78	.97	9	2.78	.97	9	2.44	1.01
F	N/A			2.91			1.63		
P-Value	0.06			0.02			0.17		
Post Hoc Test				1<2 3<2,4			N/A		

Table 6.2: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by location

ANOVAs	My Hotel has a responsibility to respond to the environmental impacts (N=240)		
	N	M	SD
North (1)	132	3.89	.70
Central (2)	38	4.05	.52
East (3)	16	3.69	.70
South (4)	44	3.75	.78
Offshore (5)	10	3.00	1.33
F	4.68		
P-Value	0.00		
Post Hoc Test	1, 2, 3, 4>5		

Table 6.3: The importance of factors influencing hotel's adoption of environmental actions, analyzed by location

ANOVAs	Government Incentives (N=238)			Technology Availability (N=238)			Supplier Availability (N=238)			Employee Loyalty (N=237)		
	N	M	SD	N	M	SD	N	N	M	SD	M	SD
North (1)	130	4.34	.73	130	4.25	.66	130	4.16	.70	130	4.02	.73
Central (2)	38	4.16	.72	38	4.16	.68	38	4.00	.62	38	4.18	.69
East (3)	16	3.88	.50	16	3.69	.70	16	3.63	.89	16	3.75	.68
South (4)	44	4.07	.79	44	3.93	.70	44	3.91	.68	43	3.67	.81
Offshore (5)	10	4.40	.52	10	4.20	.42	10	4.20	.42	10	4.20	.63
F	2.49			3.78			3.00			3.32		
P-Value	0.04			0.01			0.02			0.01		
Post Hoc Test (LSD)	1>3,4			1,2>3 1>4			1>3,4 5>3			1,2,5>4 2>3		

Note: Mean based on scale of 1='Not very important', 3="No effect", 5='Very important'

Table 6.4: Level of Implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by location

ANOVAs	Reduce and pre-treat chemical and hazardous wastes (N=231)			Reduce the use of materials (N=237)		
	N	M	SD	N	M	SD
North (1)	125	3.28	1.45	129	3.22	1.27
Central (2)	38	3.29	1.37	38	3.13	1.28
East (3)	15	3.53	1.25	16	3.56	1.41
South (4)	43	2.98	1.58	44	3.14	1.41
Offshore (5)	10	1.70	1.42	10	1.90	1.52
F		3.25			2.73	
P-Value		0.01			0.03	
Post Hoc Test (LSD)		1,2,3,4>5			1,2,3,4>5	

Hotel Classification

In general, there was no perceptual difference between tourist hotels and standard hotels about climate change impacts on tourism business (criteria for classification was outlined in Table 4.1). Tourist hotels did have a more supportive attitude toward green marketing than standard hotels (Table 6.5). They especially considered the factors pf "CSR policy" (mean=4.29; sig.=0.05), government policy and regulation (mean=4.29; sig.=0.02), and parent cmpany's policy (mean=4.27; sig.=0.04) in their environmental actions, according to the T-test analysis (Table 6.6). Overall, tourist hotels were leading in the implementation of climate change measures (mean=2.60; T-test: Sig.=0.01), including 14 out of 22 mitigation practices, and 1 out of 10 adaptation approaches (Table 6.7, 6.8). The arguments are further illustrated below.

Table 6.5: Attitudes towards environment, climate change, environmental regulation, and green marketing, analyzed by hotel classification

Statement	T-test	N	Mean	SD	Sig.
My hotel…					
believes the hotel which claims to be 'green' is only using it as a marketing ploy.	Tourist Hotel	64	2.52	.89	
	Standard Hotel	184	2.96	1.01	
	All Respondents	248	2.85	1.00	.00
believes It is not possible to be both profitable and environmentally friendly.	Tourist Hotel	64	2.25	.69	
	Standard Hotel	185	2.64	.95	
	All Respondents	249	2.54	.90	.00
believes customers are not interested in whether a hotel is environmentally friendly or not.	Tourist Hotel	64	2.39	.94	
	Standard Hotel	185	2.75	.97	
	All Respondents	249	2.66	.97	.01

Note: Mean: based on scale of 1='Strongly disagree', 3="Neither agree nor disagree", 5='Strongly agree'.

Table 6.6: The importance of factors influencing hotel adoption of environmental actions, analyzed by hotel classification

Factors	T-test	N	Mean	SD	Sig.
CSR Policy	Tourist Hotel	63	4.29	.55	
	Standard Hotel	183	4.09	.72	
	All Respondents	246	4.14	.68	.05*
Government Policy and Regulation	Tourist Hotel	63	4.29	.55	
	Standard Hotel	183	4.06	.66	
	All Respondents	246	4.12	.64	.02
Parental Company's Policy	Tourist Hotel	63	4.27	.60	
	Standard Hotel	181	4.04	.80	
	All Respondents	244	4.10	.76	.04

Note: Mean: based on scale of 1='Not very important', 3="No effect", 5='Very important'

Table 6.7: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel classification

		N	Mean	SD	Sig.
Recycle waste and raise customer's awareness of waste	Tourist Hotel				
	Standard Hotel	183	3.51	1.32	
	All Respondents	246	3.61	1.23	.03
Frequently clean and maintain electricity facilities	Tourist Hotel	61	3.84	.95	
	Standard Hotel	182	3.30	1.26	
	All Respondents	243	3.43	1.21	.00
Implement control system for heating/cooling/lighting facilities	Tourist Hotel	61	4.07	.87	
	Standard Hotel	179	3.15	1.39	
	All Respondents	240	3.38	1.34	.00
Reduce and pre-treat chemical and hazardous wastes	Tourist Hotel	60	3.83	.91	
	Standard Hotel	180	2.97	1.57	
	All Respondents	240	3.19	1.48	.00
Provide locally-produced and seasonal food	Tourist Hotel	62	3.84	1.16	
	Standard Hotel	182	2.96	1.61	
	All Respondents	244	3.18	1.56	.00
Reduce the use of materials	Tourist Hotel	62	3.53	1.17	
	Standard Hotel	184	3.03	1.38	
	All Respondents	246	3.15	1.35	.01
Use energy-efficient appliances	Tourist Hotel	60	3.65	1.19	
	Standard Hotel	178	2.94	1.45	
	All Respondents	238	3.12	1.42	.00
Measure and monitor resource usage and waste production	Tourist Hotel	61	3.69	1.09	
	Standard Hotel	179	2.64	1.51	
	All Respondents	240	2.90	1.49	.00
Reduce the use of air conditioning	Tourist Hotel	62	2.90	1.28	
	Standard Hotel	178	2.81	1.36	
	All Respondents	240	2.84	1.34	.66
Encourage guest/staff to use green vehicles/public transport	Tourist Hotel	60	3.27	1.38	
	Standard Hotel	180	2.67	1.55	
	All Respondents	240	2.82	1.53	.01
Purchase fair-trade/green-label products where possible	Tourist Hotel	61	3.20	1.40	
	Standard Hotel	177	2.50	1.46	
	All Respondents	238	2.68	1.47	.00
Adapt building design for energy saving	Tourist Hotel	61	2.79	1.49	
	Standard Hotel	174	2.40	1.54	
	All Respondents	235	2.50	1.53	.09
Initiate a hotel environmental policy	Tourist Hotel	60	2.85	1.27	
	Standard Hotel	171	2.33	1.28	
	All Respondents	231	2.46	1.30	.01
Set up environmental targets and benchmarking	Tourist Hotel	61	2.74	1.32	
	Standard Hotel	169	2.34	1.32	
	All Respondents	230	2.44	1.33	.04
Implement environmental management system	Tourist Hotel	61	2.64	1.43	
	Standard Hotel	167	2.28	1.40	
	All Respondents	228	2.37	1.41	.09

Table 6.7 Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel classification (continued)

		N	Mean	SD	Sig.
Implement energy-saving education/incentive for staff/ guest	Tourist Hotel	60	2.50	1.47	
	Standard Hotel	173	2.15	1.57	
	All Respondents	233	2.24	1.55	.13
Develop an environmental code of ethics' for supplier chain	Tourist Hotel	58	2.66	1.67	
	Standard Hotel	168	2.02	1.52	
	All Respondents	226	2.18	1.58	.01
Use alternative fuels and renewable energy	Tourist Hotel	60	2.57	1.36	
	Standard Hotel	175	2.04	1.55	
	All Respondents	235	2.17	1.52	.02
Achieve environmental certification	Tourist Hotel	59	1.93	1.55	
	Standard Hotel	161	1.66	1.47	
	All Respondents	220	1.74	1.49	.24
Involve in and provide carbon offset projects for guests	Tourist Hotel	58	1.69	1.42	
	Standard Hotel	167	1.72	1.60	
	All Respondents	225	1.72	1.55	.88
Integrate emission management with supply chain	Tourist Hotel	57	1.82	1.47	
	Standard Hotel	157	1.53	1.45	
	All Respondents	214	1.61	1.46	.19
Designate a manager with specific responsibility for environment management system (EMS) and emission issues	Tourist Hotel	59	1.61	1.50	
	Standard Hotel	165	1.26	1.30	
	All Respondents	224	1.35	1.36	.09

Table 6.8: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by hotel classification

		N	Mean	SD	Sig.
Adapt hotel's products, marketing and positioning	Tourist Hotel	61	2.97	1.35	
	Standard Hotel	180	2.74	1.44	
	All Respondents	241	2.80	1.42	.28
Implement water-saving and reuse measures	Tourist Hotel	60	3.37	1.19	
	Standard Hotel	179	2.47	1.54	
	All Respondents	239	2.70	1.51	.00
Volunteer for local conservation or community projects	Tourist Hotel	61	2.72	1.53	
	Standard Hotel	174	2.34	1.53	
	All Respondents	235	2.44	1.53	.10
Involve and comply with climate change policies and plans	Tourist Hotel	59	2.27	1.50	
	Standard Hotel	164	1.92	1.56	
	All Respondents	223	2.01	1.55	.14
Involved in the national tourism program regarding to energy efficiency and renewable energy use	Tourist Hotel	58	1.98	1.50	
	Standard Hotel	162	1.80	1.56	
	All Respondents	220	1.85	1.54	.45
Provide climate change and environment education for customers and staff	Tourist Hotel	61	2.11	1.45	
	Standard Hotel	173	1.71	1.41	
	All Respondents	234	1.81	1.43	.05
Locate new establishments in low-climate-risk areas	Tourist Hotel	53	1.42	1.54	
	Standard Hotel	166	1.86	1.63	
	All Respondents	219	1.75	1.61	.08
Develop links with international policies, mechanism, cooperation and standards regarding to climate change	Tourist Hotel	56	1.71	1.55	
	Standard Hotel	163	1.68	1.55	
	All Respondents	219	1.69	1.54	.89
Offer incentives for adaptation and mitigation measures	Tourist Hotel	59	1.69	1.45	
	Standard Hotel	165	1.58	1.47	
	All Respondents	224	1.61	1.46	.59
Involved in the climate change network to promote activities proposed in UNWTO's Davos Report and Declaration	Tourist Hotel	53	1.42	1.35	
	Standard Hotel	155	1.45	1.41	
	All Respondents	208	1.44	1.39	.89
Mitigation measures	Tourist Hotel	63	2.86	.92	
	Standard Hotel	184	2.35	1.06	
	All Respondents	247	2.48	1.05	.00
Adaptation measures	Tourist Hotel	63	2.02	1.05	
	Standard Hotel	184	1.80	1.24	
	All Respondents	247	1.86	1.19	.21
Climate Change measures	Tourist Hotel	63	2.60	.93	
	Standard Hotel	184	2.18	1.08	
	All Respondents	247	2.29	1.06	.01

Star Rating

In this study, the factor of star rating is only effective in differentiating part of hotel respondents' environmental attitudes and actions. The criteria for star rating was outlined in Table 4.3. High standard hotels (four to five stars) had less recognition of their contribution to climate change than low standard hotels (one to three stars) (Table 6.9; T-test: sig.=0.02), but the attitude of one to three star hotels was actually closer to neutral (mean=3.06). The high-star-rating hotels did have higher implementation of waste recycling and pre-treatment (see also Erdogan & Baris 2007), energy facility maintenance and use control, resource use management, local food purchase, material use reduction, as well as water saving (Nicholls & Kang 2012a), than low-star-rating hotels, based on T-test analysis (Table 6.10). However, their general performance of climate change measures was not distinguished, which is opposed to previous findings (Chang 2006; Dief & Font 2012).

Table 6.9: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by star rating

Statement	T-test	N	Mean	SD	Sig.
My hotel…					
contributes to climate change	1-3 Star Hotel	16	3.06	.93	
	4-5 Star Hotel	31	2.35	.95	
	All Respondents	47	2.60	.99	.02

Table 6.10: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by star rating

		N	Mean	SD	Sig. T-test
Recycle waste and raise customer's awareness of waste	1-3 Star Hotel	16	3.31	1.25	
	4-5 Star Hotel	32	4.06	.76	
	Total	48	3.81	1.00	.01
Frequently clean and maintain electricity facilities	1-3 Star Hotel	16	3.31	1.14	
	4-5 Star Hotel	30	3.93	.94	
	Total	46	3.72	1.05	.05
Implement control system for heating/cooling/lighting facilities	1-3 Star Hotel	16	3.31	.95	
	4-5 Star Hotel	31	4.06	.93	
	Total	47	3.81	.99	.01
Reduce and pre-treat chemical and hazardous wastes	1-3 Star Hotel	16	2.63	1.50	
	4-5 Star Hotel	30	4.00	.87	
	Total	46	3.52	1.30	.00
Provide locally-produced and seasonal food	1-3 Star Hotel	16	3.06	1.57	
	4-5 Star Hotel	31	4.00	1.03	
	Total	47	3.68	1.30	.02
Reduce the use of materials	1-3 Star Hotel	16	2.75	1.44	
	4-5 Star Hotel	31	3.58	1.18	
	Total	47	3.30	1.32	.04
Measure and monitor resource usage and waste production	1-3 Star Hotel	16	2.81	1.47	
	4-5 Star Hotel	31	3.74	.93	
	Total	47	3.43	1.21	.01
Implement water-saving and reuse measures	1-3 Star Hotel	14	2.43	1.51	
	4-5 Star Hotel	30	3.47	1.07	
	Total	44	3.14	1.31	.01

Management System

Chain affiliated hotels responded differently to the aspects of environmental attitude, motivation, and action than independent hotels. It is observed that chain hotels have a stronger belief in government's responsibility to regulate tourism business with respect to climate change (sig.=0.04). On the basis of T-test analysis they also appear more motivated to support carbon offset schemes (sig.=0.05), and the nature of green hotels (sig.=0.00) (Table 6.11). Strategic factors (Table 6.12), such as competitive advantage (sig.=0.04) (Kirk 1998; Tzschentke et al. 2004; Manaktola & Jauhari 2007; Graci & Dodds 2008; Sloan et al. 2009; López-Gamero et al. 2010; Nicholls & Kang 2012a), CSR policy (sig.=0.05), and parental company's policy (sig.=0.00) (Álvarez Gil et al. 2001; Chan & Wong 2006) were relatively more important to chain-affiliated hotels. Accordingly, they had higher levels of implementation in 8 of 32 climate change measures, mainly regarding to green purchase, energy, waste, water and resource management (Table 6.13) (see also Peršić-Živadinov & Blažević 2010; Nicholls & Kang 2012a; Rahman et al. 2012). Previous

literature has also suggested that the environmental performance of chain hotels is also related to their knowledge levels being above that of independent hotels (Shah 2011). Nevertheless, their overall levels of environmental implementation was not evidently higher than that of independent hotels.

Table 6.11: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by management system

Statement	T-test	N	Mean	Std Dev	Sig.
My hotel…					
believes that government should regulate the tourism industry regarding climate change.	Independent Hotel	167	3.80	.81	
	Chain Hotel	71	4.03	.63	
	Total	238	3.87	.77	.04
supports a carbon offset scheme	Independent Hotel	168	3.46	.90	
	Chain Hotel	72	3.71	.80	
	Total	240	3.54	.88	.05
believes the hotel which claims to be 'green' is only using it as a marketing ploy.	Independent Hotel	167	3.01	1.02	
	Chain Hotel	72	2.44	.82	
	Total	239	2.84	.99	.00

Table 6.12: The importance of factors influencing hotel's adoption of environmental actions, analyzed by management system

Factors		N	Mean	SD	Sig.
Competitive Advantages	Independent Hotel	165	4.16	.64	
	Chain Hotel	71	4.34	.56	
	All Respondents	236	4.21	.62	.04
CSR Policy	Independent Hotel	165	4.09	.67	
	Chain Hotel	72	4.28	.63	
	All Respondents	237	4.15	.66	.05
Parental Company's Policy	Independent Hotel	163	4.01	.78	
	Chain Hotel	72	4.35	.59	
	All Respondents	235	4.11	.74	.00

Note: Mean: based on scale of 1='Not very important', 3="No effect", 5='Very important'

Table 6.13: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by management system

T-test		N	Mean	Std Dev	Sig.
Frequently clean and maintain electricity facilities	Independent Hotel	165	3.36	1.22	
	Chain Hotel	69	3.70	1.06	
	All Respondents	234	3.46	1.18	.05*
Implement control system for heating/cooling/lighting facilities	Independent Hotel	162	3.27	1.32	
	Chain Hotel	69	3.72	1.21	
	All Respondents	231	3.40	1.31	.01
Reduce and pre-treat chemical and hazardous wastes	Independent Hotel	162	3.04	1.55	
	Chain Hotel	69	3.55	1.17	
	All Respondents	231	3.19	1.47	.02
Provide locally-produced and seasonal food	Independent Hotel	165	2.99	1.60	
	Chain Hotel	70	3.74	1.26	
	All Respondents	235	3.22	1.54	.00
Reduce the use of materials	Independent Hotel	166	3.05	1.39	
	Chain Hotel	71	3.48	1.12	
	All Respondents	237	3.18	1.33	.02
Measure and monitor resource usage and waste production	Independent Hotel	162	2.75	1.52	
	Chain Hotel	70	3.30	1.32	
	All Respondents	232	2.92	1.48	.01
Encourage guest/staff to use green vehicles/public transport	Independent Hotel	162	2.69	1.53	
	Chain Hotel	69	3.16	1.41	
	All Respondents	231	2.83	1.51	.03
Purchase fair-trade/green-label products where possible	Independent Hotel	163	2.58	1.47	
	Chain Hotel	66	3.03	1.40	
	All Respondents	229	2.71	1.46	.03
Implement water-saving and reuse measures	Independent Hotel	160	2.54	1.53	
	Chain Hotel	70	3.11	1.36	
	All Respondents	230	2.71	1.50	.01

Size

This research further examined the impact of the factor of size, including number of employees, rooms, and beds, on hotel environmental behaviour in response to climate change. According to Pearson correlation analysis, the number of beds appeared as the more obvious variable to differentiate respondent's perception of climate change impacts, especially with respect to the national tourism industry and hotel's region scales in the previous five years (Table 6.14), but the correlations were weak. The T-test Analysis showed large hotels with more than 250 beds perceived more negative impacts of climate change than small and medium hotels (Table 6.15). This observation corresponded to past studies that small hotels had low awareness of climate change phenomenon (Bicknell & Mcmanus 2006; Jarvis & Pulido Ortega 2010).

Table 6.14: Perception of climate change impacts in the past and next five years, analyzed by hotel's size, target market, years of trading and experience of multiple extreme weather events

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

		No of Staff		No of rooms		No of Beds		% of International Guest		Years of Trading		Exp. of Multiple EWEs	
		-5 yrs	+5 yrs	-5 yrs	+5 yrs	-5 yrs	+5 yrs	-5 yrs	+5 yrs	-5 yrs	+5 yrs	-5 yrs	+5 yrs
National tourism	Correlation	-.08	-.04	-.12	-.06	-.17	-.05	-.09	-.11	.05	.04	-.23	-.13
	P-value	.20	.53	.07	.40	.02	.47	.21	.12	.48	.55	0.0	.05
	N	238	228	238	228	212	203	222	215	232	222	238	228
Hotel's region	Correlation	-.08	-.10	-.10	-.09	-.18	-.12	-.01	-.00	-.03	.03	-.30	-.23
	P-value	.20	.12	.14	.17	.01	.09	.84	.99	.64	.69	0.0	.00
	N	237	229	237	229	211	204	221	216	230	222	237	229
Hotel's business	Correlation	-.01	-.05	-.04	-.03	-.11	-.05	.04	-.01	-.03	-.00	-.28	-.20
	P-value	.88	.42	.52	.61	.12	.50	.55	.87	.62	.99	0.0	.00
	N	236	229	236	229	210	204	220	216	229	222	236	229

Note: Mean: based on scale of 1='Very negative', 3="No effect", 5='Very positive'.

Table 6.15: Perception of climate change impacts on national tourism industry, hotel's region and hotel's business, analyzed by number of beds

		Impacts in the past 5 years				Impacts in the next five years			
		N	M	SD	Sig.	N	M	SD	Sig.
National Tourism Industry	SM Hotel (<250 beds)	137	2.56	.87		130	2.44	1.00	
	Large Hotel (≥ 250 beds)	75	2.28	.73		73	2.30	1.01	
	All Respondents	212	2.46	.83	0.02	203	2.39	1.01	0.35
Hotel's Region	SM Hotel (<250 beds)	136	2.65	.84		131	2.54	.93	
	Large Hotel (≥ 250 beds)	75	2.33	.70		73	2.33	.99	
	All Respondents	211	2.54	.81	0.01	204	2.47	.95	0.13
Hotel's Business	SM Hotel (<250 beds)	136	2.57	.92		131	2.49	.98	
	Large Hotel (≥ 250 beds)	74	2.36	.69		73	2.37	.98	
	All Respondents	210	2.50	.85	0.09	204	2.45	.98	0.41

Note: Mean: based on scale of 1='Very negative', 3="No effect", 5='Very positive'.

In the group of environmental attitude questions, the size factor, either defined by number of employees, rooms, or beds, is found influential on hotel recognition of environmental responsibility and green marketing (Table 6.16). However, the correlations are relatively low. As a result more detailed examination of the impact of the size factor on a range of different environmental and climate change factors was conducted using the different definitions that had been applied in the hotel and environment literature (see Chapter 2; see also Table 4.9) with respect to assessments based on the number of employees (e.g., Tables 6.17); the number of rooms in a property (e.g., Tables 6.18, 6.19, 6.20, 6.21), and the number of beds (e.g., Tables 6.22, 6.23). The categories that are used throughout this chapter are detailed below:

- Number of rooms A: Small: ≤10 rooms; Medium: 11-50 rooms; Large: >50 rooms
- Number of rooms B: Small: <50 rooms; Medium: 50-149 rooms; Large: ≥150 rooms
- Number of rooms C: Small-Medium (SM) Hotel ≤50 rooms; Large Hotel >50 rooms
- Number of rooms D: SM Hotel <150 rooms), Large Hotel: ≥150 rooms
- Number of rooms E: SM Hotel <250 rooms), Large Hotel: ≥250 rooms

- Number of beds A: Small-Medium Hotel (SM) <100 beds; Large Hotel: ≥100 beds
- Numbers of beds B: Small-Medium Hotel (SM) <250 beds; Large Hotel ≥250 beds

- Number of employees A: Micro: <10 staff; Small: 10-49 staff; Medium: 50-249 staff; Large: ≥250 staff
- Number of employees B: Small-Medium (SM)<250 staff; Large ≥250 staff

Generally, small-sized hotels had less agreement about their environmental contribution and responsibility, government policy over climate change concern, and green marketing, than large-sized hotels (Leslie 2001; Vernon et al. 2003; Zografakis et al. 2011). Detailed analysis is provided below with further discussion provided at the end of the chapter.

Table 6.16: Attitudes towards environment, climate change, environmental regulation, and green marketing, analyzed by size, target market, years on trading, experience of multiple extreme weather events, and staff to room ratio

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Statement		No of staff	No of rooms	No of beds	% of International Guest	Years on Trading	Exp. of Multiple EWEs
My hotel has an impact on the environment.	Correlation	.02	-.00	.05	-.05	-.09	.05
	P-value	.79	.99	.43	.50	.18	.46
	N	250	250	223	234	243	250
contributes to climate change.	Correlation	-.09	-.10	-.03	-.03	-.03	.07
	P-value	.14	.14	.71	.66	.69	.26
	N	246	246	219	230	239	246
has a responsibility to respond to the environmental impacts	Correlation	.13	.15	.15	.03	-.13	.12
	P-value	.04	.02	.02	.62	.04	.06
	N	250	250	223	234	243	250
has a responsibility to respond to climate change impacts.	Correlation	.03	.04	.08	.03	-.13	.09
	P-value	.70	.54	.24	.66	.04	.18
	N	250	250	223	234	243	250
believes government should regulate the tourism industry regarding climate change.	Correlation	.11	.08	.07	-.01	-.17	.15
	P-value	.10	.19	.33	.88	.01	.02
	N	248	248	221	232	242	248
supports current government environmental policy over climate change concern.	Correlation	.12	.09	.09	.04	-.13	.21
	P-value	.07	.15	.18	.59	.05	.00
	N	250	250	223	234	243	250
supports a carbon tax	Correlation	.04	.02	.04	.01	-.06	.14
	P-value	.50	.74	.60	.88	.36	.02
	N	249	249	222	233	243	249
supports a carbon offset scheme	Correlation	.11	.07	.11	.06	-.04	.17
	P-value	.09	.24	.11	.39	.51	.01
	N	250	250	223	234	243	250
supports a carbon trading scheme	Correlation	.08	.04	.07	.09	-.05	.13
	P-value	.19	.57	.31	.17	.47	.04
	N	249	249	222	233	242	249
will implement strategies to respond to climate change even it is not required by government regulation.	Correlation	.09	.05	.08	.11	-.14	.12
	P-value	.17	.43	.26	.10	.03	.06
	N	249	249	223	233	242	249
believes the hotel which claims to be 'green' is only using it as a marketing ploy.	Correlation	-.21	-.22	-.20	-.19	.03	-.05
	P-value	.00	.00	.00	.01	.67	.47
	N	248	248	221	232	242	248
believes It is not possible to be both profitable and environmentally friendly.	Correlation	-.17	-.19	-.18	-.13	.06	-.10
	P-value	.01	.00	.01	.06	.34	.12
	N	249	249	222	233	243	249
believes Customers are not interested in whether a hotel is environmentally friendly or not.	Correlation	-.16	-.16	-.16	-.08	.02	-.12
	P-value	.01	.01	.02	.20	.81	.06
	N	249	249	222	233	243	249

Table 6.17: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size – number of employees

One-Way ANOVAs	My hotel… has an impact on the environment. (N=250)			has a responsibility to respond to Environmental Impacts (N=250)			has a responsibility to respond to climate change impacts. (N=250)			believes that government should regulate the tourism industry regarding climate change. (N=248)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro <10 staff (1)	26	3.04	1.11	26	3.08	1.13	26	3.19	1.10	26	3.42	1.14
Small: 10-49 staff (2)	122	3.51	.89	122	3.89	.61	122	3.69	.71	121	3.90	.66
Medium: 50-249 staff (3)	70	3.17	1.12	70	3.99	.73	70	3.69	.84	70	3.91	.81
Large: ≥250 staff	32	3.53	.92	32	4.03	.40	32	3.59	.76	31	4.00	.52
F		N/A			N/A			N/A			N/A	
P-Value		0.03			0.00			0.03			0.02	
Post Hoc Test (LSD)		N/A			2, 3, 4>1			N/A			N/A	

Table 6.17: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size – number of employees (continued)

One-Way ANOVAs	My hotel… supports current government environmental policy over climate change concern. (N=250)			believes the hotel which claims to be 'green' is only using it as a marketing ploy. (N=248)			believes It is not possible to be both profitable and environmentally friendly. (N=249)			believes customers are not interested in whether a hotel is environmentally friendly or not. (N=249)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro <10 staff (1)	26	3.58	.86	26	3.35	1.02	26	2.88	1.07	26	3.19	.90
Small: 10-49 staff (2)	122	3.84	.61	121	2.99	.96	121	2.74	.99	121	2.74	1.01
Medium: 50-249 staff (3)	70	3.99	.55	69	2.49	.93	70	2.11	.53	70	2.39	.86
Large: ≥250 staff	32	4.00	.57	32	2.66	1.00	32	2.44	.72	32	2.53	.95
F		N/A			6.74			N/A			5.14	
P-Value		0.02			0.00			0.00			0.00	
Post Hoc Test (LSD)		N/A			1>3, 4 2>3			1,2>3			1>2>3 1>4	

Table 6.18: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size – number of rooms A

One-Way ANOVAs	My hotel… has an impact on the environment. (N=250)			has a responsibility to respond to Environmental Impacts (N=250)			has a responsibility to respond to climate change impacts. (N=250)			believes that government should regulate the tourism industry regarding climate change. (N=248)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3	1.67	.58	3	2.00	1.00	3	2.33	.58	2.00	1.00	2.00
Medium: 11-50 rooms (2)	72	3.39	.97	72	3.63	.85	72	3.50	.92	3.85	.73	3.85
Large: >50 rooms (3)	175	3.39	.99	175	3.97	.62	175	3.70	.74	3.91	.74	3.91
F	4.54			N/A			N/A			9.87		
P-Value	0.01			0.00			0.00			0.00		
Post Hoc Test (LSD)	2,3>1			3>2			N/A			2,3>1		

Table 6.18: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size – number of rooms A (continued)

One-Way ANOVAs	My hotel… believes the hotel which claims to be 'green' is only using it as a marketing ploy. (N=248)			believes It is not possible to be both profitable and environmentally friendly. (N=249)			believes customers are not interested in whether a hotel is environmentally friendly or not. (N=249)		
	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3	3.00	1.00	3	2.33	.58	3	3.00	1.00
Medium: 11-50 rooms (2)	72	3.22	.94	72	2.89	1.04	72	2.97	1.03
Large: >50 rooms (3)	173	2.69	.99	174	2.40	.80	174	2.52	.92
F	7.72			N/A			5.86		
P-Value	0.00			0.00			0.00		
Post Hoc Test (LSD)	3<2			3<2			3<2		

Table 6.19: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size– number of rooms B

One-Way ANOVAs	My hotel… has a responsibility to respond to the environmental impacts. (N=250)			believes the hotel which claims to be 'green' is only using it as a marketing ploy. (N=248)			believes It is not possible to be both profitable and environmentally friendly. (N=249)			believes customers are not interested in whether a hotel is environmentally friendly or not. (N=249)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: <50 rooms (1)	73	3.56	.88	73	3.21	.91	73	2.86	1.03	73	2.97	1.03
Medium: 50-149 rooms (2)	96	3.94	.66	95	2.78	1.05	95	2.54	.92	95	2.62	.94
Large: ≥150 rooms (3)	81	4.00	.61	80	2.60	.92	81	2.25	.62	81	2.42	.89
F	N/A			7.78			N/A			6.62		
P-Value	0.00			0.00			0.00			0.00		
Post Hoc Test (LSD)	1<2,3			1>2,3			1,2>3			1>2,3		

Table 6.20: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size – number of rooms C

Statement		N	M	SD	Sig.
My hotel…					
has a responsibility to respond to the environmental impacts	SM Hotel: ≤50 rooms	75	3.56	.90	
	Large Hotel: >50 rooms	175	3.97	.62	
	All Respondents	250	3.85	.74	.00
has a responsibility to respond to climate change impacts.	SM Hotel: ≤50 rooms	75	3.45	.93	
	Large Hotel: >50 rooms	175	3.70	.74	
	All Respondents	250	3.62	.81	.03
believes the hotel which claims to be 'green' is only using it as a marketing ploy.	SM Hotel: ≤50 rooms	75	3.21	.93	
	Large Hotel: >50 rooms	173	2.69	.99	
	All Respondents	248	2.85	1.00	.00
believes It is not possible to be both profitable and environmentally friendly.	SM Hotel: ≤50 rooms	75	2.87	1.03	
	Large Hotel: >50 rooms	174	2.40	.80	
	All Respondents	249	2.54	.90	.00
believes customers are not interested in whether a hotel is environmentally friendly or not.	SM Hotel: ≤50 rooms	75	2.97	1.03	
	Large Hotel: >50 rooms	174	2.52	.92	
	All Respondents	249	2.66	.97	.00

Table 6.21: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size, analyzed by hotel size – number of rooms D

Statement		N	Mean	SD	Sig.
My hotel…					
has a responsibility to respond to the environmental impacts	SM Hotel: <150 rooms	169	3.78	.79	
	Large Hotel: ≥150 rooms	81	4.00	.61	
	All Respondents	250	3.85	.74	.02
believes the hotel which claims to be 'green' is only using it as a marketing ploy.	SM Hotel: <150 rooms	168	2.96	1.01	
	Large Hotel: ≥150 rooms	80	2.60	.92	
	All Respondents	248	2.85	1.00	.01
believes It is not possible to be both profitable and environmentally friendly.	SM Hotel: <150 rooms	168	2.68	.98	
	Large Hotel: ≥150 rooms	81	2.25	.62	
	All Respondents	249	2.54	.90	.00
believes customers are not interested in whether a hotel is environmentally friendly or not.	SM Hotel: <150 rooms	168	2.77	.99	
	Large Hotel: ≥150 rooms	81	2.42	.89	
	All Respondents	249	2.66	.97	.01

Table 6.22: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size – number of beds A

Statement	T-test	N	M	SD	Sig.
My hotel…					
has a responsibility to respond to the environmental impacts	SM Hotel: <100 beds	73	3.58	.88	
	Large Hotel: ≥100 beds	150	3.95	.66	
	All Respondents	223	3.83	.76	.00
has a responsibility to respond to climate change impacts.	SM Hotel: <100 beds	73	3.45	.91	
	Large Hotel: ≥100 beds	150	3.72	.73	
	All Respondents	223	3.63	.80	.02
supports a carbon offset scheme	SM Hotel: <100 beds	73	3.36	.93	
	Large Hotel: ≥100 beds	150	3.61	.86	
	All Respondents	223	3.52	.89	.05*
believes the hotel which claims to be 'green' is only using it as a marketing ploy.	SM Hotel: <100 beds	72	3.15	.93	
	Large Hotel: ≥100 beds	149	2.73	1.00	
	All Respondents	221	2.87	1.00	.00
believes It is not possible to be both profitable and environmentally friendly.	SM Hotel: <100 beds	73	2.90	1.06	
	Large Hotel: ≥100 beds	149	2.39	.81	
	All Respondents	222	2.56	.93	.00
believes customers are not interested in whether a hotel is environmentally friendly or not.	SM Hotel: <100 beds	73	3.03	.96	
	Large Hotel: ≥100 beds	149	2.51	.94	
	All Respondents	222	2.68	.98	.00

Table 6.23: Attitudes towards environment, climate change, environmental regulations, and green marketing, analyzed by hotel size– number of beds B

Statement		N	M	SD	Sig.
My hotel…					
has a responsibility to respond to the environmental impacts	SM Hotel: <250 beds	144	3.75	.80	
	Large Hotel: ≥250 beds	79	3.97	.66	
	All Respondents	223	3.83	.76	.03
supports current government environmental policy over climate change concern.	SM Hotel: <250 beds	144	3.79	.64	
	Large Hotel: ≥250 beds	79	4.00	.56	
	All Respondents	223	3.87	.62	.02
supports a carbon offset scheme	SM Hotel: <250 beds	144	3.40	.95	
	Large Hotel: ≥250 beds	79	3.76	.72	
	All Respondents	223	3.52	.89	.00
supports a carbon trading scheme	SM Hotel: <250 beds	143	3.36	.93	
	Large Hotel: ≥250 beds	79	3.62	.77	
	All Respondents	222	3.45	.89	.04
believes the hotel which claims to be 'green' is only using it as a marketing ploy.	SM Hotel: <250 beds	143	2.99	1.01	
	Large Hotel: ≥250 beds	78	2.64	.94	
	All Respondents	221	2.87	1.00	.01
believes It is not possible to be both profitable and environmentally friendly.	SM Hotel: <250 beds	144	2.70	1.01	
	Large Hotel: ≥250 beds	78	2.29	.69	
	All Respondents	222	2.56	.93	.00
believes customers are not interested in whether a hotel is environmentally friendly or not.	SM Hotel: <250 beds	144	2.81	1.00	
	Large Hotel: ≥250 beds	78	2.44	.88	
	All Respondents	222	2.68	.98	.01

Regarding the main influencing factors on respondents' environmental actions, this research found tht macro-sized hotels (<10 employees) placed less importance on CSR Policy (sig.=0.02) and parental company's policy (sig.=0.01) than large sized hotels on the basis of one-Way ANOVAs Analysis (Table 6.24). Other tests also provided significant insights. For example, Pearson correlation analysis indicated the importance of government's regulation and policy for large sized hotels (Table 6.25), although the correlation is relatively weak. Table 6.26 indicates that small hotels (≤10 rooms) had lower concerns over 8 factors than medium and large hotels. However, these findings are based on only three hotels with no more than ten rooms and so are potentially not representative.

Table 6.24: The importance of factors influencing hotel's adoption of environmental actions, analyzed by hotel size – number of employees

One-Way ANOVAs	CSR Policy (N=246)			Parental Company's Policy (N=244)		
	N	M	SD	N	M	SD
Micro: <10 staff (1)	25	3.80	.72	25	3.76	.72
Small: 10-49 staff (2)	121	4.12	.74	119	4.03	.82
Medium: 50-249 staff (3)	68	4.26	.59	68	4.25	.70
Large: ≥250 staff (4)	32	4.25	.51	32	4.28	.52
F		3.24			3.59	
P-Value		0.02			0.01	
Post Hoc Test (LSD)		2,3,4>1			3,4>1	

Note: Mean based on scale of 1='Not very important', 3="No effect", 5='Very important'

Table 6.25: The importance of factors influencing hotel's adoption of environmental actions, analyzed by size, target market, years on trading, experience of multiple extreme events, and staff to room ratio

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Rank	Factor		No of employees	No of rooms	No of beds	% of International Guest	Years of Trading	Exp. of Multiple EWEs
1	Cost Reduction	Correlation	-.02	-.02	-.02	-.06	-.10	-.01
		P-value	.72	.77	.73	.39	.13	.92
		N	246	246	219	230	239	246
2	Public Relation and Reputation	Correlation	.11	.08	.09	-.03	-.12	.13
		P-value	.09	.20	.16	.62	.07	.049
		N	246	246	219	230	239	246
	Owner or Top manager's Personal Value & Belief	Correlation	.06	.00	.00	.01	-.13	.15
		P-value	.36	.98	.95	.92	.04*	.02
		N	246	246	219	230	239	246
4	Staff Availability & Expertise	Correlation	.10	.06	.05	-.02	-.12	.06
		P-value	.11	.31	.46	.79	.07	.31
		N	247	247	220	231	240	247
5	Customer Demand	Correlation	.04	.05	.02	.06	-.03	.09
		P-value	.52	.47	.76	.40	.62	.18
		N	246	246	219	230	239	246
	Existing Building Structure	Correlation	-.00	-.09	-.14	.02	-.11	.08
		P-value	.98	.15	.04*	.82	.09	.23
		N	246	246	219	230	239	246
	Government Incentives	Correlation	.11	.05	-.02	-.08	-.06	.04
		P-value	.09	.43	.75	.22	.37	.53
		N	247	247	220	231	240	247
8	Competitive Advantages	Correlation	.10	.09	.07	.05	-.05	.04
		P-value	.13	.16	.30	.47	.47	.56
		N	245	245	218	229	238	245
	Capital Investment	Correlation	.03	-.07	-.09	.06	-.27	.03
		P-value	.60	.31	.20	.40	.00*	.63
		N	246	246	219	230	239	246
10	Existing Facility	Correlation	-.03	-.08	-.12	.01	-.09	.06
		P-value	.66	.23	.08	.83	.16	.34
		N	247	247	220	231	240	247
11	CSR Policy	Correlation	.11	.09	.06	.00	-.14	.13
		P-value	.10	.17	.37	.95	.03*	.05
		N	246	246	22	230	239	246
12	Time Availability	Correlation	.03	-.02	-.09	.01	-.06	.07
		P-value	.64	.80	.17	.94	.36	.29
		N	247	247	220	231	240	247
	Risk Management	Correlation	.01	-.03	-.08	-.04	-.14	.14
		P-value	.88	.64	.24	.54	.03*	.03
		N	247	247	220	231	240	247

Table 6.25: The importance of factors influencing hotel's adoption of environmental actions, analyzed by size, target market, years on trading, experience of multiple extreme events, and staff to room ratio (continued)

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Rank	Factor		No of employees	No of rooms	No of beds	% of International Guest	Years on Trading	Exp. of Multiple EWEs
14	Technology Availability	Correlation	.06	.01	-.05	-.00	-.10	.09
		P-value	.36	.83	.43	.97	.11	.16
		N	247	247	220	231	240	247
	Government Policy & Regulation	Correlation	.15	.10	.10	.04	-.09	.06
		P-value	.02*	.10	.16	.58	.17	.36
		N	246	246	219	230	239	246
16	Current Information	Correlation	.01	-.02	-.04	-.06	-.08	.11
		P-value	.90	.74	.52	.34	.23	.10
		N	247	247	220	231	240	247
	Parental Company's Policy	Correlation	.12	.08	.06	.01	-.22	.03
		P-value	.06	.23	.35	.94	.00*	.68
		N	244	244	217	228	237	244
18	Industry Leadership	Correlation	.04	.01	.02	-.06	-.15	.13
		P-value	.51	.85	.78	.34	.03*	.04
		N	246	246	219	230	239	246
19	Supplier Availability	Correlation	-.02	-.04	-.06	-.05	-.15	.02
		P-value	.82	.52	.39	.43	.02*	.81
		N	247	247	220	231	240	247
	Environment Concern	Correlation	.10	.05	.00	-.02	-.07	.18
		P-value	.12	.43	1.00	.77	.27	.01
		N	245	245	218	229	238	245
21	Climate Change Concern	Correlation	.11	.07	.02	.04	-.08	.23
		P-value	.10	.30	.73	.58	.22	.00
		N	246	246	219	230	239	246
	Employee Loyalty	Correlation	.03	.02	-.04	.01	-.06	.04
		P-value	.64	.76	.58	.94	.40	.58
		N	246	246	219	230	239	246
23	Stakeholder Pressure	Correlation	.01	-.02	.00	-.02	-.14	.00
		P-value	.86	.82	.99	.82	.03*	.96
		N	246	246	219	230	239	246

Table 6.26: The importance of factors influencing hotel's adoption of environmental actions, analyzed by hotel size – number of rooms

One-Way ANOVAs	Cost Reduction (N=246)			Public Relations & Reputation (N=246)			Owner or Top manager's Personal Value & Belief (N=246)			Government Incentives (N=247)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3.33	1.16	3.33	3	3.33	.58	3	3.33	.58	3	3.00	1.00
Medium: 11-50 rooms (2)	4.35	.74	4.35	71	4.30	.64	71	4.28	.68	71	4.23	.80
Large: >50 rooms (3)	4.30	.55	4.30	172	4.27	.59	172	4.26	.58	173	4.24	.70
F	N/A			3.64			3.51			4.19		
P-Value	0.02			0.03			0.03			0.02		
Post Hoc Test (LSD)	N/A			1<2,3			1<2,3			1<2,3		

Table 6.26: The importance of factors influencing hotel's adoption of environmental actions, analyzed by hotel size – number of rooms (continued)

One-Way ANOVAs	Competitive Advantages (N=245)			CSR Policy (N=246)			Technology Availability (N=247)			Government Policy & Regulation (N=246)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3	3.33	.58	3	3.00	1.0	3	3.00	1.00	3	3.00	1.00
Medium: 11-50 rooms (2)	70	4.27	.66	71	4.14	.74	71	4.14	.80	71	4.13	.74
Large: >50 rooms (3)	172	4.19	.63	172	4.16	.64	173	4.13	.64	172	4.13	.57
F	3.19			4.40			4.00			N/A		
P-Value	0.04			0.01			0.02			0.01		
Post Hoc Test (LSD)	1<2,3			1<2,3			1<2,3					

Table 6.26: The importance of factors influencing hotel's adoption of environmental actions, analyzed by hotel size – number of rooms (continued)

	Parental Company's Policy (N=244)			Industry Leadership (N=246)			Supplier Availability (N=247)			Environment Concern (N=245)			Employee Loyalty (N=246)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3	3.00	.00	3	2.67	.58	3	2.67	.58	3	3.00	1.00	3	2.67	1.53
Medium: 11-50 rooms (2)	71	4.03	.86	71	4.13	.83	71	4.17	.74	71	4.07	.76	71	4.07	.85
Large: >50 rooms (3)	170	4.15	.70	172	4.04	.69	173	4.02	.69	171	4.04	.59	172	3.95	.68
F	3.90			5.80			7.06			N/A			N/A		
P-Value	0.02			0.00			0.00			0.02			0.01		
Post Hoc Test (LSD)	1<2,3						1<2,3								

Note: Mean based on scale of 1='Not very important', 3="No effect", 5='Very important'

The size factor is also highly related to hotel's implementation of climate change measures (Tables 6.27, 6.28). It is generally agreed small-sized hotels had lower adoption of environmental practices than large sized hotels (Table 6.27-6.44) (Alvarez Gil et al. 2001; Hobson & Essex 2001; Céspedes-Lorente et al. 2003; Mensah 2006; Kasim 2009; Jarvis & Pulido Ortega 2010; Tarí et al. 2010; Turton et al. 2010; Dodds & Holmes 2011; Rahman et al. 2011; Shah 2011; Ruhanen & Shakeela 2012). Indeed, large hotels, which usually have higher financial security, are more likely to experiment environmental strategy, technology, and product, even at a risk of long term payback (Shah 2011). Noticeably, the size definition based on three-level employee numbers is found as a more effective variable. It is also one of the few factors, which are able to distinguish hotel adoption of adaption measures. Issues regarding the relationship of hotel size to adoption of practices are discussed further at the end of the chapter.

Table 6.27: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by size, target market, years of trading, experience of multiple extreme weather events, and staff to room ratio

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Rank	Mitigation Measure		No of employees	No of rooms	No of beds	% of International Guest	Years of Trading	Exp.of Multiple EWEs
1	Recycle waste and raise customer's awareness of waste	Correlation	.19	.15	.17	-.04	-.01	.17
		P-value	.00	.02	.01	.53	.94	.01
		N	246	246	220	231	240	246
2	Frequently clean and maintain electricity facilities	Correlation	.21	.21	.18	.08	-.03	.11
		P-value	.00	.00	.01	.26	.68	.08
		N	243	243	218	227	237	243
3	Implement control system for heating/cooling/lighting facilities	Correlation	.30	.29	.26	.04	-.01	.05
		P-value	.00	.00	.00	.54	.85	.48
		N	240	240	215	225	234	240
4	Reduce and pre-treat chemical and hazardous wastes	Correlation	.27	.21	.18	.03	-.04	.06
		P-value	.00	.00	.01	.66	.50	.37
		N	240	240	216	225	234	240
5	Provide locally-produced and seasonal food	Correlation	.29	.27	.29	.17	-.05	.11
		P-value	.00	.00	.00	.01	.46	.10
		N	244	244	219	229	238	244
6	Reduce the use of materials	Correlation	.21	.20	.21	-.03	.01	.18
		P-value	.00	.00	.00	.70	.93	.01
		N	246	246	221	230	240	246
7	Use energy-efficient appliances	Correlation	.21	.19	.18	.04	-.07	.10
		P-value	.00	.00	.01	.59	.28	.12
		N	238	238	214	224	232	238
8	Measure and monitor resource usage and waste production	Correlation	.32	.27	.27	-.02	-.02	.13
		P-value	.00	.00	.00	.76	.79	.05*
		N	240	240	215	225	235	240
9	Reduce the use of air conditioning	Correlation	.05	.10	.16	-.00	-.03	.22
		P-value	.45	.13	.02	.96	.62	.00
		N	240	240	215	225	234	240
10	Encourage guest/staff to use green vehicles/public transport	Correlation	.27	.23	.25	.11	-.13	.09
		P-value	.00	.00	.00	.11	.05*	.16
		N	240	240	215	225	234	240
11	Purchase fair-trade/green-label products where possible	Correlation	.28	.21	.21	.06	-.00	.11
		P-value	.00	.00	.00	.37	.98	.10
		N	238	238	213	224	233	238
12	Adapt building design for energy saving	Correlation	.14	.16	.16	.05	-.13	.03
		P-value	.03	.02	.02	.43	.05*	.60
		N	235	235	211	220	229	235
13	Initiate a hotel environmental policy	Correlation	.27	.26	.27	.12	-.07	.09
		P-value	.00	.00	.00	.08	.27	.17
		N	231	231	206	216	225	231
14	Set up environmental targets and benchmarking	Correlation	.27	.24	.25	.04	-.09	.09
		P-value	.00	.00	.00	.54	.20	.16
		N	230	230	205	216	224	230

Table 6.27: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by size, target market, years of trading, experience of multiple extreme weather events, and staff to room ratio (continued)

Pearson Correlation Coefficients (Prob > |r| under H0: Rho=0)

Rank	Mitigation Measure		No of employees	No of rooms	No of beds	% of International Guest	Years of Trading	Exp. of Multiple EWEs
15	Implement environmental management system	Correlation	.23	.18	.21	-.01	-.05	.09
		P-value	.00	.01	.00	.86	.49	.19
		N	228	228	203	216	222	228
16	Implement energy-saving education/incentive for staff/ guest	Correlation	.18	.17	.16	.10	-.08	.06
		P-value	.01	.01	.02	.16	.21	.40
		N	233	233	210	218	227	233
17	Develop an environmental code of ethics' for supplier chain	Correlation	.22	.20	.23	.12	-.03	.15
		P-value	.00	.00	.00	.09	.68	.03
		N	226	226	202	214	222	226
18	Use alternative fuels and renewable energy	Correlation	.14	.13	.12	-.08	-.05	.18
		P-value	.04	.05	.08	.27	.41	.01
		N	235	235	211	221	230	235
19	Achieve environmental certification	Correlation	.22	.24	.20	-.01	-.06	.08
		P-value	.00	.00	.00	.95	.40	.25
		N	220	220	196	207	215	220
20	Involve in and provide carbon offset projects for guests	Correlation	.07	.07	.14	.11	-.19	.11
		P-value	.29	.29	.05	.12	.01	.12
		N	225	225	201	211	219	225
21	Integrate emission management with supply chain	Correlation	.16	.17	.16	.07	-.15	.14
		P-value	.02	.02	.03	.34	.04	.05*
		N	214	214	191	201	209	214
22	Designate a manager with specific responsibility for environment management system (EMS) and emission issues	Correlation	.21	.24	.23	.04	-.05	.10
		P-value	.00	.00	.00	.58	.45	.14
		N	224	224	199	210	218	224

Table 6.28: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size, target market, years of trading, experience of multiple extreme weather events, and staff to room ratio

Rank	Adaptation Measure		No of employees	No of rooms	No of beds	% of International Guest	Years of Trading	Experience of Multiple EWEs
1	Adapt hotel's products, marketing and positioning	Correlation	.12	.09	.11	-.04	-.04	.11
		P-value	.06	.15	.10	.56	.57	.09
		N	241	241	216	226	237	241
2	Implement water-saving and reuse measures	Correlation	.26	.23	.22	-.04	-.08	.11
		P-value	.00	.00	.00	.51	.21	.09
		N	239	239	215	224	233	239
3	Volunteer for local conservation or community projects	Correlation	.13	.10	.11	-.10	.02	.19
		P-value	.05*	.14	.10	.14	.77	.00
		N	235	235	210	222	231	235
4	Involve and comply with climate change policies and plans	Correlation	.16	.12	.13	.01	-.06	.09
		P-value	.02	.08	.07	.91	.37	.18
		N	223	223	199	211	219	223
5	Involved in national tourism program on energy efficiency and renewable energy use	Correlation	.16	.08	.09	-.02	-.10	.11
		P-value	.02	.24	.20	.78	.14	.12
		N	220	220	196	207	215	220
6	Provide climate change and environment education	Correlation	.22	.17	.23	.02	-.09	.18
		P-value	.00	.01	.00	.78	.19	.01
		N	234	234	210	220	229	234
7	Locate new establishments in low-climate-risk areas	Correlation	-.03	-.05	.04	-.13	-.18	.09
		P-value	.64	.42	.61	.07	.01	.17
		N	219	219	196	207	213	219
8	Develop links with international policies, mechanism, cooperation and standards	Correlation	.14	.07	.07	-.01	-.09	.16
		P-value	.04	.32	.30	.93	.19	.02
		N	219	219	196	207	215	219
9	Offer incentives for adaptation and mitigation measures	Correlation	.14	.11	.14	.05	-.05	.13
		P-value	.03	.11	.05	.46	.46	.06
		N	224	224	200	211	221	224
10	Involved in climate change network to promote activities proposed in UNWTO's Davos Report and Declaration	Correlation	.12	.04	.03	-.05	-.08	.10
		P-value	.09	.60	.64	.50	.25	.16
		N	208	208	185	195	203	208
Mitigation measures		Correlation	.29	.27	.28	.05	-.09	.17
		P-value	.00	.00	.00	.45	.15	.01
		N	247	247	221	231	241	247
Adaptation measures		Correlation	.18	.13	.15	-.04	-.10	.17
		P-value	.00	.04	.03	.60	.13	.01
		N	247	247	221	231	241	247
Climate Change measures		Correlation	.26	.23	.25	.02	-.10	.18
		P-value	.00	.00	.00	.74	.13	.01
		N	247	247	221	231	241	247

Table 6.29: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of employees A

One-Way ANOVAs	Recycle waste and raise customer's awareness of waste (N=246)			Frequently clean & maintain electricity facilities (N=243)			Implement control system for heating/cooling/lighting facilities (N=240)			Reduce and pre-treat chemical and hazardous wastes (N=240)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	25	3.04	1.72	25	2.84	1.31	25	2.64	1.52	26	2.46	1.82
Small: 10-49 staff (2)	122	3.55	1.21	121	3.32	1.25	118	3.11	1.38	119	2.91	1.57
Medium: 50-249 staff (3)	67	3.73	1.18	67	3.55	1.13	66	3.76	1.10	65	3.68	1.06
Large: ≥250 staff (4)	32	4.00	.76	30	4.10	.71	31	4.23	.72	30	3.87	.90
F	N/A			N/A			N/A			N/A		
P-Value	0.02			0.00			0.00			0.00		
Post Hoc Test (LSD)	N/A			1,2,3<4			1<3,4 2<3,4			1<3,4 2<3,4		

Table 6.29: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of employees A (continued)

One-Way ANOVAs	Provide locally-produced & seasonal food (N=244)			Reduce the use of materials (N=246)			Use energy-efficient appliances (N=238)			Measure and monitor resource usage & waste production (N=240)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	26	1.92	1.96	26	2.42	1.58	25	2.16	1.63	26	2.15	1.69
Small: 10-49 staff (2)	120	2.92	1.52	122	3.06	1.34	117	2.96	1.39	117	2.56	1.52
Medium: 50-249 staff (3)	67	3.76	1.18	67	3.40	1.27	65	3.48	1.34	66	3.38	1.21
Large: ≥250 staff (4)	31	4.03	1.02	31	3.61	1.02	31	3.74	1.06	31	3.84	.90
F	N/A			4.96			N/A			N/A		
P-Value	0.00			0.00			0.00			0.00		
Post Hoc Test (LSD)	1<3,4 2<3,4			1<2<4 1<3			1,2<4 1<3			1<3,4 2<3,4		

Table 6.29: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of employees A (continued)

One-Way ANOVAs	Encourage guest/staff to use green vehicles/public transport (N=240)			Purchase fair-trade/green-label products where possible (N=238)			Adapt building design for energy saving (N=235)			Initiate a hotel environmental policy (N=231)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	26	2.08	1.60	25	1.84	1.43	24	1.63	1.47	23	1.52	1.44
Small: 10-49 staff (2)	118	2.53	1.57	116	2.47	1.50	114	2.39	1.56	113	2.31	1.21
Medium: 50-249 staff (3)	66	3.30	1.31	66	2.97	1.30	67	2.84	1.54	65	2.75	1.24
Large: ≥250 staff (4)	30	3.53	1.20	31	3.52	1.24	30	2.90	1.09	30	3.13	1.11
F		8.52			8.37			N/A			9.26	
P-Value		0.00			0.00			0.00			0.00	
Post Hoc Test (LSD)		1<3,4 2<3,4			1<2<3,4			1<3,4			1<2<3,4	

Table 6.29: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of employees A (continued)

One-Way ANOVAs	Set up environmental targets & benchmarking (N=230)			Implement environmental management system (N=228)			Implement energy-saving education/incentive for staff/ guest (N=233)			Develop an environmental code of ethics' for supplier chain (N=226)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	23	1.87	1.58	22	2.09	1.41	25	1.40	1.47	24	1.42	1.53
Small: 10-49 staff (2)	111	2.21	1.25	110	2.09	1.39	112	2.06	1.57	108	1.91	1.53
Medium: 50-249 staff (3)	66	2.71	1.29	66	2.65	1.41	65	2.62	1.44	63	2.52	1.42
Large: ≥250 staff (4)	30	3.17	1.09	30	3.00	1.23	31	2.77	1.38	31	3.03	1.64
F		7.00			4.83			5.78			7.52	
P-Value		0.00			0.00			0.00			0.00	
Post Hoc Test (LSD)		1<3,4 2<3,4			1<4 2<3,4			1<2<3,4			1<3,4 2<3,4	

Table 6.29: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of employees A (continued)

	Use alternative fuels & renewable energy (N=235)			Achieve environmental certification (N=220)			Involve i and provide carbon offset projects for guests (N=225)			Integrate emission management with supply chain (N=214)			Designate a manager with specific responsibility for EMS and emission issues (N=224)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	25	1.24	1.48	23	1.00	1.38	25	1.08	1.47	24	.88	1.33	21	1.00	1.41
Small: 10-49 staff (2)	114	2.00	1.52	102	1.50	1.43	109	1.59	1.56	100	1.35	1.37	109	1.07	1.18
Medium: 50-249 staff (3)	65	2.62	1.42	65	1.98	1.44	60	2.07	1.55	59	2.03	1.45	64	1.64	1.46
Large: ≥250 staff (4)	31	2.65	1.31	30	2.57	1.46	31	2.00	1.41	31	2.19	1.42	30	2.00	1.41
F		6.97			6.95			3.11			6.98			5.56	
P-Value		0.00			0.00			0.03			0.00			0.00	
Post Hoc Test (LSD)		1<2<3,4			1<3,4 2<3,4			1<3,4			1<3,4 2<3,4			1<4 2<3,4	

Table 6.30: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of employees A

One-Way ANOVAs	Adapt hotel's products, marketing and positioning (N=241)			Implement water-saving and reuse measures (N=239)			Volunteer for local conservation or community projects (N=235)			Involve and comply with climate change policies and plans (N=223)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	26	2.08	1.55	26	1.58	1.58	26	2.00	1.81	25	1.28	1.70
Small: 10-49 staff (2)	118	2.75	1.39	118	2.53	1.50	112	2.14	1.49	105	1.79	1.50
Medium: 50-249 staff (3)	66	2.98	1.42	64	3.06	1.38	66	2.79	1.39	63	2.48	1.41
Large: ≥250 staff (4)	31	3.19	1.25	31	3.55	1.00	31	3.16	1.39	30	2.43	1.52
F		3.57			N/A			5.88			5.52	
P-Value		0.02			0.00			0.00			0.00	
Post Hoc Test (LSD)		1<2,3,4			1<2<4 1<3			1<3,4 2<3,4			1<3,4 2<3,4	

Table 6.30: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of employees A (continued)

One-Way ANOVAs	Involved in the national tourism program regarding energy efficiency & renewable energy use (N=220)			Provide climate change & environment education for customers and staff (N=234)			Develop links with international policies, mechanism, cooperation & standards regarding to climate change (N=219)			Offer incentives for adaptation & mitigation measures (N=224)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	24	.96	1.33	26	1.15	1.29	25	1.08	1.50	25	.88	1.20
Small: 10-49 staff (2)	104	1.77	1.60	111	1.57	1.37	104	1.60	1.52	105	1.50	1.41
Medium: 50-249 staff (3)	62	2.11	1.42	66	2.18	1.44	61	1.87	1.53	63	1.86	1.48
Large: ≥250 staff (4)	30	2.30	1.49	31	2.45	1.31	29	2.17	1.54	31	2.06	1.57
F		4.43			6.99			2.71			4.06	
P-Value		0.01			0.00			0.05			0.01	
Post Hoc Test (LSD)		1<2,3,4			1<3,4 2<3,4			1<3,4			1<3,4	

Table 6.30: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of employees A (continued)

One-Way ANOVAs	Involve in the climate change network to promote activities proposed in UNWTO's Davos Report & Declaration (N=208)			Mitigation measures (N=247)			Adaptation measures (N=247)			Climate Change measures (N=247)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Micro: <10 staff (1)	22	.82	1.18	26	1.77	.97	26	1.27	1.11	26	1.61	.95
Small: 10-49 staff (2)	99	1.34	1.37	122	2.27	1.02	122	1.69	1.20	122	2.09	1.04
Medium: 50-249 staff (3)	59	1.64	1.39	67	2.86	.94	67	2.16	1.12	67	2.64	.96
Large: ≥250 staff (4)	28	1.82	1.49	32	3.08	.86	32	2.36	1.09	32	2.86	.89
F		2.82			14.11			6.60			12.02	
P-Value		0.04			0.00			0.00			0.00	
Post Hoc Test (LSD)		1<3,4			1<2<3,4			1<3,4 2<3			1<2<3,4	

Table 6.31: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of employees B

		N	M	SD	Sig
Recycle waste and raise customer's awareness of waste	SM: <250 staff	214	3.55	1.28	
	Large: ≥250 staff	32	4.00	0.76	
	All Respondents	246	3.61	1.23	0.05
Frequently clean and maintain electricity facilities	SM: <250 staff	213	3.34	1.24	
	Large: ≥250 staff	30	4.10	.71	
	All Respondents	243	3.43	1.21	0.00
Implement control system for heating / cooling / lighting facilities	SM: <250 staff	209	3.26	1.36	
	Large: ≥250 staff	31	4.23	.72	
	All Respondents	240	3.38	1.34	0.00
Reduce and pre-treat chemical and hazardous wastes	SM: <250 staff	210	3.09	1.52	
	Large: ≥250 staff	30	3.87	.90	
	All Respondents	240	3.19	1.48	0.01
Provide locally-produced and seasonal food	SM: <250 staff	213	3.06	1.58	
	Large: ≥250 staff	31	4.03	1.02	
	All Respondents	244	3.18	1.56	0.00
Reduce the use of materials	SM: <250 staff	215	3.09	1.38	
	Large: ≥250 staff	31	3.61	1.02	
	All Respondents	246	3.15	1.35	0.04
Use energy-efficient appliances	SM: <250 staff	207	3.02	1.45	
	Large: ≥250 staff	31	3.74	1.06	
	All Respondents	238	3.12	1.42	0.01
Measure and monitor resource usage and waste production	SM: <250 staff	209	2.77	1.51	
	Large: ≥250 staff	31	3.84	.90	
	All Respondents	240	2.90	1.49	0.00
Encourage guest/staff to use green vehicles/public transport	SM: <250 staff	210	2.72	1.55	
	Large: ≥250 staff	30	3.53	1.20	
	All Respondents	240	2.82	1.53	0.01
Purchase fair-trade/green-label products where possible	SM: <250 staff	207	2.56	1.47	
	Large: ≥250 staff	31	3.52	1.24	
	All Respondents	238	2.68	1.47	0.00

Table 6.31: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of employees B (continued)

		N	M	SD	Sig T-test
Initiate a hotel environmental policy	SM: <250 staff	201	2.36	1.29	
	Large: ≥250 staff	30	3.13	1.11	
	All Respondents	231	2.46	1.30	0.00
Set up environmental targets and benchmarking	SM: <250 staff	200	2.34	1.33	
	Large: ≥250 staff	30	3.17	1.09	
	All Respondents	230	2.44	1.33	0.00
Implement environmental management system	SM: <250 staff	198	2.28	1.41	
	Large: ≥250 staff	30	3.00	1.23	
	All Respondents	228	2.37	1.41	0.01
Implement energy-saving education/incentive for staff/ guest	SM: <250 staff	202	2.16	1.56	
	Large: ≥250 staff	31	2.77	1.38	
	All Respondents	233	2.24	1.55	0.04
Develop an environmental code of ethics' for supplier chain	SM: <250 staff	195	2.05	1.53	
	Large: ≥250 staff	31	3.03	1.64	
	All Respondents	226	2.18	1.58	0.00
Achieve environmental certification	SM: <250 staff	190	1.61	1.46	
	Large: ≥250 staff	30	2.57	1.46	
	All Respondents	220	1.74	1.49	0.00
Integrate emission management with supply chain	SM: <250 staff	183	1.51	1.44	
	Large: ≥250 staff	31	2.19	1.42	
	All Respondents	214	1.61	1.46	0.02
Designate a manager with specific responsibility for environment management system (EMS) and emission issues	SM: <250 staff	194	1.25	1.33	
	Large: ≥250 staff	30	2.00	1.41	
	All Respondents	224	1.35	1.36	0.01

Table 6.32: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size - number of employees B

		N	M	SD	Sig
Implement water-saving and reuse measures	SM: <250 staff	208	2.57	1.53	
	Large: ≥250 staff	31	3.55	1.00	
	All Respondents	239	2.70	1.51	0.00
Volunteer for local conservation or community projects	SM: <250 staff	204	2.33	1.53	
	Large: ≥250 staff	31	3.16	1.39	
	All Respondents	235	2.44	1.53	0.01
Provide climate change and environment education for customers and staff	SM: <250 staff	203	1.71	1.42	
	Large: ≥250 staff	31	2.45	1.31	
	All Respondents	234	1.81	1.43	0.01
Mitigation Measures	SM: <250 staff	215	2.39	1.04	
	Large: ≥250 staff	32	3.08	.86	
	All Respondents	247	2.48	1.05	0.00
Adaptation Measures	SM: <250 staff	215	1.78	1.19	
	Large: ≥250 staff	32	2.36	1.09	
	All Respondents	247	1.86	1.19	0.01
Climate Change Measures	SM: <250 staff	215	2.20	1.05	
	Large: ≥250 staff	32	2.86	.89	
	All Respondents	247	2.29	1.06	0.00

Table 6.33: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms A

One-Way ANOVAs	Frequently clean and maintain electricity facilities (N=243)			Implement control system for heating/cooling /lighting facilities (N=240)			Provide locally-produced and seasonal food (N=244)			Use energy-efficient appliances (N=238)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3	2.00	1.00	3	.33	.58	3	3.33	2.89	1.33	2.31	1.33
Medium: 11-50 rooms (2)	71	3.20	1.25	69	3.14	1.44	70	2.57	1.77	2.79	1.48	2.79
Large: >50 rooms (3)	169	3.56	1.17	168	3.54	1.22	171	3.43	1.37	3.28	1.35	3.28
F	4.46			10.83			N/A			5.41		
P-Value	0.01			0.00			0.00			0.01		
Post Hoc Test (LSD)	1,2<3			1<2<3			2<3			1,2<3		

Table 6.33: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms A (continued)

One-Way ANOVAs	Measure and monitor resource usage & waste production (N=240)			Encourage guest/staff to use green vehicles/public transport (N=240)			Initiate a hotel environmental policy (N=231)			Set up environmental targets & benchmarking (N=230)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3	1.00	1.00	3	1.33	1.16	3	.00	.00	3	.00	.00
Medium: 11-50 rooms (2)	67	2.61	1.68	70	2.56	1.64	66	2.27	1.34	66	2.27	1.38
Large: >50 rooms (3)	170	3.05	1.38	167	2.96	1.47	162	2.59	1.23	161	2.56	1.27
F	N/A			3.19			N/A			N/A		
P-Value	0.01			0.04			0.00			0.00		
Post Hoc Test (LSD)	N/A			N/A			1<2,3			1<2,3		

Table 6.33: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms A (continued)

One-Way ANOVAs	Implement energy-saving education/incentive for staff/ guest (N=233)			Use alternative fuels & renewable energy (N=235)			Mitigation measures (N=247)			Climate Change measures (N=247)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: ≤10 rooms (1)	3	.00	.00	3	.33	.58	3	1.05	.48	3	.86	.47
Medium: 11-50 rooms (2)	65	2.15	1.68	67	1.97	1.65	72	2.27	1.14	72	2.12	1.15
Large: >50 rooms (3)	165	2.32	1.48	165	2.29	1.45	172	2.60	.98	172	2.38	1.00
F	N/A			N/A			N/A			N/A		
P-Value	0.03			0.04			0.00			0.01		
Post Hoc Test (LSD)	1<2,3			1<2,3			N/A			1<3		

Table 6.34: Level of Implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms B

One-Way ANOVAs	Frequently clean and maintain electricity facilities (N=243)			Implement control system for heating/cooling /lighting facilities (N=240)			Reduce and pre-treat chemical & hazardous wastes (N=240)			Provide locally-produced and seasonal food (N=244)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: <50 rooms (1)	72	3.10	1.24	70	2.97	1.50	70	2.96	1.67	71	2.54	1.79
Medium: 50-149 rooms (2)	93	3.41	1.27	93	3.25	1.33	94	3.04	1.54	95	3.22	1.47
Large: ≥150 rooms (3)	78	3.77	1.02	77	3.92	.97	76	3.58	1.10	78	3.73	1.18
F		N/A			N/A			N/A			N/A	
P-Value		0.00			0.00			0.02			0.00	
Post Hoc Test (Dunnett T3)		1<3			1,2<3			1,2<3			1<2<3	

Table 6.34: Level of Implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms B (continued)

One-Way ANOVAs	Reduce the use of materials (N=246)			Use energy-efficient appliances (N=238)			Measure and monitor resource usage and waste production (N=240)			Encourage guest/staff to use green vehicles/public transport (N=240)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: <50 rooms (1)	73	2.96	1.47	69	2.67	1.50	68	2.47	1.65	71	2.44	1.60
Medium: 50-149 rooms (2)	95	3.02	1.35	93	3.14	1.40	95	2.78	1.50	93	2.78	1.53
Large: ≥150 rooms (3)	78	3.50	1.17	76	3.50	1.27	77	3.44	1.13	76	3.22	1.37
F		N/A			N/A			N/A			N/A	
P-Value		0.02			0.00			0.00			0.01	
Post Hoc Test (Dunnett T3)		1,2<3			1<3			1,2<3			1<3	

Table 6.34: Level of Implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms B (continued)

One-Way ANOVAs	Purchase fair-trade/green-label products where possible (N=238)			Adapt building design for energy saving (N=235)			Initiate a hotel environmental policy (N=231)			Set up environmental targets & benchmarking (N=230)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: <50 rooms (1)	70	2.56	1.58	67	2.16	1.66	67	2.12	1.37	67	2.12	1.40
Medium: 50-149 rooms (2)	91	2.35	1.46	91	2.49	1.48	90	2.39	1.26	88	2.44	1.28
Large: ≥150 rooms (3)	77	3.18	1.26	77	2.81	1.43	74	2.86	1.17	75	2.73	1.27
F	N/A			N/A			N/A			N/A		
P-Value	0.00			0.04			0.00			0.02		
Post Hoc Test (Dunnett T3)	1,2<3			1<3			1,2<3			1<3		

Table 6.34: Level of Implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms B (continued)

One-Way ANOVAs	Develop an environmental code of ethics' for supplier chain (N=226)			Achieve environmental certification (N=220)			Designate manager with specific responsibility for EMS and emission issues (N=224)		
	N	M	SD	N	M	SD	N	M	SD
Small: <50 rooms (1)	65	1.85	1.68	1.47	1.52	1.47	63	1.29	1.37
Medium: 50-149 rooms (2)	86	1.98	1.49	1.63	1.53	1.63	87	1.13	1.30
Large: ≥150 rooms (3)	75	2.71	1.49	2.08	1.37	2.08	74	1.68	1.37
F	N/A			N/A			N/A		
P-Value	0.00			0.04			0.03		
Post Hoc Test (Dunnett T3)	1,2<3			1<3			2<3		

Table 6.35: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of room B

One-Way ANOVAs	Implement water-saving and reuse measures (N=239)			Provide climate change and environmental education for customers & staff (N=234)			Mitigation measures (N=247)			Climate Change measures (N=247)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Small: <50 rooms (1)	72	2.44	1.62	67	1.52	1.46	73	2.16	1.11	73	2.02	1.12
Medium: 50-149 rooms (2)	92	2.49	1.51	90	1.74	1.38	95	2.43	1.04	95	2.24	1.07
Large: ≥150 rooms (3)	75	3.20	1.27	77	2.14	1.40	79	2.85	.88	79	2.60	.91
F	N/A			N/A			N/A			N/A		
P-Value	0.00			0.03			0.00			0.00		
Post Hoc Test (Dunnett T3)	1,2<3			1<3			1,2<3			1,2<3		

Table 6.36: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms C

		N	M	SD	Sig. T-tes
Frequently clean and maintain electricity facilities	SM: ≤50 rooms	74	3.15	1.26	
	Large: >50 rooms	169	3.56	1.17	
	All Respondents	243	3.43	1.21	.02
Implement control system for heating/cooling/lighting facilities	SM: ≤50 rooms	72	3.03	1.52	
	Large: >50 rooms	168	3.54	1.22	
	All Respondents	240	3.38	1.34	.01
Provide locally-produced and seasonal food	SM: ≤50 rooms	73	2.60	1.81	
	Large: >50 rooms	171	3.43	1.37	
	All Respondents	244	3.18	1.56	.00
Use energy-efficient appliances	SM: ≤50 rooms	71	2.73	1.53	
	Large: >50 rooms	167	3.28	1.35	
	All Respondents	238	3.12	1.42	.01
Measure and monitor resource usage and waste production	SM: ≤50 rooms	70	2.54	1.68	
	Large: >50 rooms	170	3.05	1.38	
	All Respondents	240	2.90	1.49	.02
Encourage guest/staff to use green vehicles/public transport	SM: ≤50 rooms	73	2.51	1.63	
	Large: >50 rooms	167	2.96	1.47	
	All Respondents	240	2.82	1.53	.04
Initiate a hotel environmental policy	SM: ≤50 rooms	69	2.17	1.39	
	Large: >50 rooms	162	2.59	1.23	
	All Respondents	231	2.46	1.30	.03
Set up environmental targets and benchmarking	SM: ≤50 rooms	69	2.17	1.42	
	Large: >50 rooms	161	2.56	1.27	
	All Respondents	230	2.44	1.33	.04
Mitigation measures	SM: ≤50 rooms	75	2.22	1.15	
	Large: >50 rooms	172	2.60	.98	
	All Respondents	247	2.48	1.05	.01
Climate Change measures	SM: ≤50 rooms	75	2.07	1.16	
	Large: >50 rooms	172	2.38	1.00	
	All Respondents	247	2.29	1.06	.04

Table 6.37: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms D

		N	M	SD	Sig.
Recycle waste and raise customer's awareness of waste	SM: <150 rooms	167	3.48	1.33	
	Large: ≥150 rooms	79	3.87	.95	
	All Respondents	246	3.61	1.23	.02
Frequently clean and maintain electricity facilities	SM: <150 rooms	165	3.27	1.26	
	Large: ≥150 rooms	78	3.77	1.02	
	All Respondents	243	3.43	1.21	.00
Implement control system for heating/cooling/lighting facilities	SM: <150 rooms	163	3.13	1.41	
	Large: ≥150 rooms	77	3.92	.97	
	All Respondents	240	3.38	1.34	.00
Reduce and pre-treat chemical and hazardous wastes	SM: <150 rooms	164	3.01	1.59	
	Large: ≥150 rooms	76	3.58	1.10	
	All Respondents	240	3.19	1.48	.01
Provide locally-produced and seasonal food	SM: <150 rooms	166	2.93	1.65	
	Large: ≥150 rooms	78	3.73	1.18	
	All Respondents	244	3.18	1.56	.00
Reduce the use of materials	SM: <150 rooms	168	2.99	1.40	
	Large: ≥150 rooms	78	3.50	1.17	
	All Respondents	246	3.15	1.35	.01
Use energy-efficient appliances	SM: <150 rooms	162	2.94	1.46	
	Large: ≥150 rooms	76	3.50	1.27	
	All Respondents	238	3.12	1.42	.00
Measure and monitor resource usage and waste production	SM: <150 rooms	163	2.65	1.57	
	Large: ≥150 rooms	77	3.44	1.13	
	All Respondents	240	2.90	1.49	.00
Encourage guest/staff to use green vehicles/public transport	SM: <150 rooms	164	2.63	1.57	
	Large: ≥150 rooms	76	3.22	1.37	
	All Respondents	240	2.82	1.53	.01
Purchase fair-trade/green-label products where possible	SM: <150 rooms	161	2.44	1.51	
	Large: ≥150 rooms	77	3.18	1.26	
	All Respondents	238	2.68	1.47	.00
Adapt building design for energy saving	SM: <150 rooms	158	2.35	1.56	
	Large: ≥150 rooms	77	2.81	1.43	
	All Respondents	235	2.50	1.53	.03
Initiate a hotel environmental policy	SM: <150 rooms	157	2.27	1.31	
	Large: ≥150 rooms	74	2.86	1.17	
	All Respondents	231	2.46	1.30	.00
Set up environmental targets and benchmarking	SM: <150 rooms	155	2.30	1.34	
	Large: ≥150 rooms	75	2.73	1.27	
	All Respondents	230	2.44	1.33	.02

Table 6.37: Level of Implementation of UNWTO and UNEP (2008) Recommended Mitigation Measures for the Accommodation Sector to Respond to Climate Change, analyzed by hotel size – number of rooms D (continued)

		N	M	SD	Sig. T-test
Implement energy-saving education/incentive for staff/ guest	SM: <150 rooms	156	2.09	1.56	
	Large: ≥150 rooms	77	2.55	1.48	
	All Respondents	233	2.24	1.55	.03
Develop an environmental code of ethics' for supplier chain	SM: <150 rooms	151	1.92	1.57	
	Large: ≥150 rooms	75	2.71	1.49	
	All Respondents	226	2.18	1.58	.00
Achieve environmental certification	SM: <150 rooms	146	1.56	1.52	
	Large: ≥150 rooms	74	2.08	1.37	
	All Respondents	220	1.74	1.49	.01
Integrate emission management with supply chain	SM: <150 rooms	142	1.44	1.46	
	Large: ≥150 rooms	72	1.94	1.39	
	All Respondents	214	1.61	1.46	.02
Designate a manager with specific responsibility for EMS and emission issues	SM: <150 rooms	150	1.19	1.33	
	Large: ≥150 rooms	74	1.68	1.37	
	All Respondents	224	1.35	1.36	.01

Table 6.38: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of rooms D

		N	M	SD	Sig. T-test
Implement water-saving and reuse measures	SM: <150 rooms	164	2.47	1.55	
	Large: ≥150 rooms	75	3.20	1.27	
	All Respondents	239	2.70	1.51	.00
Involve and comply with climate change policies and plans	SM: <150 rooms	150	1.87	1.55	
	Large: ≥150 rooms	73	2.32	1.51	
	All Respondents	223	2.01	1.55	.04
Provide climate change and environment education for customers and staff	SM: <150 rooms	157	1.65	1.41	
	Large: ≥150 rooms	77	2.14	1.40	
	All Respondents	234	1.81	1.43	.01
Mitigation measures	SM: <150 rooms	168	2.31	1.08	
	Large: ≥150 rooms	79	2.85	.88	
	All Respondents	247	2.48	1.05	.00
Climate Change measures	SM: <150 rooms	168	2.14	1.09	
	Large: ≥150 rooms	79	2.60	.91	
	All Respondents	247	2.29	1.06	.00

Table 6.39: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of rooms E

		N	M	SD	Sig. T-test
Frequently clean and maintain electricity facilities	SM: <250 rooms	209	3.37	1.23	
	Large: ≥250 rooms	34	3.82	.97	
	All Respondents	243	3.43	1.21	.04
Implement control system for heating/cooling/lighting facilities	SM: <250 rooms	206	3.26	1.35	
	Large: ≥250 rooms	34	4.12	.95	
	All Respondents	240	3.38	1.34	.00
Reduce and pre-treat chemical and hazardous wastes	SM: <250 rooms	207	3.08	1.52	
	Large: ≥250 rooms	33	3.88	.89	
	All Respondents	240	3.19	1.48	.00
Provide locally-produced and seasonal food	SM: <250 rooms	210	3.09	1.61	
	Large: ≥250 rooms	34	3.76	1.05	
	All Respondents	244	3.18	1.56	.02
Use energy-efficient appliances	SM: <250 rooms	205	3.03	1.43	
	Large: ≥250 rooms	33	3.64	1.30	
	All Respondents	238	3.12	1.42	.02
Measure and monitor resource usage and waste production	SM: <250 rooms	206	2.78	1.52	
	Large: ≥250 rooms	34	3.65	.98	
	All Respondents	240	2.90	1.49	.00
Encourage guest/staff to use green vehicles/public transport	SM: <250 rooms	207	2.74	1.53	
	Large: ≥250 rooms	33	3.33	1.47	
	All Respondents	240	2.82	1.53	.04
Purchase fair-trade/green-label products where possible	SM: <250 rooms	204	2.57	1.48	
	Large: ≥250 rooms	34	3.35	1.25	
	All Respondents	238	2.68	1.47	.00
Initiate a hotel environmental policy	SM: <250 rooms	200	2.36	1.28	
	Large: ≥250 rooms	31	3.13	1.18	
	All Respondents	231	2.46	1.30	.00
Set up environmental targets and benchmarking	SM: <250 rooms	198	2.35	1.32	
	Large: ≥250 rooms	32	3.00	1.22	
	All Respondents	230	2.44	1.33	.01
Implement environmental management system	SM: <250 rooms	196	2.29	1.42	
	Large: ≥250 rooms	32	2.88	1.29	
	All Respondents	228	2.37	1.41	.03
Implement energy-saving education/incentive for staff/ guest	SM: <250 rooms	199	2.15	1.58	
	Large: ≥250 rooms	34	2.79	1.23	
	All Respondents	233	2.24	1.54	.02
Develop an environmental code of ethics' for supplier chain	SM: <250 rooms	193	2.09	1.57	
	Large: ≥250 rooms	33	2.70	1.57	
	All Respondents	226	2.18	1.58	.04
Achieve environmental certification	SM: <250 rooms	188	1.63	1.47	
	Large: ≥250 rooms	32	2.38	1.45	
	All Respondents	220	1.74	1.49	.01
Integrate emission management with supply chain	SM: <250 rooms	183	1.52	1.47	
	Large: ≥250 rooms	31	2.10	1.27	
	All Respondents	214	1.61	1.46	.04
Designate a manager with specific responsibility for environment management system (EMS) and emission issues	SM: <250 rooms	193	1.24	1.31	
	Large: ≥250 rooms	31	2.06	1.44	
	All Respondents	224	1.35	1.36	.00

Table 6.40: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of room E

		N	M	SD	Sig. T-test
Implement water-saving and reuse measures	SM: <250 rooms	207	2.58	1.54	
	Large: ≥250 rooms	32	3.47	1.02	
	All Respondents	239	2.70	1.51	.00
Volunteer for local conservation or community projects	SM: <250 rooms	201	2.36	1.54	
	Large: ≥250 rooms	34	2.91	1.40	
	All Respondents	235	2.44	1.53	.05
Mitigation measures	SM: <250 rooms	212	2.41	1.06	
	Large: ≥250 rooms	35	2.94	.87	
	All Respondents	247	2.48	1.05	.01
Climate Change measures	SM: <250 rooms	212	2.22	1.07	
	Large: ≥250 rooms	35	2.68	.89	
	All Respondents	247	2.29	1.06	.02

Table 6.41: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of beds A

T-test		N	M	SD	Sig.
Frequently clean and maintain electricity facilities	SM:<100 beds	71	3.15	1.29	
	Large: ≥100 beds	147	3.52	1.16	
	All Respondents	218	3.40	1.22	.04
Implement control system for heating / cooling / lighting facilities	SM:<100 beds	70	3.04	1.54	
	Large: ≥100 beds	145	3.48	1.26	
	All Respondents	215	3.34	1.37	.03
Provide locally-produced and seasonal food	SM:<100 beds	71	2.42	1.78	
	Large: ≥100 beds	148	3.50	1.37	
	All Respondents	219	3.15	1.59	.00
Use energy-efficient appliances	SM:<100 beds	70	2.77	1.53	
	Large: ≥100 beds	144	3.28	1.38	
	All Respondents	214	3.12	1.45	.02
Measure and monitor resource usage and waste production	SM:<100 beds	69	2.51	1.62	
	Large: ≥100 beds	146	3.00	1.45	
	All Respondents	215	2.84	1.52	.03
Encourage guest/staff to use green vehicles / public transport	SM:<100 beds	70	2.33	1.65	
	Large: ≥100 beds	145	3.00	1.45	
	All Respondents	215	2.78	1.55	.00
Adapt building design for energy saving	SM:<100 beds	67	2.10	1.71	
	Large: ≥100 beds	144	2.63	1.47	
	All Respondents	211	2.46	1.57	.02
Initiate a hotel environmental policy	SM:<100 beds	67	2.10	1.46	
	Large: ≥100 beds	139	2.57	1.22	
	All Respondents	206	2.42	1.32	.02
Set up environmental targets and benchmarking	SM:<100 beds	67	2.10	1.49	
	Large: ≥100 beds	138	2.54	1.27	
	All Respondents	205	2.40	1.36	.03
Develop environmental code of ethics' for supplier chain	SM:<100 beds	65	1.80	1.72	
	Large: ≥100 beds	137	2.34	1.54	
	All Respondents	202	2.16	1.61	.03

Table 6.42: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of bed A

T-test		N	Mean	Std Dev	Sig.
Provide climate change and environment education for customers and staff	SM:<100 beds	68	1.40	1.46	
	Large: ≥100 beds	142	1.92	1.41	
	All Respondents	210	1.75	1.44	.01
Mitigation measures	SM:<100 beds	73	2.12	1.11	
	Large: ≥100 beds	148	2.61	1.00	
	All Respondents	221	2.45	1.06	.00
Climate Change measures	SM:<100 beds	73	1.97	1.12	
	Large: ≥100 beds	148	2.39	1.02	
	All Respondents	221	2.25	1.07	.01

Table 6.43: Level of implementation of UNWTO and UNEP (2008) recommended mitigation measures for the accommodation sector to respond to climate change, analyzed by hotel size – number of beds B

		N	M	SD	Sig. T-test
Recycle waste and raise customer's awareness of waste	SM: <250 beds	143	3.50	1.35	
	Large: ≥250 beds	77	3.84	.99	
	All Respondents	220	3.62	1.24	.05
Frequently clean and maintain electricity facilities	SM: <250 beds	141	3.22	1.28	
	Large: ≥250 beds	77	3.74	1.01	
	All Respondents	218	3.40	1.22	.00
Implement control system for heating/cooling/lighting facilities	SM: <250 beds	140	3.04	1.47	
	Large: ≥250 beds	75	3.89	.95	
	All Respondents	215	3.34	1.37	.00
Reduce and pre-treat chemical and hazardous wastes	SM: <250 beds	141	2.89	1.64	
	Large: ≥250 beds	75	3.61	1.06	
	All Respondents	216	3.14	1.50	.00
Provide locally-produced and seasonal food	SM: <250 beds	142	2.80	1.67	
	Large: ≥250 beds	77	3.81	1.19	
	All Respondents	219	3.15	1.59	.00
Reduce the use of materials	SM: <250 beds	144	2.95	1.40	
	Large: ≥250 beds	77	3.44	1.22	
	All Respondents	221	3.12	1.36	.01
Use energy-efficient appliances	SM: <250 beds	141	2.89	1.50	
	Large: ≥250 beds	73	3.55	1.24	
	All Respondents	214	3.12	1.45	.00
Measure and monitor resource usage and waste production	SM: <250 beds	139	2.52	1.57	
	Large: ≥250 beds	76	3.43	1.23	
	All Respondents	215	2.84	1.52	.00
Encourage guest/staff to use green vehicles / public transport	SM: <250 beds	141	2.54	1.60	
	Large: ≥250 beds	74	3.24	1.34	
	All Respondents	215	2.78	1.55	.00
Purchase fair-trade / green-label products where possible	SM: <250 beds	137	2.39	1.53	
	Large: ≥250 beds	76	3.07	1.36	
	All Respondents	213	2.63	1.50	.00
Initiate a hotel environmental policy	SM: <250 beds	135	2.26	1.38	
	Large: ≥250 beds	71	2.72	1.15	
	All Respondents	206	2.42	1.32	.02
Set up environmental targets and benchmarking	SM: <250 beds	133	2.23	1.40	
	Large: ≥250 beds	72	2.72	1.24	
	All Respondents	205	2.40	1.36	.01
Develop environmental code of ethics' for supplier chain	SM: <250 beds	128	1.91	1.62	
	Large: ≥250 beds	74	2.61	1.52	
	All Respondents	202	2.16	1.61	.00

Table 6.44: Level of implementation of UNWTO and UNEP (2008) recommended adaptation measures for the accommodation sector to respond to climate change, analyzed by size – number of bed B

		N	M	SD	Sig.
Implement water-saving and reuse measures	SM: <250 beds	140	2.39	1.53	
	Large: ≥250 beds	75	3.07	1.42	
	All Respondents	215	2.63	1.52	.00
Provide climate change and environment education for customers and staff	SM: <250 beds	134	1.57	1.38	
	Large: ≥250 beds	76	2.08	1.50	
	All Respondents	210	1.75	1.44	.01
Mitigation measures	SM: <250 beds	144	2.25	1.10	
	Large: ≥250 beds	77	2.81	.87	
	All Respondents	221	2.45	1.06	.00
Climate Change measures	SM: <250 beds	144	2.09	1.12	
	Large: ≥250 beds	77	2.56	.91	
	All Respondents	221	2.25	1.07	.00

Target Market

The factor of target market is found influential on hotel's attitude toward green marketing and adoption of local-produced food. The hotels with a higher percentage of foreign tourists were less likely to regard the notion of a green hotel as being a marketing ploy (P-value=0.01; Correlation=-0.19) (Table 6.16). International hotels also had higher implementation of providing local-produced and seasonal food (P-value=0.01; Correlation=0.17) (Table 6.27), although this was possibly for creating product differentiation. Nevertheless, it is an interesting finding given the often focus on local businesses as a provider of local foods rather than international ones (Hall & Gössling 2013). However, it should be noted that the above correlations are relatively weak. In addition, there is no result that clearly supports Kučerová (2012)'s argument that international hotels had higher environmental performances (Table 6.28). However, international hotels may focus on international tourists' demand for location convenience and comfort rather than environment protection since they mainly visit Taiwan for business purposes (Chen 2012).

Years of Trading

A hotel business' age appears related to their environmental attitudes, concerns, and actions. Overall, new hotels had more positive attitudes towards environment and climate change responsibility

(P-value=0.04; Correlation=-0.13), governmental regulation regarding climate change (P-value=0.01; Correlation=-0.17), and voluntarily corporate actions (P-value=0.03; Correlation=-0.14) (table 6.16). The hotels with fewer years of trading, placed higher importance on eight factors (Table 6.25), including "owner or top manager's personal value & belief" (P-value=0.04; Correlation=-0.13), capital investment (P-value=0.00; Correlation=-0.27), CSR Policy (P-value=0.03; Correlation=-0.14), risk management (P-value=0.03; Correlation=-0.14), parental company's policy (P-value=0.00; Correlation=-0.22), industry leadership (P-value=0.03; Correlation=-0.15), supplier availability (P-value=0.02; Correlation=-0.15), and stakeholder pressure (P-value=0.03; Correlation=-0.14). Newer hotel businesses also had higher implementation of energy-saving building, low carbon transport (P-value=0.05; Correlation=-0.13), carbon offset projects for guests (P-value=0.01; Correlation=-0.19), emission management with supply chain (P-value=0.04; Correlation=-0.15), and low-climate-risk location (P-value=0.01; Correlation=-0.18)(Tables 6.27, 6.28). However, it should be noted that the above correlations are relatively low. The findings of this thesis corresponded to other research that has noted that newer hotels are more proactive in adopting green building and low carbon practices, either for cost advantage or strategic concerns (Chang 2006; Tseng et al. 2012). It also reflects Lee's observation in Gu Guan area (2005), that new hotels started to choose the location at a low risk of weather extremes and natural disasters.

Experience of Extreme Weather Events

The experience of extreme weather events represented as a significant variable to interpret Taiwanese hotels' perception, attitude, concern, and action in response to environment and climate change in this study (Belle & Bramwell 2005; Hall 2006; Lee & Hung 2007; Hall & Clayton 2009; Cheng 2010; Helgenberger 2011; Rowell & Richins 2013). Based on the answers of multiple-choice questions, this study firstly applied two-step cluster analysis to classify respondents into lodging facility with (1) no experiences of extreme weather events; (2) experience of multiple extreme weather events, such as drought, strong wind, typhoon, extreme rainfall, or floods; and (3) experience of typhoon events. Overall, the hotels with experiences of multiple extreme weather events appeared to have stronger environmental interests. For example, those hotel respondents perceived higher negative climate change

impacts on national tourism industry, hotel's region, and hotel's business for the past five years (Tables 6.45). According to the one-way ANOVAs analysis, they showed higher support toward government environmental policy (sig.=0.03) and specially valued climate change concern (sig.=0.01), the owner or top manager's personal value and belief (sig.=0.03), and CSR policy (sig.=0.04) in their environmental actions. Also, this group of hotel respondents had higher rates of implementation in reducing the use of air-conditioning service (sig.=0.01).

Type of Destination

A two-step cluster analysis was applied to group the location of hotel respondents, including urban, multiple nature, mountain, lake and river, hotspring, as well as coast destinations, based on their multiple choices of area characteristics. Overall, this factor is only related to the environmental action of hotel respondents according to the one-way ANOVAs Analysis (Table 6.46). It is observed that mountain and hotspring hotels had higher level of mitigation measures than urban and coast hotels. A post hoc multiple comparison test indicated that mountain hotels had a higher level of adoption of achieving environmental certification, involving in local conservation or community projects, reducing air-conditioning and material use than urban hotels (Table 6.46). Hotspring hotels performed better in the aspects of promoting green transportation and community conservation, less use of material and air-conditioning than coast hotels.

Table 6.45: Hotel response to environment and climate change, analyzed by experience of extreme weather events

One-Way ANOVAs	**Perception:**											
	Climate Change Impacts on National Tourism for the previous five years (N=238)			Climate Change Impacts on Hotel's Region for the previous five years (N=228)			Climate Change Impacts on Hotel's Business for the previous five years (N=229)			Climate Change Impacts on Hotel's Region for the next five years (N=237)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
None (1)	53	2.81	.74	45	2.49	.90	45	2.76	.68	51	2.94	.54
Multiple EWEs (2)	123	2.37	.89	120	2.31	1.05	120	2.35	1.03	123	2.38	.85
Typhoon (3)	62	2.55	.92	63	2.59	1.12	64	2.63	.95	63	2.68	.84
F		4.98			N/A			N/A			N/A	
P-Value		0.01			0.00			0.00			0.03	
Post Hoc Test (LSD)		1>2			1>2			1>2				

Table 6.45: Hotel response to environment and climate change, analyzed by experience of extreme weather events (continued)

One-Way ANOVAs	**Attitude:** My hotel supports current government environmental policy over climate change concern. (N=250)			**Influential Factor:** Climate Change Concern. (N=246)			Owner or Top manager's Personal Value & Belief (N=246)			CSR Policy (N=246)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
None (1)	55	3.80	.70	54	3.80	.74	55	4.07	.69	55	4.07	.63
Multiple EWEs (2)	130	3.97	.57	127	4.09	.67	126	4.34	.62	126	4.25	.67
Typhoon (3)	65	3.74	.64	65	3.86	.73	65	4.25	.50	65	4.00	.73
F		3.47			4.44			3.74			3.21	
P-Value		0.03			0.01			0.03			0.04	
Post Hoc Test (LSD)		2>3			2>1,3			2>1			2>3	

Table 6.45: Hotel response to environment and climate change, analyzed by experience of extreme weather events (continued)

One-Way ANOVAs	**Action:** Reduce the use of air conditioning (N=240)		
	N	M	SD
None (1)	52	2.48	1.39
Multiple EWEs (2)	125	3.08	1.34
Typhoon (3)	63	2.65	1.22
F	4.64		
P-Value	0.01		
Post Hoc Test (LSD)	2>1,3		

Table 6.46: Level of implementation of UNWTO and UNEP (2008) recommended climate change measures for the accommodation sector to respond to climate change, analyzed by destination

One-Way ANOVAs	Provide locally-produced & seasonal food (N=244)			Reduce the use of materials (N=246)			Reduce the use of air conditioning (N=240)			Encourage guest/staff to use green vehicles/public transport (N=240)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Mountain (1)	29	3.62	1.47	29	3.66	1.05	29	3.59	1.15	29	3.17	1.39
Multi-nature (2)	6	3.00	2.45	6	3.17	1.72	6	3.17	1.72	6	2.83	1.60
Lake & River (3)	14	4.07	1.14	14	3.50	1.45	13	2.69	1.32	14	3.21	1.31
Hotspring (4)	31	3.65	1.17	31	3.42	1.34	31	3.45	1.34	31	3.39	1.20
Urban (5)	148	3.01	1.56	150	3.04	1.33	147	2.59	1.27	144	2.68	1.59
Coast (6)	16	2.44	1.71	16	2.50	1.55	14	2.50	1.45	16	2.00	1.55
F	N/A			2.26			4.73			2.53		
P-Value	0.01			0.05			0.00			0.03		
Post Hoc Test (LSD)	N/A			1,3,4>6 1>5			1>3,5,6 4>5,6			1,3,4>6 4>5		

Table 6.46: Level of implementation of UNWTO and UNEP (2008) recommended climate change measures for the accommodation sector to respond to climate change, analyzed by destination (continued)

One-Way ANOVAs	Achieve environmental certification (N=220)			Volunteer for local conservation or community projects (N=235)			Mitigation measure (N=247)			Climate Change measures (N=247)		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Mountain (1)	28	2.54	1.58	29	2.97	1.35	29	2.91	.98	29	2.70	.93
Multi-nature (2)	6	1.33	1.63	6	3.17	2.23	6	2.33	1.08	6	2.20	1.10
Lake & River (3)	13	1.62	1.12	14	2.71	1.38	14	2.65	.84	14	2.51	.84
Hotspring (4)	28	1.82	1.68	31	3.26	1.24	31	2.77	.94	31	2.59	1.00
Urban (5)	132	1.63	1.45	139	2.11	1.48	151	2.37	1.07	151	2.16	1.09
Coast (6)	13	1.23	1.09	16	2.31	1.89	16	2.14	1.08	16	1.98	1.03
F	2.23			4.44			2.29			2.31		
P-Value	0.05			0.00			0.05			0.05		
Post Hoc Test (LSD)	1<5,6			1,4>5 4>6			1>5,6 4>5,6			1,4>5 1>6		

Remarks: The mean difference is significant at the .05 level

Discussion

This chapter revealed the factors of size, standard (defined by star rating and national classification system), and experience of extreme weather events, were related to the Taiwanese accommodation sector response to the environment and climate change. The following will further discuss the significance of these determinants to hotel and environment studies and some of the overlooked issues in previous literature. It also emphasizes the importance of adopting concepts according to the conditions of local climate change phenomena, international standards, and domestic hotel characteristics.

Hotel Size

Although previous research has focused on hotel scale to explore the environmental behaviour of large and small lodging facilities there is, as noted in Chapters 2 and 4, no internationally accepted criterion for hotel size (Rahman et al. 2012). Overall, at least of eight definitions have been applied, mainly based on the number of employees, rooms, and beds (see Table 4.9). Number of staff number is one of the more popular criteria (Vernon et al. 2003; Garay and Font 2012), which is influenced by European Commission (2005) regulations. Room and/or bed capacity are also widely used due (Hobson & Essex 2001; Bohdanowicz 2005; Tzschentke et al. 2008; Dalton et al. 2009a; 2009b; Jarvis & Pulido Ortega 2010; Radwan et al. 2010, 2012; Chan 2011; Nicholls & Kang 2012a). However, the reason for adopting certain hotel scales is only rarely explained in previous research (Rahman et al. 2012).

To explore the issue of the influence of hotel size criterion, the size impact on hotel's environmental behaviour was firstly tested via the real number of employees, rooms, and beds, using Pearson correlation analysis. From this large sized hotel operators are more likely to perceive their own environmental responsibilities (see also Vernon et al. 2003), and to support green marketing than small-sized lodging facilities. The relationship between hotel size and their environmental implementation was evident, although not strong. Staff number appeared as the most representative variable, which contributing to differentiate hotel adoption of 80% of climate change measures. Large

hotels by staff size are more likely to be affected by government policy and regulation (Pearson correlation analysis; P-value=0.02), while no relation was found by testing the variables of room or bed number with respect to influential factors on hotel's environmental action.

One-way ANOVAs analysis and T-tests were utilized to examine size impact according to the definitions noted in Table 4.9. In the employee category, the four-level classification (Micro Hotel: <10 staff; Small Hotel: 10-49 staff; Medium Hotel: 50-249 staff; Large Hotel: ≥250 staff), demonstrates stronger relationshps to variables, presenting statistical significance in 62% attitude questions, 91% action questions, and 9% of motivation questions. Room capacity criteria were also examined, Overall, the three-level room definition, that grouped hotel size by ≤10, 11-50, and >50 rooms, contributed a high level of statistic significance, including 54% in attitude questions, 31% in action questions, and 57% in influential-factor questions according to one-way ANOVAs analysis. However, due to a lack of sufficient responses at the lower size end (only three hotels had less than 10 rooms), this is insifficient support for the validity of such findings although it is clearly a line of further research. In examining the size factor on the basis of bed numbers, statistical significance was found in 54% attitude questions, 34% action questions, and 0% influence-factor questions according to the results of T-test analysis. Therefore, this research concluded that size scale based on four different levels of employees, is the most adequate standard to differentiate the environmental behaviour of Taiwanese accommodation sector given the range of statistical significance. This finding is likely because the number of hotel staff, accounting the highest part of operational expense, and has a close relationship to pressure to improve hotel cost efficiency and resource allocation via proactively environmental solutions (Chen and Chang 2012).

Hotel Standard

Similar to previous research, this study supports the noton that higher standard hotels have higher implementation of environmental practices (Mensah 2006; Erdogan & Baris 2007; Ali et al. 2008; Peršić-Živadinov & Blažević 2010; Nicholls & Kang 2012a). Hotel classification systems are used as a quality indicator of facility and service of lodging facility and are evaluated by room guest experience of comfort and professionalism during their hotel stay (López Fernández & Serrano Bedia 2004). In the

Taiwan hotel system, lodging providers are categorized into tourist hotel and standard hotel on the basis of room and facility capacity (TTB 2010b; 2013c). Standard hotels are required to build with guest room, lobby, reception, bathroom, and storage room, and tourist hotels should have over 30 guest rooms and no less than nine amenities (refer to Table 4.1). The TTB introduced a star-rating system to the hospitality industry in 2008 which emphasized the importance of service and hardware criteria in hotel standard evaluation (TTB 2012e). For all star hotels, it is compulsory to adopt building and space design, lobby and reception area, restaurant, toilet and bathroom, as well as 24-hour Hotel Service, but the ones with business centers are also graded into the levels of three to five star hotels. Please refer back to Table 4.3 for the ranking standard of the star hotel system.

In this study, the national hotel system was found as a more significant variable than star rating in interpretting the relationship between accommodation standard and environmental behaviour of hotels in response to environment and climate change. The t-test analysis indicated that the environmental behaviour of tourist hotels was different from standard hotels with respect to several aspects of attitude, action, and influential factors. For example, tourist hotel respondents had a stronger belief in green marketing than standard hotels (Table 6.5). Also, tourist hotels had higher implementation of nearly half of the identified climate change measures, especially in the field of mitigation (Sig.=0.00). Tourist hotels also appeared more influenced by CSR policy (Sig.=005), government policy and regulation (Sig.=0.02), and parent company's policies (Sig.=0.04) than standard hotels. The importance of star rating was based on the responses of 48 star hotels, about 17% of the 276 star-rated hotels. High star-rated hotels (four-to-five star) had higher implementation of 25% of climate change measures than low-star-rating hotels (one-to-three star), which also overlapped with the results of hotel classification analysis. High standard hotels appeared more proactive in conducting energy-, waste-, water- practices, local purchase, and material-use reduction. However, tourist hotels are leading in adopting energy-efficient facilities, green transport, green product, ethical supply chains, alternative energy, environmental policy, target, and benchmarking. Overall, the national hotel system is potentially a more representative factor than the star rating scheme in evaluating the environmental behavior of Taiwanese accommodation sector on the basis of hotel standard, but further research is required since only 10% of Taiwanese hotels had received star accreditation at the time of conducting this study.

Experience of Extreme Weather Events

The results of this research supports previous findings that tourism operators with the experience of extreme weather events were more sensitive to climate change impact on the industry (Belle & Bramwell 2005; Hall 2006; Lee & Hung 2007; Hall & Clayton 2009; Cheng 2010; Helgenberger 2011; Rowell & Richins 2013). However, the importance of evaluating the characteristics of such experience have been strengthened in the present study. Hall (2006) argued the risk perception of tourism entrepreneurs are more affected by individual understanding of catastrophe, including the level of scale, frequency, and damage. Indeed, this research found there was no perception difference between hotel respondents with no experience of extreme weather event or just with the experience of typhoon. Nevertheless, the hotel respondents with experiences of multiple extreme weather events, were more pessimistic about the climate change impacts on tourism (Table 6.45). This observation corresponded to the notion that Taiwan has been a “catastrophic country” (NCDR 2011). Those lodging operators who had experience multiple events were more aware of the connection between climate change and tourism business. It also explained why they were more supportive to current government policy over climate change concern. According to Pearson correlation analysis hotel respondents with experience of more kinds of extreme weather events also had higher recognition of implementing carbon tax (P-value=0.2), carbon offset (P-value=0.1) and carbon trading schemes (P-value=0.4), although the correlations were not that strong (Table 6.16).

According to the results of one-way ANOVAs Analysis, hotel respondents with experience of multiple extreme weather events only performed better at reducing the use of air-conditioning. However, Pearson correlation analysis showed that the experienced hotels had higher implementation of climate change measures (P-value=0.01), including reducing the use of air conditioning (P-value=0.00), using alternative fuels and renewable energy (P-value=0.01), integrating emission management with supply chain (P-value=0.05), reducing the use of materials (P-value=0.01), recycling waste and raising customer’s awareness of waste (P-value=0.01), measuring and monitoring resource usage and waste production (P-value=0,05), developing an environmental code of ethics’ for supplier chain (P-value=0.03),

volunteering for local conservation or community projects (P-value=0.00), providing climate change and environment education (P-value=0.01), and developing links with international policies, mechanism, cooperation and standards regarding to climate change (P-value=0.02), than less experienced hotels (Table 6.28). In addition to conventional reasons, like public relations and reputation (P-value=0.05), and owner/top manager value and belief (P-value=0.02), those hotels were more motivated by some of the more neglected factors in hotels and environmental practice research, such as environmental concern (P-value=0.01), climate change concern (P-value=0.00), CSR policy (P-value=0.05), industry leadership (P-value=0.04), and risk management (P-value=0.03) (see Hall 2006; Graci & Dodds 2008; Morrison & Pickering 2012). Even though the above correlations were modest (Table 6.25), it does suggest that the more experienced hotel operations potentially adopt environment, climate change, and CSR concerns in their daily operation. With the increase of frequent and severe extreme weather events in the region, there is still a reasonable expectation that Taiwanese hotels will become more environmentally responsible and make more solid progress in adopting climate change measures.

Chapter 7

Conclusions

This research is one of first studies to explore how tourism businesses respond to environment and climate change in an Asian context. It both provides a detailed discussion with respect to climate change impacts on regional tourism and hotel business, and an insight into the environmental behaviour and practices of Taiwanese hotels. This research therefore not only contributes to an improved understanding of the Taiwanese situation but also to the development of Asian focussed research on the tourism and hospitality industry's environmental practices. This chapter concludes the thesis. It summarizes the key findings of the research, discussed the prospective research contributions and issues, and then proposes potential solutions to facilitate the transformation of Taiwan hotel business upon the challenges of climate change.

As Chapter 1 indicated this study contributes not only to an improved understanding of tourism business, and specifically the accommodation sector, response to climate change in a Taiwanese context but, given the relative lack of literature (Hall 2008), also in the broader Asian context. Thus, this baseline study of Taiwanese hotels was designed to answer:

(1) How do Taiwanese hotels perceive the impacts of climate change?
(2) What role do business social and environmental policies and actions, including green marketing initiatives play in hotel response to climate change?
(3) What is the level of implementation of UNWTO and UNEP (2008)'s recommended climate change measures for tourism business by Taiwanese accommodation establishments? (see Table 1.8 for an outline of the specific UNWTO-WNEP [2008] measures for accommodation establishments).

For these three main questions the major influential factors, as drawn from the relevant international and domestic literature (see Chapters 2 and 3), on Taiwanese hotel attitudes, barriers, motivations, and perceptions to enact climate change and environment practices were also explored. The key findings in

response to these questions are detailed below

Key Findings

Generally speaking, Taiwanese hotel respondents highly acknowledged the existence of climate change, but rarely related this phenomenon to their daily business operation. Taiwanese hotels have a high awareness of climate change, possibly due to information provided by general media and by government. Ninety-nine percent of hotel respondents had access to information of climate change. Respondents also had substantial experience of extreme weather events, with nearly 80% of hotel respondents having been affected by weather extremes, and over half of them had experienced more than one kind of extreme weather events. Overall, they recognized the occurrence of hotter summers, more frequent typhoons and extreme rainfall events. The Taiwanese focus on climate change is different from that of international findings, such as concerns over warmer winters (Bicknell & Mcmanus 2006; Tervo 2007; Brouder & Lundmark 2011; Morrison & Pickering 2012), and African hotel operators' awareness of extreme temperature, drought and ecosystem changes (Saarinen et al. 2012). This study has therefore shed insight on tourism and hospitality business response to climate change in a substantially different climatic context from where research has primarily been conducted (Hall 2008; Scott et al. 2012). Interestingly, despite substantial awareness of climate change as well as the effects of weather extremes, Taiwanese hotel respondents perceived only slightly negative climate change impacts on tourism and hotel businesses, although they did expected its influence to increase at the national level as well as the business level in the future (see also Jarvis & Pulido Ortega 2010; Saarinen et al. 2012).

The environmental attitude of Taiwan hotel respondents was rather reserved. Local lodging operators tended to deny their hotel's contribution to climate change. In addition, their agreement with the role of corporate responsibility and government policy in response to environment and climate change, or the effect of green marketing, was close to neutral or only slightly positive. These results corresponded to the environmental attitude of some regional hotels in New Zealand and Barbadian tourism business, like their hesitation about governmental intervention in order to avoid extra business costs (Belle & Bramwell 2005; Hall 2006). Jarvis and Pulido Ortega (2010) argued that such attitudes, including a hotel's

sense of environmental responsibility, could be improved if the relations between climate change, hotel business, and sustainability are beter explained to hotel managers and owners on the basis of scientific evidence, although Hall (2014b) has questioned the notion that better explanation alone would change tourism business behaviours.

Progress of climate change management in the Taiwan accommodation sector was arguably far behind best international practices (Gössling 2010; Scott et al. 2012). Hotel respondents mostly focus on waste management, energy-saving practice, and local-produced cuisine. However, the level of environmental implementation of Taiwanese hotels averaged lower than even a moderate standard. It also corresponded to hotel's low level of adoption of current environmental policy, although there was general awareness of such schemes. Hotel performance with respect to climate change adaptation was close to poor. Such a situation is possibly due to the development strategies of many Asian developing countries, including Taiwan. For example, a low water price policy is quite common in the region. This was originally aimed at assisting industrial development, but this has had an effect of user's have a poor sense of the value of water conservation. The findings also suggest local hotels' unfamiliarity or ignorance of UNWTO's proposed measures for accommodation sector response to climate change, such as international cooperation for knowledge exchange (see also Leslie 2001; Wan 2006; Erdogan & Baris 2007).

In reviewing the influential factors on hotel's environmental action, 20 of 23 factors identified in the literature (Chapters 2 and 3) and then included in the survey were rated as important or above. Taiwanese hotel's low level of environmental implementation also suggests their low confidence in the benefits of climate change measures, such as cost reduction, public relation and reputation, customer demand, and competitive advantage, as well as their insufficient capacity of leadership, staff, existing building, and financial resource. However, this research argued that environmental and governmental forces may actually be the keys to stimulate concrete actions of leading Taiwanese hotels, followed by the factors of corporate policy and social responsibility. According to the canonical correlation analysis that was conducted there was a positive relation between hotel's environmental attitude and implementation. For example, hotel attitude towards "implementing strategies to respond to climate

change, even not required by government" was influential on their conduction of "involving and complying with climate change policies and plans". In addition, respondent's attitude towards climate change policy and their contributions to climate change were highly related to the implementation of "integrating emission management with supply chain". Overall, the findings indicated the importance of enhancing hotels' knowledge of climate change phenomenon, to build up their sense of environmental responsibility, and to educate them of the availability of climate change policy measures.

The experience of the Taiwan hotel industry also provided some significant insights of transforming daily operation to climate change mitigation. For example, Taiwanese hotels posited a high priority for waste management, including waste recycling, customer education, material-use reduction, as well as decrease and pretreatment of chemical and hazardous wastes. In fact, this result has a strong legislative background. Since 1997, a series of waste management programs, like kitchen waste collection, the minimization of resource consumption, less use of plastic bags, disposable chopsticks and drinking cups, resource recycling, reuse, and regeneration, have been promoted with the participation of Taiwanese residents, business, recycling companies, and local governments (EPA 2012d). Apparently, it has become part of daily routine in domestic hotels in order to comply with governmental policy and social expectation. Another interesting finding in the research is Taiwanese hotel adoption of seasonal and local-produced food, as a representative example of integrating low-carbon- mile concept into a distinguished selling point (see also Hall and Gössling 2013). Supported by rich farming produce all year round, it has become popular for Taiwanese hotels to provide creative cuisines using premium local food. In the face of fierce competition, the use of seasonal and local produce is actually a conventional strategy for Taiwanese hotels, while reducing carbon mileage appears as a bonus for promotional headlines (Now News 2013).

By testing the relationships between hotel characteristics and environmental behaviour, this research concluded that size and experience factors were the more influential on hotel response to environment and climate change. Large-sized hotels with experience of multiple extreme weather events were more proactive with respect to their environmental perception, attitude and actions. The variables used had their own significance for interpretting this issue. For instance, Eastern Taiwan hotels, large-sized

accommodation providers, and lodging facilities with experience of weather extremes were more likely to perceive negative impacts of climate change on tourism. There was also some difference in their environmental attitude. Generally speaking, small-sized hotels were more passive, while new hotels had greater recognition of their responsibility toward the environment and climate change. Chain hotels, weather extreme experienced lodging facilities, and newly built accommodation providers had stronger beliefs in government's responsibility and policy to regulate tourism business, although the latter also had greater willingness to undertake voluntary actions. Research also noted that tourist-type, international and chain-affiliated hotels were also more supportive of green marketing strategies.

As to respondents' environmental actions, lodging facilities which are classified as tourist hotels, locate in mountain regions, or have experience of more kinds of extreme weather events, had the highest rates of implementation of climate change measures. In contrast, small-sized hotels had lower levels of adoption of environmental practices than large-sized hotels. Noticeably, hotels that experienced weather extremes paid greater attention to environment and climate change concerns, which were ranked as one of the lowest priorities of other hotel segments, but were found to be effective motivators in facilitating hotel's environmental performance. Although tourist hotels placed high importance on CSR Policy, government policy and regulation, it is also observed that small-sized hotels' were ignorant of such aspects. This research further argued that there is potential for chain-affiliated and newly-built hotels in Taiwan to improve their implementation of climate change measures since they have acknowledged the significance of corporate policy and social responsibility factors.

Research Contributions and Prospective Issues

This research is one of the first studies that examines (1) the environmental behaviour of accommodation businesses in response to environment and climate change in a Taiwanese and Asian context; and (2) the level of implementation of climate change measures recommended by UNWTO and UNEP (2008). It is initially found the environmental action of Taiwanese hotel respondents is related to their attitude towards corporate responsibility, government policy and green marketing, but independent from their perception of climate change impacts on tourism. However, this research also

indicated that hotels with experience of multiple extreme weather events were more proactive to adopt environmental practices. A possible explanation is hotel respondents did not attribute weather extremes to one of the climate change phenomena. Nevertheless, further research is required to understand the gap between hotel's awareness, attitude, and action in the face of climate change. Another issue is how to interpret hotel performance in response to climate change. This study evaluated hotels' level of environmental adoption by respondents' self-assessment, while the current knowledge of implementation standard is rather limited. Nevertheless, there is a demand to assess the energy, resource and water consumption by hotel business in order to compare with the benchmarking rate, especially if carbon management becomes more regulated in the near future. Some of the research gaps that emerge with respect to hotel knowledge and practice could perhaps be investigated via the conduct of a Delphi approach in order to help define hotel actions, especially given that several of the forms of climate change adaptation usually lack quantitative indicators.

The application of hotel variables, such as size, standard, and experience of weather extremes, was challenged in this study. Global literature generally agreed that small hotels were less proactive in environment management than large hotels. However, this conclusion is hard to justify in the absence of internationally accepted hotel scale (Rahman et al. 2012). This research observed at least eight definitions of hotel size that have been utilized in previous environmental studies, mainly based on the number of employees, rooms, and beds. Confusingly, one hotel could be classified as small accommodation provider in one piece of research, but labeled as a large lodging operator in another study (Hobson & Essex 2001; Chan 2011; Nicholls & Kang 2012a; Rahman et al. 2012). Therefore, the present research strengthened the importance of having an internationally standardized definition of hotel scale, while discussing the size impact on hotel's environmental behaviour. After testing the available classifications, the size factor, defined by a four-level employee approach (Micro: <10 staff; Small: 10-49 staff; Medium: 50-249 staff; Large: ≥250 staff), was found as the most significant predictor of a relationship between hotel size and environmental practices.

Similar issues appeared in the use of a hotel standard variable in the previous environmental literature, as each country may have its own requirements for star rating or hotel classification. Overall, this study

supports the notion that quality hotels have higher levels of implementation of environmental practices (Mensah 2006; Erdogan & Baris 2007; Ali et al. 2008; Peršić-Živadinov & Blažević 2010; Nicholls & Kang 2012a). Nevertheless, this research found that the national hotel system classification was a more significant predictor than star rating accreditation, when examining the relations between accommodation standard and environmental behaviour of Taiwanese hotels in response to environment and climate change. It is reasoned that the criteria of hotel classification system are more directly related to the operational costs of accommodation providers. Accordingly, the high-standard lodging facilities, called tourist hotels in this study, usually have greater financial pressure to engage in resource-saving practices and green market development.

Given that the East Asia region is especially vulnerable to climate change and natural disasters (see Chapter 1), this research not only acknowledged the impact of extreme weather event experience on Taiwanese hotel response to environment and climate change, but also identified how its characteristics, such as experience of multiple weather extremes, influenced hotel environmental behaviour. This research principally agreed with past findings that tourism operators with experience of extreme weather events were more environmentally proactive (Belle & Bramwell 2005; Hall 2006; Lee & Hung 2007; Hall & Clayton 2009; Cheng 2010; Helgenberger 2011; Rowell & Richins 2013). Research results showed there was no difference in perception between hotel respondents without experience of extreme weather event or just with the experience of a typhoon. However, it was found that hotel respondents with experiences of multiple extreme weather events, had higher awareness of climate change impacts, had a more supportive attitude towards climate change policy, and were leading progress in implementing climate change measures. Thus, this study suggests that the results of such regional level research with respect to the features of such experiences, including scale, frequency, and damage are significant not only with respect to understanding such experiences but also in identifying how they may assist in better communicating climate change and environmental practice messages and improving adoption rates of climate change measures.

Management Implications

The low level of hotel respondents' implementation of climate change measures is an accurate reflection of the current degree of industry commitment to climate change adaptation and mitigation (see also Gössling 2010; Scott et al. 2012). Unlike the statements from some industry reports (e.g. UNWTO-UNEP 2008; WEF 2009; WTTC 2009, 2010) this research does not try to jump to an optimistic anticipation that the green transformation of Taiwanese hotel business will occur in the next few years in response to the threats of climate change. Nevertheless, some baseline efforts, especially in the fields of climate change research, benchmarking development, education and training, government regulation and policy, should be reasonably expected or encouraged. First, this research observed some novel types of climate change impacts on tourism and hotel business, which are not adequately examined in the Western literature on tourism and climate change. Thus, a science-based research project is important in order to provide a time-framed forecast or indication with respect to climate change and Taiwanese tourism and hotel business would be extremely valuable. Such a report would also provide strong evidence of the relations between the environmental behaviour of tourism and hotel industry, and climate change consequences on their business, especially with respect to resource shortages, and help provide a foundation for government mitigation and adaptation policy in response to environment and climate change.

Secondly, a benchmarking system that classifies hotel consumption levels of energy and water, and production of waste, needs to be developed on the basis of a lodging facility's scale, standard, and location. Previous studies have emphasized resource savings of green-leading hotels. However, it is actually hard for all hotels to duplicate those experiences due to limitations in corporate capacity, customer demand, or geographic condition (Chan 2011; Chen & Chen 2012). Such an approach is also rather debatable since the hotels that save the largest amount of consumption do not necessarily consume the least. Therefore, a benchmarking system is suggested as a essential step to help guide Taiwanese hotels to conduct climate change mitigation.

Thirdly, a government-led education and training project should facilitate the development of climate change knowledge and CSR in the Taiwanese hotel industry (see also López-Gamero et al 2011b). This research indicated that Taiwanese hotels generally lacked an understanding of climate change impacts on their business, although they recognized themselves as victims of frequent extreme weather events. Such knowledge needs to build on the basis of a large-scale regionally based study of climate change phenomena, and its interaction with local tourism activities, something that is extremely unlikely for a single hotel to conduct. Another focal point of educational programmes is greater support for developing CSR programmes, which were found as effective motivators for Taiwanese hotel's environmental actions as well as knowledge transfer with respect to energy-, water, or waste-saving techniques according to hotel's capacity, size, and location (Chan 2011). Since this information is involved with corporate know-how and international knowledge exchange, it would rely on third party to collect and deliver. Learning from the failure experience of green hotel scheme (Chen & Chen 2012), the TTB is potentially a more appropriate authority for such advice rather than the EPA given its direct governance power over hotel business. It should be planned as a long-term joint project in order to nurture the green roots of Taiwanese hotels in response to climate change and environment (Zhang et al. 2002).

Fourthly, this research suggests that a legislative-based environmental policy is likely more suitable than voluntary schemes for Taiwan hotel business given the role of compliance within local industry culture (Shah 2011; Lai 2012). The inefficiency of voluntary forms of environmental policy interventions has been evidenced by Taiwanese hotels' high awareness and low adoption rate. In contrast, the implementation of waste management regulation, which contributes to the involvement of citizens, supplier and business by the combination of fine and infrastructure solutions, has brought evident improvements in the environmental performance of the Taiwan hotel industry. This results of this research potentially supports the need for a strong influence of the public sector on hotel business, but the choice of instruments is extremely important for the next generation environmental policies that aims at managing climate change impacts (Hall 2014b).

Finally, a new form of marketing model is emerging in the hotel industry, but it needs a systematic introduction to promote flagship projects in order to help Taiwanese hotels proactively cope with

climate change challenges. For example, hotspring hotels have developed “cool-theme” products to increase business in the longer, hotter summer period. However, it is more important to implant strategic thinking, such as renovating hotel designs, changing consumption patterns, or re-package product, such as those of the hotsprings, instead of sinking in price competition. Nevertheless, the communication of service change, such as strengthening the benefits of eco-friendly lodging facility, is potentially more demanding than a price discount approach, especially given that the value of the concept of environmentally friendly lodging is still questioned by local hotels and mass customers (Ham & Han 2013). Internationally successful stories, including upscale green hotels that emphasize offers of healthy environment, fresh organic foods, less chemical amenities, non-petrochemical items, and air quality, need to be shared and transferred into local know-how (Scott et al. 2012). In addition, the recovery marketing approach that was recently practiced by the hotels which were continuously affected by weather extremes and natural disasters (Lee 2005) also requires further study with respect to its wider implications. This research suggested its development should integrate the information of environmental evaluation and product renovation instead of designing a short-vision marketing campaign only for recovering income loss.

In conclusion, although this research is based on an unknown future, it is believed that the increasingly high likelihood of catastrophic climate change (see Chapter 1) is significant enough to reason, analyze, and capture a new form of accommodation business model that places greater premium on environmental factors. With the intensive stimulation of climate change phenomena and increased and the magnitude and frequency of extreme weather events, like the 2013 Super Typhoon Haiyan, the Asia and Taiwanese tourism industries needs a regional platform to explore, communicate and establish its know-how in response to environment and climate change that is immediately relevant to the local experience and context. This example of Taiwanese hotels provides some thoughts on the level of transformation in the accommodation sector required to cope with environment and climate change challenges. Without providing for such a transformation from an Asian perspective, it is likely that the accommodation sector will find it increasingly hard to adapt and mitigate, with a corresponding and potentially irreversible decline not only in the economic vitality of the Taiwanese hotel sector but also the natural resources on which they ultimately depend.

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Appendix A: EPA (2012) Green Mark Criteria

1.Scope
This standard is applicable to all accommodation service providers ("hotels") with valid government-issued tourist hotel business licenses or hotel licenses, which include both tourist hotels and hotels (including guest houses owned by government agencies).
2.Levels of Green Mark Hotels
Green Mark certified hotels are divided into the following levels:
(1) Gold-level: Meet requirements of all mandatory criteria in 3.1 and all optional criteria in 3.2;
(2) Silver-level: Meet all mandatory criteria in 3.1, and at least one requirement in each optional sub-criterion (3.2.1-3.2.6) listed in 3.2, and meet at least 50% of all requirements in 3.2;
(3) Bronze-level: Meet all mandatory criteria in 3.1.
Table 1 Levels of Green Mark Hotels and Requirements

Level	Characteristics and Requirements
Gold	Meet requirements of all 3.1 and 3.2 criteria
Silver	Meet requirements of all 3.1 and at least one requirement in 3.2.1 to 3.2.6, and at least 50% of all requirements in 3.2
Bronze	Meet all requirements of in 3.1

3. Site Characteristics and Specific Requirements
Evidence shall be provided for requirements relevant to applicant's hotel. No verification is required if related facilities are not present on site.
3.1 Mandatory Criteria
3.1.1 The hotel's environmental management shall meet the following requirements:
(1) No record of fines/punishments by environmental competent authority due to legal non-compliances one year prior to submitting application;
(2) The indoor air quality shall meet the EPA stipulated air quality requirements, and shall have maintenance measures in place and conduct period testing;
(3) Have environmental policy and environmental management program/action plan in place;
(4) Establish annual baseline data for energy and water consumption, disposable product consumption and waste management;
(5) Conduct annual employee environmental education and training and maintain relevant records;
(6) Implement office environmental measures in office area based on EPA's "DIY Environmental Protection Measures in the Office" and "Practice Manual for Environmental Initiatives in the Office Environment";
(7) Maintain tidiness for the perimeter around the facilities;
(8) The restaurant uses no food sourced from endangered species;
3.1.2 The hotel's energy conservation measures shall meet the following requirements:
(1) Conduct annual maintenance and adjustment of heating/ventilation/air conditioning (HVAC) system;
(2) Install on-off sensor or timing device for the ventilation system of basement parking area;
(3) The venting fan and light switch in the bathroom of guest room shall be switched on-off together;
(4) Reduce use of elevator or escalator during low-usage time;
(5) Install heat recovery or thermal insulation equipment at large air conditioning system, hot water boiler system or heated swimming pool;
(6) Ensure existence of procedure for maintaining light off in unoccupied areas;
(7) Install plastic curtain or air curtain at the refrigeration area of the restaurant;
(8) Install optical sensor or on-off timer for outdoor lighting.
3.1.3 The hotel's water conservation measures shall meet the following requirements:
(1) Conduct semi-annual maintenance and adjustment for water-using equipment (including piping, storage tanks and cooling towers);
(2) Place placard or use other means to let guests know that they have the option of replacing the towers/sheets daily or multiple-day;
(3) Post placard or adopt other means in the guest rooms/bathrooms to encourage electricity and water conservation;
3.1.4 The hotels' green purchasing activities shall meet the following requirements:
(1) If there are environment-related products for sale in the hotel store, they shall include certified green products (including Green Mark, Type-II, energy conserving and water saving products);
(2) For office products/supplies, consumerables or spare products, and cleaning products, environmental friendly products shall be purchased preferentially (including Green Mark, Type-II, energy conserving and water saving products).
3.1.5 The hotel's reduction of disposal product use and waste reduction measures shall meet the following requirements:
(1) Do not offer disposable products (shampoo, conditioner, soap, tooth brush, toothpaste in one-time use small packaging); or have incentives or measures in place to encourage guests reduce use of disposable products.
(2) Do not offer disposable tableware (one-time use plate, chopsticks, paper cup, plastic cup, etc.).

(3) Have measures in place to inform guests of the environmental impacts of disposable products;
(4) If applicable, do not use disposal tablecloth in the restaurant.
3.1.6 The hotel's toxic/hazardous substance management shall meet the following requirements:
(1) Relevant facilities or procedures are in place to recycle waste batteries and lamps; the collected waste batteries/lamps shall be delivered to the municipal waste management department, or recyclers and processors of waste batteries or lamps; and evidence shall be collected for such recycling activities;
(2) The use of environmental, sanitary or pest control chemicals shall comply with local environmental regulations;
3.1.7 The hotel's garbage sorting and resource recycling activities shall meet the following requirements:
(1) Garbage sorting and resource recycling shall be conducted;
(2) Kitchen/food waste shall be collected and recycled;
(3) No purchasing of excessively-packaged products to reduce packaging waste;
(4) Oil separation/retention device shall be in place and properly operated to treat wastewater from kitchen or restaurant prior to their discharge to the sanitary sewer.
3.1.8 The hotel's pollution control measures shall meet the following requirements:
(1) The restaurant shall be equipped with tableware cleaning equipment meeting the requirements of health/sanitation competent authority;
(2) The site's wastewater shall be discharged into public sanitary sewer or properly operated wastewater treatment facilities with periodic sludge removal. Water quality of the effluent shall meet the relevant effluent standards.
(3) The restaurant or kitchen's ventilation hoods shall be equipped with oil mist and odor treatment device and the hoods' noise level shall meet relevant legal requirements.
3.2 Optional Criteria
3.2.1 The hotel's environmental management shall meet the following requirements:
(1) Participate in community activities or programs benefiting community residents;
(2) Have improvement mechanism in place to gather and review guests' comments;
(3) Preferentially adopt local or organic produce in the restaurant, and use no food sourced from endangered species;
(4) Participate in EPA's Green Action Campaign.
3.2.2 The hotel's energy conservation measures shall meet the following requirements:
(1) Reset the thermostat to default temperature setting after the guests have left the room;
(2) Over half of the indoor light fixtures shall use energy conserving lamps;
(3) Over half of all exit signs or emergency directional signs shall use compact fluorescent lamps or LED lamps;
(4) The power on-off switch and the room key card for the guest room shall work together; or have measures in place to switch off power after the guests left the room;
(5) Provide means to encourage guests not to drive to the hotel, such as providing shuttle service to the hotel.
3.2.3 The hotel's water conservation measures shall meet the following requirements:
(1) Over half of all faucets and showerheads shall meet water-saving criteria;
(2) Over half of all toilets shall be Green Mark, Water-Saving Mark products or with water saving device installed;
(3) The overflow/bath water from the pool or spa areas shall be collected separately from other waste water (such as kitchen or bathroom shower water), and be reused after primary treatment (such as filtering out hairs and suspended solids).
3.2.4 The hotels' green purchasing activities shall meet the following requirements: The green product ratio in at least five green product categories (including Green Mark, Type-II, energy conserving and water saving products) shall be at least 50%.
3.2.5 The hotel's reduction of disposal product use and waste reduction measures shall meet the following requirements:
(1) The restaurant shall provide reusable napkins or towels to the guests;
(2) Do not offer disposable tableware (including one-time use PS/plastic/paper plate, cup, bo[w]l, fork, spoon, chopsticks, etc.).
3.2.6 The hotel's toxic/hazardous substance management shall meet the following requirements:
(1) If applicable, halogenated solvent shall not be used in the dry cleaning equipment.
(2) For water-cooled air conditioning system, cooling water shall be periodically checked for presence of Legionella pneumophila.
3.3 If the hotel has a valid ISO 14001 certificate, the requirements of 3.1.1, 3.1.6 and 3.1.7 can be assumed met.
4.Labeling
Based on the achieved level, the hotel can be labeled as "Gold-Level Green Mark Hotel", "Silver-Level Green Mark Hotel", "Bronze-Level Green Mark Hotel", and the Green Mark Certificate shall be placed at a prominent place of the hotel counter for public recognition.
5. Notes
5.1 Green Mark-labeled hotels shall conduct continuous improvement actions to the above environmental measures, and shall provide an annual report on baseline comparison, analysis of difference in compliance with relevant requirements, and results in implementing environmental management program/action plan.
5.2 The silver-level or bronze-level hotel can set the goal of becoming a gold-level hotel, and conduct relevant measures and efforts in pursuing this goal.

Appendix B: Survey
Institution Letter

University of Canterbury
College of Business & Economics
Department of Management
Private Bag 4800, Christchurch 8140, New Zealand
Yi-Ping (Melissa), Su
Tel: 886-920722885
Email: Melissa.su@pg.canterbury.ac.nz

Address of Recipient

Date/Month/Year

Dear Type name of Director/Dean

The Taiwanese Hotel Sector's Response to Climate Change: Environmental Behaviours and Practices

I am a PhD. student at the Department of Management, University of Canterbury. I am conducting the study "The Taiwanese Hotel Sector's Response to Climate Change: Environmental Behaviours and Practices" supervised by Professor C. Michael Hall (michael.hall@canterbury.ac.nz) and Dr Lucie Ozanne (lucie.ozanne@canterbury.ac.nz), for a better understanding of the management strategies of the Taiwanese tourist hotel sector with respect to efforts to adapt and mitigate climate change.

It is appreciated if you would complete the attached questionnaire on behalf of your institution. Please be assured that your rights, including the confidentiality of all data gathered for this study and the anonymity of you and your institutions in all publications of the findings, are preserved. All data is to be securely stored at the University of Canterbury for five years following the study. Please also note that participation in the study is voluntary. If you do participate, you have the right to decline to answer any questions, to withdraw from the study at any time prior to publication, and to request the return of any information provided.

I would appreciate it if you would email the completed questionnaire with the signed consent form to me provided by Day/Date/Month.

If you have any questions about this research, please do not hesitate to contact Yi-Ping (Melissa), Su at Melissa.su@pg.canterbury.ac.nz.

Thank you in advance for your contribution.

Yours sincerely

Yi-Ping (Melissa), Su
PhD. Candidate
Department of Management, University of Canterbury
Tel: 886-920722885
Email: Melissa.su@pg.canterbury.ac.nz

Institution Consent Form

Yi-Ping Su
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UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Taiwanese Hotel Sector's Response to Climate Change: Environmental Behaviours and Practices

Declaration of Consent to Participate

I have read and understood the information provided about this research project. I agree my interview to be audio recorded when participating in case study research.

I understand that my participation is voluntary and that I may withdraw at any time prior to publication of the findings.

I understand that any information or opinions I provide will be kept confidential to the researcher and that any published or reported results will not identify me or my institution.

I understand that all data from this research will be stored securely at the University of Canterbury for five years following the study.

I understand that I will receive a report on the findings of this study and have provided my email details below for this purpose.

I notice the project has been reviewed and approved by the Department of Management, University of Canterbury, and the UC HEC Low Risk Approval process

By signing below, I agree to participate in this research project.

Name:

Institution:

Date:

Signature:

Email address for report on study:

(Note: email confirmation will be sent on receipt of your survey)

*Please **return this completed consent form with the questionnaire** in the envelope provided*
by Day/Date/Month

Thank you for your contribution to this study.

Survey Questions

Part 1: Company Information

Please answer the question or tick the box that best describes your company's background.

1. **Please indicate the number of employees in your hotel:** staff
2. **Please indicate (1) the number of rooms in your hotel:** rooms.
   (2) the number of beds in your hotel: beds.
3. **Approximate annual Room occupancy rate**
   ☐≤ 10% ☐11%-20% ☐21%-30% ☐31-40% ☐41-50%
   ☐51-60% ☐61%-70% ☐71%-80% ☐81-90% ☐91-100%
4. **Ownership**
   ☐Local sole proprietor
   ☐Foreign proprietor
   ☐Local partnership
   ☐Local/foreign partnership
   ☐Local limited liability company
   ☐Foundation
   ☐Others ( )
   If your hotel is involved in a foreign partnership, please indicate the form of relationship.
   ☐Franchises ☐Management contracts ☐International affiliates

5. **Hotel Facilities (please tick all that applies)**
   ☐Guest Rooms ☐Conference room ☐Banquet, restaurant and café ☐Laundry
   ☐Computer Center ☐Shop ☐Beauty Salon ☐Swimming Pool
   ☐Fitness/Sport center ☐Others _____

6. **Please tick the three months with the highest room occupancy.**
   ☐Jan. ☐Feb. ☐Mar. ☐Apr. ☐May ☐Jun.
   ☐Jul. ☐Aug. ☐Sep. ☐Oct. ☐Nov. ☐Dec.

7. **Please provide an estimate of the percentage balance between domestic and international customers.**
   Domestic: %; International: %

8. **Type of Room Customer**
   Business and conference %; Holiday %; Others ( ): %

9. **Please indicate (1) when your hotel commenced operation. Year: ( ).**
   (2) When the most recent hotel refurbishment was. Year:( ).

10. **Which types of destination is your hotel located in? Please tick all that apply.**
    ☐Urban ☐Hotspring ☐Coast ☐Mountain
    ☐Lake & River ☐Others ( )

Part 2: Perception, Knowledge and Attitude Questions

11. Please tick one box for each of the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. The management of my hotel believes it has an impact on the environment.	☐	☐	☐	☐	☐
b. The management of my hotel thinks that it has a responsibility to respond to the environmental impacts of tourism.	☐	☐	☐	☐	☐
c. The management of my hotel believes that the hotel which claims to be 'green' is only using it as a marketing ploy.	☐	☐	☐	☐	☐
d. The management of my hotel thinks that it is not possible to be both profitable and environmentally friendly.	☐	☐	☐	☐	☐
e. The management of my hotel thinks that customers are not interested in whether a hotel is environmentally friendly or not.	☐	☐	☐	☐	☐
f. The management of my hotel believes that climate change exists.	☐	☐	☐	☐	☐
g. The management of my hotel believes that it contributes to climate change.	☐	☐	☐	☐	☐
h. The management of my hotel thinks that it has a responsibility to respond to climate change impacts.	☐	☐	☐	☐	☐
i. The management of my hotel thinks that government should regulate the tourism industry regarding climate change.	☐	☐	☐	☐	☐
j. My hotel supports current government environmental policy over climate change concern.	☐	☐	☐	☐	☐
k. My hotel would support a carbon tax as part of government climate change policy.	☐	☐	☐	☐	☐
l. My hotel would support a carbon offset scheme* as part of government climate change policy.	☐	☐	☐	☐	☐
m. My hotel would support a carbon trading scheme* as part of government climate change policy.	☐	☐	☐	☐	☐
n. My hotel will implement strategies to respond to climate change even it is not required by government regulation.	☐	☐	☐	☐	☐

Remarks:

Carbon offset: A carbon offset is a financial instrument aimed at a reduction in greenhouse gas emissions.

Carbon trading: A trading system is designed to offset carbon emissions via the process of buying and selling carbon credits. Companies are assigned a quota of carbon that they are allowed to emit. If a company's emissions are less than its quota then it can sell credits, if emissions are more then it will need to buy carbon credits.

12. What are the climate change impacts on the tourism industry? Please tick one box for each assessment, including the evaluation for the past 5 years and the next 5 years.

	For the past 5 years					For the next 5 years				
	Very Negative	Negative	No effect	Positive	Very Positive	Very Negative	Negative	No effect	Positive	Very Positive
a. What have been/will be the impacts of climate change on the national tourism industry?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b. What have been/will be the impacts of climate change on your hotel's region?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c. What have been/will be the impacts of climate change on your hotel's business?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

13. Where do you receive the information about climate change issue (Please tick all that apply)?

☐Customers	☐Colleagues	☐Consultants	☐Suppliers
☐Tourism Bureau	☐Bureau of Energy	☐Ministry of Interior	☐Environmental Protection Administration
☐Water Resource Agency	☐International Organization	☐Hotel & Tourism Association	☐Newspaper, TV, radio
☐World Wide Web	☐Trade shows & convention	☐Academic research & external reports	☐Trade publications
☐Internal reports	☐Others ( )	☐None. I do not receive any information.	

14. Has your hotel been affected by any of the extreme weather events in the past five years (Please tick all that apply)?

☐Heat wave	☐Drought	☐Extreme rainfall	☐Strong wind	☐Floods
☐Sand storm	☐Typhoon	☐Others ( )	☐None	

15. How do you perceive the following climate change impacts on your location in the next five years? Please tick one box for each item.

	Lower		No changes		Higher
	1	2	3	4	5
a. Spring Temperature	☐	☐	☐	☐	☐
b. Summer Temperature	☐	☐	☐	☐	☐
c. Autumn Temperature	☐	☐	☐	☐	☐
d. Winter Temperature	☐	☐	☐	☐	☐
e. Sea level	☐	☐	☐	☐	☐

	Less Frequent		No changes		More Frequent
	1	2	3	4	5
f. Drought	☐	☐	☐	☐	☐
g. Heat Wave	☐	☐	☐	☐	☐
h. Extreme Rainfall	☐	☐	☐	☐	☐
i. Strong Wind	☐	☐	☐	☐	☐
j. Sand Storm	☐	☐	☐	☐	☐
k. Typhoon	☐	☐	☐	☐	☐
l. Floods	☐	☐	☐	☐	☐
m. Snow	☐	☐	☐	☐	☐

	Less threatened		No changes		More Threatened
	1	2	3	4	5
n. Beach shoreline	☐	☐	☐	☐	☐
o. Water availability	☐	☐	☐	☐	☐
p. Electricity availability	☐	☐	☐	☐	☐
q. Coral reef	☐	☐	☐	☐	☐
r. Biodiversity	☐	☐	☐	☐	☐
s. Health & Safety	☐	☐	☐	☐	☐

t. Others, Please identify_____

16. How do you perceive the climate change impacts on your location in the next twenty years? Please tick one box for each item.

	Lower		No changes		Higher
	1	2	3	4	5
a. Spring Temperature	☐	☐	☐	☐	☐
b. Summer Temperature	☐	☐	☐	☐	☐
c. Autumn Temperature	☐	☐	☐	☐	☐
d. Winter Temperature	☐	☐	☐	☐	☐
e. Sea level	☐	☐	☐	☐	☐

	Less Frequent		No changes		More Frequent
	1	2	3	4	5
f. Drought	☐	☐	☐	☐	☐
g. Heat Wave	☐	☐	☐	☐	☐
h. Extreme Rainfall	☐	☐	☐	☐	☐
i. Strong Wind	☐	☐	☐	☐	☐
j. Sand Storm	☐	☐	☐	☐	☐
k. Typhoon	☐	☐	☐	☐	☐
l. Floods	☐	☐	☐	☐	☐
m. Snow	☐	☐	☐	☐	☐

	Less threatened 1	2	No changes 3	4	More Threatened 5
n. Beach shoreline	☐	☐	☐	☐	☐
o. Water availability	☐	☐	☐	☐	☐
p. Electricity availability	☐	☐	☐	☐	☐
q. Coral reef	☐	☐	☐	☐	☐
r. Biodiversity	☐	☐	☐	☐	☐
s. Health & Safety	☐	☐	☐	☐	☐

t. Others, Please identify_____

Part 3: Actions responding to environment and climate change issues

17. Is your hotel aware of and does it adopt any of the following environmental policies and initiatives? Please tick one box for the evaluation of your hotel's awareness and one for adoption.

	Awareness		Adoption		
	Aware	Unaware	Does not plan to adopt	Has adopted	Plans to adopt
Environmental policy					
a. Green Hotel Label	☐	☐	☐	☐	☐
b. Certification Subsidies for Tourism Industry	☐	☐	☐	☐	☐
c. Sponsorship Directions of Providing Preferential Loans for Enterprises Purchasing of Energy-Saving Equipment for the Banks	☐	☐	☐	☐	☐
d. Regulations Governing Application of Tax Credit to Companies Purchasing Equipment or Technology Used for Energy Saving Purposes or Employing New and Clean Energy	☐	☐	☐	☐	☐
e. 585 Incandescent Replacement Program	☐	☐	☐	☐	☐
f. Voluntary Energy Conservation Agreement	☐	☐	☐	☐	☐
g. Voluntary CO_2 Emission Registration	☐	☐	☐	☐	☐

h. If your hotel plans to apply for Green Hotel Label, please indicate the application year: Year ( )

18. Please provide an estimate of the extent of your hotel's implementation of the following proposed responses to environment and climate change issues? Please tick one box for each measure.

	Don't Know	Implementation None Low High					
		0	1	2	3	4	5
a. Initiate a hotel environmental policy	☐	☐	☐	☐	☐	☐	☐
b. Set up environmental targets and benchmarking	☐	☐	☐	☐	☐	☐	☐
c. Implement environmental management system	☐	☐	☐	☐	☐	☐	☐
d. Designate a manager with specific responsibility for environment management system and emission issues	☐	☐	☐	☐	☐	☐	☐
e. Achieve environmental certification	☐	☐	☐	☐	☐	☐	☐
f. Adapt building design for energy saving	☐	☐	☐	☐	☐	☐	☐
g. Reduce the use of air conditioning	☐	☐	☐	☐	☐	☐	☐
h Frequently clean and maintain electricity facilities	☐	☐	☐	☐	☐	☐	☐
i. Control system for heating, cooling and lighting facilities	☐	☐	☐	☐	☐	☐	☐
j. Use energy-efficient appliances	☐	☐	☐	☐	☐	☐	☐
k. Use alternative fuels and renewable energy	☐	☐	☐	☐	☐	☐	☐
l. Encourage guest/staff to use green vehicles and public transports	☐	☐	☐	☐	☐	☐	☐
m. Provide locally-produced and seasonal food	☐	☐	☐	☐	☐	☐	☐
n. Involve in and provide carbon offset projects for guests	☐	☐	☐	☐	☐	☐	☐
o. Energy-saving education/incentives for staffs and guests	☐	☐	☐	☐	☐	☐	☐
p. Integrate emission management with supply chain	☐	☐	☐	☐	☐	☐	☐
q. Conduct water-saving and reuse measures	☐	☐	☐	☐	☐	☐	☐
r. Reduce the use of materials	☐	☐	☐	☐	☐	☐	☐
s. Recycle waste and raise customer's awareness of waste	☐	☐	☐	☐	☐	☐	☐
t. Reduce and pre-treat chemical and hazardous wastes	☐	☐	☐	☐	☐	☐	☐
u. Measure and monitor resource usage (e.g. energy, water) and waste production	☐	☐	☐	☐	☐	☐	☐
v. Purchase fair-trade/green-label products where possible	☐	☐	☐	☐	☐	☐	☐
w. Develop an environmental code of ethics' for supplier chain	☐	☐	☐	☐	☐	☐	☐
x. Volunteer for local conservation or community projects	☐	☐	☐	☐	☐	☐	☐
y. Adapt hotel's products, marketing and positioning	☐	☐	☐	☐	☐	☐	☐
z. Locate new establishments in low-climate-risk areas	☐	☐	☐	☐	☐	☐	☐
aa. Offer incentives for adaptation and mitigation measures*	☐	☐	☐	☐	☐	☐	☐
ab. Provide climate change and environment education for customers and staffs	☐	☐	☐	☐	☐	☐	☐
ac. Involve in the climate change network to promote activities proposed in UNWTO's Davos Report and Declaration	☐	☐	☐	☐	☐	☐	☐
ad. Involved in the national tourism program regarding to energy efficiency and renewable energy use	☐	☐	☐	☐	☐	☐	☐
ae. Involved and complying with climate change policies and plans	☐	☐	☐	☐	☐	☐	☐
af. Develop links with international policies, mechanism, cooperation and standards regarding to climate change	☐	☐	☐	☐	☐	☐	☐
ag. Others, please identify	☐	☐	☐	☐	☐	☐	☐

_____

Remarks:

1. Adaptation: using Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. (IPCC 2007).
2. Mitigation: implementing policies to reduce greenhouse gas emissions ((IPCC 2007).

19. How does your hotel communicate environmental performance with staff? Please tick all that apply.

☐Regular meeting ☐Company website ☐Internal publication ☐Billboard
☐Training program ☐Intranet ☐Others ( ) ☐None

20. How important are the following factors in influencing your hotel's adoption of environmental actions? Please tick one box for each factor.

	Not Very Important	Not Important	No effect	Important	Very Important
a. Cost reduction	☐	☐	☐	☐	☐
b. Customer demand	☐	☐	☐	☐	☐
c. Employee loyalty	☐	☐	☐	☐	☐
d. Public relation and reputation	☐	☐	☐	☐	☐
e. Competitive advantage	☐	☐	☐	☐	☐
f. Stakeholder pressure, e.g. community and investor	☐	☐	☐	☐	☐
g. Government policy and regulation	☐	☐	☐	☐	☐
h. Environment concern	☐	☐	☐	☐	☐
i. Climate change concern	☐	☐	☐	☐	☐
j. Owner or top manager's personal value and belief	☐	☐	☐	☐	☐
k. Corporate social responsibility policy	☐	☐	☐	☐	☐
l. Parental company's policy	☐	☐	☐	☐	☐
m. Capital Investment	☐	☐	☐	☐	☐
n. Existing building structure	☐	☐	☐	☐	☐
o. Existing facility	☐	☐	☐	☐	☐
p. Time availability	☐	☐	☐	☐	☐
q. Staff availability and expertise	☐	☐	☐	☐	☐
r. Supplier availability	☐	☐	☐	☐	☐
s. Technology availability	☐	☐	☐	☐	☐
t. Government Incentive	☐	☐	☐	☐	☐
u. Current information	☐	☐	☐	☐	☐
v. Risk Management	☐	☐	☐	☐	☐
w. Industry Leadership	☐	☐	☐	☐	☐
x. Others _____	☐	☐	☐	☐	☐

Part 4: Participant Information
Please tick the box that best describes your personal background.

21. Gender
☐Male ☐Female

22. Education
☐Secondary or below
☐Vocational
☐Undergraduate
☐Postgraduate
☐Other

23. Number of years working in present position
☐≤5 ☐6-10 ☐≥11

24. Number of years working in current organization
☐≤5 ☐6-10 ☐11-15 ☐16-20 ☐≥21

25. Number of years working in hospitality/tourism industry
☐≤5 ☐6-10 ☐11-15 ☐16-20 ☐21-25
☐26-30 ☐≥31

Part 5: Contact Information
Please provide hotel's contact information and email this questionnaire to Yi-Ping (Melissa), Su at yps14@uclive.ac.nz

Hotel Name:

Contact Person: Dep.: Position:

Tel: ( ) - Ext. Email: @

~ Thanks for your participation ~

Appendix C: Ethical clearance from University of Canterbury Ethics Committee

寄件者: Human Ethics
寄件日期: 2010 年 9 月 1 日 下午 05:08
收件者: Yi Su
副本: Michael Hall; Lucie Ozanne; Irene Joseph
主旨: HEC APPLICATION 2010/13/LR-PS - APPROVAL

Yi Ping

I am pleased to advise that the Chair of the Human Ethics Committee has considered and supported the Departmental approval for your recent Low Risk application; please see letter attached. A hard copy of this letter (on letterhead) will be sent to you in the internal mail to the Department of Management.

Regards

Lynda

Lynda Griffioen
Secretary
Ethics Committees
Hours: Monday & Friday 8.30am-1.30pm and Wednesday 8.30am-5.30pm
Level 6, Registry
University of Canterbury
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Telephone +64 3 364 2987 Extn 45588

Ref: HEC 2010/13/LR-PS

1 September 2010

Yi-Ping Su
Department of Management
UNIVERSITY OF CANTERBURY

Dear Yi-Ping

Thank you for forwarding to the Human Ethics Committee a copy of the low risk application you have recently made for your research proposal "Tourism business responses to climate change: the case of Taiwanese Tourist Hotel".

I am pleased to advise that this application has been reviewed and I confirm support of the Department's approval for this project.

With best wishes for your project.

Yours sincerely

Dr Michael Grimshaw
Chair, Human Ethics Committee