

PUBLIC POLICY RESEARCH FUNDING SCHEME

公共政策研究資助計劃

Project Number :

項目編號 :

2014.A4.004.15A

Project Title :

項目名稱 :

Enforcing and Complying with Voluntary Agreements
as an Alternative Environmental Policy Instrument
作為備選環境政策工具的自願協議的執行與遵守

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Project Duration (Month):

推行期(月) :

6

Funding (HK\$) :

總金額 (HK\$) :

195,332.00

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CENTRAL POLICY UNIT
Public Policy Research Funding Scheme
(Project Number: 2014.A4.004.15A)

**Enforcing and complying with voluntary agreements as an
alternative environmental policy instrument**

作為備選環境政策工具的自願協 的執行與遵守

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Preface

Entering a major shopping mall in Hong Kong, it is not uncommon to find people wearing jackets braving the chill, whether it is summer or winter outside. Regardless of time in a day, the malls are always brightly lit, shining like jewellery in the dark. It is luxurious, extravagant, yet polluting and wasting energy.

Environmental problems are often explained by market failure, inviting government intervention, with mandatory regulations and policies as critical tools, to put the externalities back into the enterprises' balance sheets and resolve the problem. However, legislation of mandatory regulations is a time consuming process, and could hardly succeed in politically difficult times, such as in current Hong Kong, when much resistance from the civil society, legislative and budgetary processes persist.

Therefore, complementary policies, such as voluntary agreements, are introduced and have started to gain momentum over the world, hoping they could achieve some concrete result in resolving the problems beyond the scope of institutional control. Using a collaborative approach, they require the voluntary compliance of the enterprises, and no formal penalties shall be given for non-compliance. While this give much flexibility, examples from around the world reveal that the efficiency of this tool remain questionable since the polluters are not obliged to participate and it relies heavily on public surveillance.

This study thus aims to examine the feasibility of voluntary agreement as an alternative policy tool in Hong Kong. With the aid of two current voluntary agreements and two proposed agreements, this study explores 1, why some entities join a voluntary agreement while others don't? 2, why some voluntary agreements have higher participation and compliance rates than others? And 3, how to better enforce a voluntary agreement?

Based on the crime and punishment model, it is revealed that the cost of compliance of a voluntary agreement could have strong influence on the enterprises' decision, while the limited effectiveness of public surveillance could also attribute to it. The result also suggests that the non-governmental organisations, which are typically the pushers of the pro-environmental act, shall work harder on varied aspects, from preaching to the public to convincing the business to engage in; from preparing a more attractive and sound programme for public engagement to lobbying for a legislative threat, to enhance the effectiveness of voluntary agreement as an alternative policy to alleviate the environmental problems.

I shall express my gratitude to the Central Policy Unit for granting the funding for this research. Without the generous support, the research would not have been possible.

I would like to give thanks to my research assistants: Mr. Kwok Tin Fai, Miss Wong Pui Ting, and Miss Duen Long Yee, Loree, for their amazing contribution on the preparation and operation work for data collection, as well as the data analysis process and the generation of this report.

Many thanks also to the student helpers from the Department of Geography and Resource Management in CUHK: Mr. Chan Chun Kit, Chan Hei Man, Wong Lik Hang, Miss Michelle Chan, Chow Lok Yiu, Ho Yan Ho, Lam Hei Yiu and Katherine Liu, for their assistance during the data collection process.

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November 24, 2015

Abstract

Mandatory laws and policies are critical in solving environmental problems. As large energy consumers, buildings attract significant attention and become the focus of this research. However, in Hong Kong's current political reality, formal mandatory regulations receive more and more resistance from the civil society and in the legislative and budgetary processes. This project aims to explore the feasibility of an alternative, complementary environmental policy instrument, particularly voluntary agreements. They require the voluntary collaboration of stakeholders, while mandatory regulations inherently put the polluters in confrontational positions against the government. However, the effectiveness of voluntary approaches could be seriously compromised because polluters are not obliged to participate and for those who do, the compliance rate may still be low.

The research adopts a theoretical analysis framework from the crime and punishment literature and answers the following questions: why some entities join a voluntary agreement while others do not? Why some voluntary agreements have higher participation and compliance rates than others? How to better enforce a voluntary agreement? We will also discuss the involvement of environmental NGOs or the civil society in general.

We choose to study shopping malls that are generally large in size and consume substantial amounts of energy. Furthermore, most of their indoor space is public space with numerous users, but the decisions relevant to energy consumption are generally under the managers of buildings rather than the users. Different from private space such as residential apartments or offices, third-party monitoring and verification are feasible in public space without intruding users' privacy to make the external voluntary enforcement of voluntary agreements possible.

We focus on four voluntary agreements on energy conservation. The first one is the 25.5 degree C thermostat setting for air conditioning. Despite the governmental promotion in the guidelines on energy efficiency of air-conditioning, overcooling often occurs in various types of buildings. Another more successful and straightforward voluntary agreement, the annual Earth Hour, is examined for comparison and elaboration of the influential enforcement factors. In addition, we also examine the compliance with the Voluntary Charter Scheme on external lighting reduction. The fourth agreement we inspect has not been widely promoted in Hong Kong, which is to reduce the number of light bulbs or "De-Lamp".

Field survey is the major method for data collection. Through questionnaire survey on both the visitors and the managers of shopping malls, the study explores the perception of the overall comfort and brightness, the preference for better indoor conditions of the shopping mall visitors, their behavioural responses, and information on the monitoring and compliance of the four voluntary agreements.

The current study reveals that people are more concerned about thermal comfort than lighting conditions, having greater reaction toward thermal discomfort than unsatisfactory lighting conditions. In particular, tolerance toward coldness would be greater than toward hotness in public spaces, whereas there is a significant difference in the range of thermal comfort between local people and tourists, in which local people prefer a lower temperature. Influence of external lighting on local people and tourists also varies that tourists are more attracted by the external lighting of a shopping mall.

It is therefore proposed that a variation in the visitor profile of the mall could lead to different decisions by the shopping mall managers on whether they shall comply with the voluntary agreement and what agreement to comply with, thus influencing the impact and effectiveness of the voluntary agreements in help reducing the energy consumption of shopping malls in Hong Kong.

Based on the result of human sensation and reaction toward the environmental condition, it is proposed that lighting regulation would be easier to gain the business support in Hong Kong compare to thermal control. Therefore, lighting reduction programmes, in both long-term and short-term, could be promoted besides the current 25.5°C guideline should an impact be seen in the short run.

It is also revealed that the awareness of the public on the issue is low while the voluntary penalty that the public shall give to enterprises not complying with the voluntary agreements is inadequate to pose a strong enough influence on the enterprise's decision. On the one hand, this suggests the hypothesis that the degree of public surveillance based on the crime and punishment model has limited influence on the decision of the enterprises in complying with the voluntary agreement. On the other hand, this suggests that the civil society shall be further strengthened with greater public awareness on the issue and willingness to engage in the public surveillance job, and the non-governmental organisations shall work more in these aspects.

摘要

強制管制措施對解決環境問題有著關鍵作用。建築物因消耗大量能源而受到關注，並成為本研究的研究重點。在香港目前的政治環境下，強制管制措施在公民社會以至立法和財政審批程序面對的阻力愈來愈大，使用愈發艱難。本研究旨在探討另一種替代環境政策工具——自願協議——的可行性。自願協議要求各利益相關方自願合作，相對地，強制管制措施本質上則令污染者和政府互相對立。可是，由於污染者並無義務參與，參與者亦無義務遵守，自願協議的有效性可能會大大降低。

這項研究借助犯罪與懲罰領域的理論分析框架來回答以下問題：為何有些人或機構願意參與自願協議而有些不願意？為何有些自願協議有較高的參與和遵守率而有些沒有？如何更好的執行自願協議？我們亦會討論非政府環保組織和公民社會在其中的作用。

我們選擇耗能的大型購物商場為研究對象。商場大部分室內空間均為公共空間，但其能源決策多由管理員制定，而非公共空間的使用者。與住宅和辦公室等私人空間不同，在公共空間中第三方監測和核實無需侵犯使用者私隱，使第三方有機會參與執行相關的自願協議。

我們重點關注四項關於節約能源的自願協議。第一項是把空調調校至攝氏 25.5 度的協議，雖然政府已推廣此項空調效益建議多年，不少建築物的室溫仍然過低。另一個較成功和直接的自願協議“地球一小時”則作對比之用並分析其重要執行因素。此外，我們亦會審視戶外燈光裝置約章計劃可能的參與情況。最後一項則是未有在香港推行的減少室內燈泡數量(減燈)計劃。

數據收集以現場問卷調查為主，商場使用者和管理者獲邀填寫問卷，以了解使用者對商場整體環境舒適度和光度的感覺，偏好以及對四項自願協議的反應和有關企業參與資訊的意見。

本研究發現市民注重舒適溫度多於照明狀況，對不適溫度的反應較對光度不滿的反應為大。特別在公共空間中對過冷的忍受程度又較對熱的忍受程度為高，當中本地居民與遊客的舒適體感溫度範圍相比，本地居民喜歡較低的室內溫度。此外，戶外燈光對本地居民和遊客的作用亦有所分別，遊客會較受戶外燈光吸引而留意到商場的存在。

因此，本研究提出商場訪客構成會影響商場管理者是否參與及參與何種自願協議的決策，因而影響有關協議對減少本港商場能源消耗的成效。

基於人體感覺及對環境狀況的反應，本研究亦提出燈光管制相對室溫管制會較易獲得本港商界的 support。因此，除了 25.5 度指引外，長期及短暫的節約燈光計劃亦可推出以收短期內節約能源之效。

本研究亦發現公眾並不十分關注有關議題。公眾對未有執行自願協定的企業所作的自願性懲罰亦不足以推動企業改變其決策。一方面，這表示基於犯罪與懲罰領域所提出公眾監察能力的假設難以影響企業參與及遵守自願協議的決定。另一方面，這表示公民社會特別是政府組織對有關議題的關注及願意參與公眾監察方面仍可以加強。

Chapter 1 Introduction

1.1. Voluntary agreements in Hong Kong's current political reality

Environmental problems are often explained as market failures, where the externality of pollution fails to be internalized on the balance sheets of polluters and thus is ignored in their decision making. Mandatory regulations are then justified to correct the market failures through governmental intervention to force the compliance of polluters. However, in the current political reality in Hong Kong, formal mandatory laws, regulations or engineering projects are getting more and more difficult to survive the legislative and budgetary processes. Recent examples related to environmental protection may include the construction of incinerators to burn municipal solid waste and the expansion of Tseung Kwan O landfill. Hong Kong is in a politically difficult era. In July 2014, public opinion survey results from the University of Hong Kong showed that only less than 30% of Hong Kong people were satisfied with the HKSAR government and less than 30% would vote for Mr. Leung Chun-Ying as the Chief Executive (The University of Hong Kong, 2014). Essentially significant mandatory regulations proposed by the government would meet protests in the legislative process and also in the following enforcement. Regulations on energy and the environment are largely controversial because the trade-off among various perspectives cannot satisfy everyone.

Hong Kong may need to find alternative ways to regulate and alleviate environmental problems. One possible solution is to subsidize polluters. For example, the Chief Executive proposed in his 2013 policy address to set aside HK\$10 billion of subsidies to phase out pre-Euro-IV diesel commercial vehicles (Leung, 2013). However, the reliance on subsidies not only worked against the "Polluter Pays Principle" but also adds financial burden on the government and eventually taxpayers. The subsidies to polluters could attract harsh criticism from the general public for wasting taxpayers' money and also from the polluters for not being enough.

In comparison to mandatory regulations that put the government and regulated entities in confrontational positions, voluntary agreements use collaborative approaches to reduce the tension between the two sides. They require the voluntary collaboration of stakeholders and no formal penalty will be issued even in the situation of non-collaboration (Lyon and Maxwell, 1999). They could potentially provide an alternative way for the HKSAR government to achieve something concrete in the current political reality. However, voluntary agreements also encounter problems, especially low participation and compliance rates, which severely compromise their effectiveness. Polluters are not obliged to participate and for those who do, the compliance rate may still be low. Voluntary agreements have been used around the world as an alternative environmental policy instrument but "the environmental effectiveness of voluntary approaches is often questionable, and their economic efficiency is generally low" (OECD, 2003).

Accordingly, how to enhance the effectiveness of voluntary agreements becomes important to achieve more on energy conservation and pollution mitigation in today's Hong Kong.

Despite the pessimistic view, one study in Hong Kong provides promising hope that voluntary approaches could result in significant energy saving in buildings (Lee and Yik, 2002). This project will examine voluntary agreements to control the energy consumption of buildings. Although energy efficiency has been consistently pointed out as the most important means to mitigate CO₂ emissions, its realization suffers from a difficult-to-close behaviour gap (Allcott and Mullainathan, 2010). Mandatory regulations are often ineffective or inappropriate to intervene on behaviours. Although the HKSAR government appears to be weak in pushing forward mandatory regulations, the civil society is powerful as demonstrated in their effective blocking of many mandatory regulations. From another perspective, the powerful and well-developed civil society could elevate the impacts of voluntary agreements. This research project will examine how the civil society, particularly non-governmental organizations (NGOs), could be helpful in encouraging the participation of entities and raising the compliance rates of voluntary agreements.

This project does not intend to promote replacing mandatory regulations on energy conservation and pollution mitigation in Hong Kong with voluntary agreements. Instead, it argues that voluntary agreements could play a complementary and sometimes more effective role in solving Hong Kong's problems. The collaborative rather than confrontational approach could ease the current political debacle in Hong Kong between the government and various interest groups. Hong Kong's urgent environmental problems thus do not need to wait until a consensus is reached to enact mandatory regulations. The government could also utilize these voluntary agreements to build consensus among the general public for achieving even greater goals.

1.2.Hong Kong's energy consumption and CO₂ emissions for air conditioning

Pollution and carbon mitigation have become important topics in Hong Kong not only environmentally but also politically. Due to its high international visibility, Hong Kong's air pollution has attracted wide attention globally (Lee, 2013). If using consumption-based CO₂ accounting rules, Hong Kong would show up on the top-ten list in the world in terms of CO₂ emissions per capita (Davis and Caldeira, 2010).

In 2010, Hong Kong Environment Bureau proposed a goal to reduce CO₂ emissions per unit of GDP by 50~60% in 2020 from the 2005 level (Environmental Protection Department, 2010a). Key measures have been proposed to replace coal with nuclear energy and natural gas in electricity generation (Environment Bureau, 2010; 2014). However, the general public protested strongly against the increasing use of nuclear energy due to the potential nuclear risk especially

after the 2011 Fukushima nuclear accident and against the raise of electricity tariff while natural gas-fired electricity is expected to be more expensive.

The control of energy consumption has been consistently pointed out as a key and often the most important measure for CO₂ emission mitigation especially in the short term. The potential in Hong Kong has far from being exhausted. This research focuses mainly on energy conservation in buildings from the perspective of air conditioning.

Hong Kong has long, hot and humid summer and its affluence makes air conditioning affordable. These factors result in substantial amounts of energy consumed for air conditioning. As shown in Figure 1, monthly electricity consumption in Hong Kong is highly correlated with average temperature. The hottest two months, July and August, consume 60% more electricity on average than the cool months of January and February (Figure 1). Besides outdoor air temperature, electricity consumption of an air conditioner is also closely associated with the temperature thermostat setting. An experiment in the Canadian Centre for Housing Technology Twin-House Research facility found that by raising the temperature set point from 22°C to 24°C, 23.3% of the electricity will be saved (Manning, et al., 2007). Although the climate and local situation in Hong Kong are substantially different to result in different percentage points of electricity saving, the qualitative judgment should still hold that higher thermostat set point saves electricity over the summer with cooling demand.

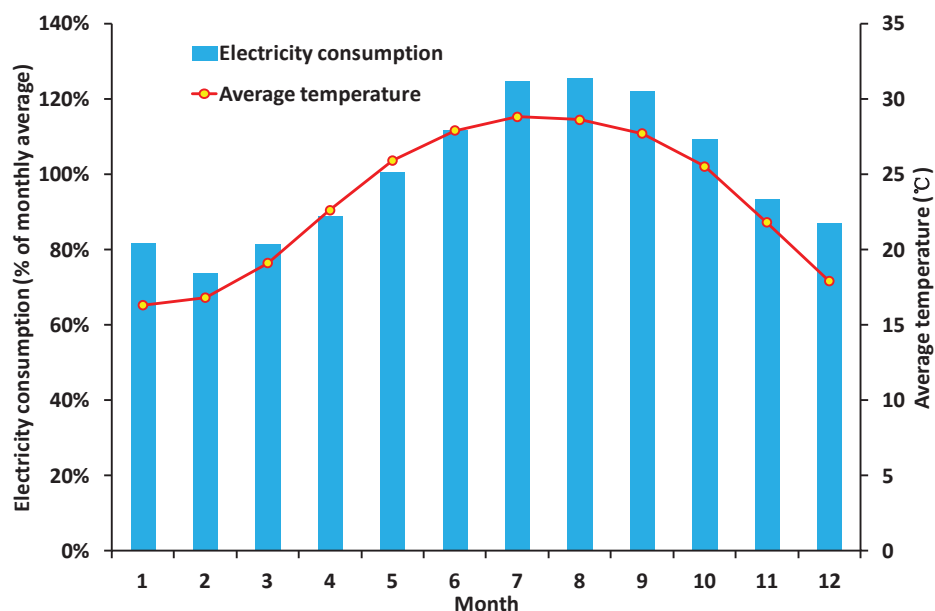


Figure 1 Monthly average electricity consumption (left axis, expressed in percentage terms relative to the monthly average over a year) and temperature (right axis) in Hong Kong from 1981 to 2010 (Hong Kong Observatory, 2012; Census and Statistics Department, 2013)

The Earth Hour, the voluntary agreement for comparison, is also closely associated with energy consumption. Hong Kong's light pollution has attracted wide attention in media reporting for being ranked the worst in the world (Cheung, 2013). It not only makes twinkling little stars invisible, but also leads to significant energy consumption and CO₂ emissions. In addition to the Earth Hour that lasts only one hour in a year, voluntary guidelines for daily compliance have been issued to alleviate the unacceptable situation and respond to mounting complaints from citizens (Environment Bureau, Environmental Protection Department, & Electrical and Mechanical Services Department, 2012). A new voluntary charter scheme is also pending to be introduced regulating lighting installations outdoor for decorative and advertising purposes during night time to alleviate the light pollution problem (Task Force on External Lighting, 2015). The enforcement of the guidelines is believed to be a key barrier to theirs making any significant impact.

Besides the Earth Hour and voluntary charter which focus on external lighting, there is another overseas example of voluntary action in reducing energy usage which focuses on indoor lighting. After the Tohoku Earthquake in 2011, Japan experienced a period of serious electricity shortage, and numerous actions were promoted to reduce the rate of electricity consumption (Kimura & Nishio, 2013). One of the most commonly implemented actions was the reduction of lighting usage, including the reduction of lamps and switching off unused lights. Such actions have reduced 4.5% to 7.4% of the electricity use in the commercial sector, ranking second among all actions taken. Back in Hong Kong, lighting is a second major consumer of electricity in the commercial sector (Electrical and Mechanical Services Department, 2015) and a reduction in usage could also contribute significantly to the reduction of electricity consumption, thus carbon emission. Therefore, a third voluntary agreement for comparison in this study would be the reduction of indoor lighting, hereafter the “de-lamp” programme.

1.3. Thermal comfort and indoor environment

Nowadays, people spend about 90% of their time indoors. Indoor environment has thus far-reaching impacts on our well-being. There are a number of parameters that influence the comfort of building occupants, including air quality, visual, acoustic and thermal conditions. Standards have been developed to delineate the acceptable ranges of these indoor environmental elements. Even if these standards are met, not all the occupants are satisfied with the indoor environment. Further, different subjective responses also occur in the same indoor conditions.

In addition to the comprehensive literature survey by Frontczak and Wargocki (2011) on the factors influencing human comfort in indoor environments, numerous studies have explored

building users' perception of the indoor thermal environment and neutral temperature, that is the thermal sensation of feeling neither slightly warm nor slightly cool (Givoni, 1998) in the indoor setting. Great number of research has been conducted to examine indoor thermal comfort in residential buildings (e.g. de Dear et al., 1991; Oseland, 1994; Becker and Paciuk, 2009; Lai and Yik, 2009; Al-ajmi and Loveday, 2010; Li et al., 2011; Djamila et al., 2013), schools (e.g. Wong and Khoo, 2003; Kwok and Chun, 2003; Hwang et al., 2006; Zhang et al., 2007; Fong et al., 2011; de Giuli, 2014) and offices (e.g. Schiller, 1990; Chan et al., 1998; Erlandson et al., 2003; Wagner et al., 2007; Ngarmpornprasert and Koetsinchai, 2010; Wu and Sun, 2012; Indraganti et al., 2013).

Examination of thermal comfort in shopping malls receives little attention although temperature is considered as one of the ambient conditions of the physical shopping environment. d'Astous (2000) stated temperature as a tactile stimulus that would influence shoppers' satisfaction. In retail and marketing literature, cold temperature was discovered as an irritation for mall shoppers (d'Astous, 2000) and temperature had a negative effect on shopping excitement (Wakefield and Baker, 1998). Other studies on thermal comfort in shopping malls were found in architectural and human biometeorological literature (e.g. Miura and Ojima 1991; Chun and Tamura, 1998 and 2005; Morgan and de Dear, 2003, Debiase, 2010).

In Hong Kong, little research in this aspect has been carried out. Chow and Fung (1995) studied 84 shopping malls located in commercial buildings and discovered that shopping mall occupants felt comfortable at mean temperature of 20-24 °C, mean relative humidity of 50-65% and mean wind speed of 0.2-0.4 m/s. Lam et al. (2001) examined the thermal conditions of ten shopping malls and detected that temperatures were 1-2 °C lower than the 25.5 °C in summer. A marketing survey revealed that about one-fourth Mainland Chinese visitors complaining the cold temperatures in the Hong Kong shopping malls (Sin and Kwok, 2006). As there are only three studies on the indoor environment in shopping malls, the present proposed study to examine the thermal conditions and shoppers' thermal perception and preference can shed light on factors affecting indoor thermal comfort; and formulation of relevant policies to save energy and enhance shopping mall attractiveness.

Due to its concentration of shopping malls and the importance of the shopping economy, Hong Kong is an ideal place to study the topic. In addition, the potential implications of this research could go much beyond Hong Kong. In particular, findings on the thermal comfort of Chinese tourists may be directly applied in mainland China to provide economic incentives for energy conservation.

Different people have different thermal comfort zone while indoor public space, fundamentally different from private space tailor-made for individuals, hold different people with a spectrum of demand. For a given temperature, some people want it warmer and others want it cooler. Even at the lowest point, about 40% of the people were not satisfied with the current temperature, half

want it warmer and half want it cooler (Hwang et al., 2006; Hwang and Cheng, 2007). If the temperature is set up at the level, the assumption is that the people who want it cooler or warmer have equal strength. However, in the actual situation, their weighting may not be equal. In reality, substantially more people complain that the temperature is too low than too high. It could indicate that those people who have lower tolerance levels to hot air have heavier weighting in the decision on setting up the thermostat.

Existing studies have rarely addressed the reaction of people when meeting such unsatisfying temperature conditions in an indoor public space. This project aims to study two aspects: (i) their reaction to ambient temperature such as through complaining or leaving the space, and (ii) their personal action on their own temperature conditions, such as putting on or taking off clothes.

Chapter 2 Research Objectives and Policy Implication

2.1. Research objectives

- To explore the feasibility of voluntary agreements as an alternative environmental policy instrument in Hong Kong
- To examine the role of civil society in promoting and enforcing environmental voluntary agreements

Environmental problems are often explained as market failures to justify mandatory regulations. However, in the current political reality in Hong Kong, formal mandatory laws, regulations or engineering projects are getting more and more difficult to survive the legislative and budgetary processes. Hong Kong may need to find alternative ways to regulate and alleviate environmental problems.

This research examines voluntary agreements as an alternative policy instrument. Mandatory regulations inherently put the polluters in confrontational positions against the government, while voluntary agreements require the voluntary collaboration of stakeholders without formal penalty for non-compliance. Voluntary agreements have been used around the world as an alternative environmental policy instrument. They could potentially provide an alternative way for the HKSAR government to achieve something concrete in the current political reality. However, the effectiveness of voluntary approaches could be seriously compromised because polluters are not obliged to participate and for those who do, the compliance rate may still be low. Accordingly, how to enhance the effectiveness of voluntary agreements becomes important to achieve more on energy conservation and pollution mitigation in today's Hong Kong.

2.2. Policy implication

This project focuses on controlling energy consumption in buildings, particularly targeting the voluntary 25.5 degree C thermostat setting for air conditioning. A widely recognized behaviour gap often prevents the utilization of energy saving opportunities. Because confrontational mandatory regulations are often ineffective or inappropriate to intervene behaviours, collaborative voluntary agreements may help enhance environmental friendly actions. The powerful and well-developed civil society in Hong Kong could lead and elevate the impacts of voluntary agreements. This research project examines how the civil society, particularly non-governmental organizations (NGOs), could be helpful in encouraging the participation of entities and raising the compliance rates of voluntary agreements.

This project does not intend to promote replacing mandatory regulations on energy conservation and pollution mitigation in Hong Kong with voluntary agreements. Instead, it argues that voluntary agreements could play a complementary and sometimes more effective role in solving Hong Kong's problems. The collaborative rather than confrontational approach could ease the current political debacle in Hong Kong between the government and various interest groups. Hong Kong's urgent environmental problems thus do not need to wait until a consensus is reached to enact mandatory regulations. The government could also utilize these voluntary agreements to build consensus among the general public for achieving even greater goals.

2.3. Research hypotheses

In order to answer the research questions on how to enhance participation and compliance with voluntary agreements, this project will explore two puzzles in the common perception after verifying their validity.

Puzzle 1: Why the Earth Hour event showed much higher participation and compliance rates than the 25.5 degree C thermostat setting guideline?

Research hypothesis: the difference could be explained using the crime and punishment model. First, compliance with both voluntary agreements will discourage customers or users away from the space. However, because the Earth Hour event is just a one-hour-per-year event while the 25.5 degree C lasts through the entire summer, the cost of changing the normal practice, or the cost of compliance to the voluntary agreement, should be much higher for the 25.5 degree C guideline. Second, whether a building has complied with the Earth Hour can be easily found out by one look, but the compliance with the 25.5 degree C guideline is much more opaque to outsiders. Accordingly, the probability of catching non-compliance is much higher for the Earth Hour event. Third, the voluntary penalty for the non-compliance with the Earth Hour event could be somewhat higher than with the 25.5 degree C requirement because of its publicity, better organization and closer involvement with the civil society. However, because of the widely recognized gap between what people say and behave about environmental protection and energy conservation, this associated voluntary penalty such as voting with their feet is expected to be low. The hypothetical explanation could be summarized in Table 1.

These hypothetical explanations imply that, first, for any programmes that involve a long period of compliance its rate of compliance is expected to reduce. Although the Earth Hour voluntary agreement is successful, its expansion to control the year-round light pollution and indoor lighting could still suffer from the same problems as the 25.5 degree C guideline does. Second, programmes that actions could be easily observed would have a higher rate of compliance and;

third, if the voluntary penalty given by the public is higher, the rate of compliance of the programme should also increase.

Puzzle 2: why a lot more people think that the indoor air temperature is too cold than too hot?

Research hypothesis: For the managers of shopping malls, a critical and implicit goal could be to maximize the number of actual users. Within a normal range, no matter what indoor air temperature is, some people will want it lower and some others want it higher. However, these two different groups of people will respond differently to a situation. On the one hand, those who feel that the indoor air is too hot could leave and choose another cooler place to stay. Over the summer with only light clothes on, it is rarely feasible to take off one. Those who feel cold could put on an overcoat or scarf to keep warm and still stay in. On the other hand, cold air temperature creates a bigger gap between the inside and outside to raise the cost of leaving the space or switching to another place, while hot air temperature has weaker effects to keep people in. Then in order to maximize the crowd, the air temperature is set to be a little lower to make more people feel cold than hot.

If the hypotheses were verified, the anticipated rates of compliance of other voluntary programmes could also be derived. While the rate of compliance to light pollution reduction would be limited, that of indoor lighting reduction would be higher (Table 1). For the current programmes, there would be three methods to enhance the participation and compliance rates of the voluntary thermostat setting guideline. First, the guideline may be revised to lower, for example, by half a degree C, the originally recommended 25.5 degree C that mainly considers thermal comfort but not actual enforcement. If the recommended temperature could be a little lower but still significantly higher than the actual setting, its higher participation and enforcement rate will lead to greater energy conservation. Second, monitoring effectiveness should be enhanced even though the agreement and monitoring are only voluntary. Third, voluntary penalty for non-participation and non-compliance could be further raised. Particularly, more complaints could be made to the managers of indoor public space for not participating in or complying with the thermostat setting guideline based on the monitoring data.

Table 1 Hypotheses to explain the compliance gap between different voluntary agreements

	Variables	25.5 degree C	Earth Hour	Light pollution	De-lamp
Dependent variable	Compliance rates	Low	High	Low	High
Independent variables	Cost of compliance	High	Low	High	Low

	Monitoring effectiveness	Low	High	High	High
	Voluntary penalty	Low	Low	Low	Low

Chapter 3 Methodology and Data Collection

3.1.Object of Study

We choose to study shopping malls. On the one hand, they are generally large in size and consume substantial amounts of energy. The effective control of their energy consumption could contribute significantly to Hong Kong's overall energy saving and CO₂ emission mitigation. On the other hand, most of their indoor space is public space with numerous users, but the decisions relevant to energy consumption are generally under the managers of buildings rather than the users. Different from private space such as residential apartments or offices, third-party monitoring and verification are feasible in public space without infringing users' privacy to make the external voluntary enforcement of voluntary agreements possible.

Hong Kong is an attractive shopping paradise in the world (Heung and Qu, 1998; Choi et al., 1999). In addition to the international tourists, local people also favour to spend their time in shopping malls for entertainment. The physical shopping environments, such as layout, decor, lighting, music, scent and temperature, are important stimuli that can influence shoppers' satisfaction and willingness to stay in the malls (Kotler, 1974; Tai and Fung, 1997; Baker, 1986). Temperature, one of the ambient environmental conditions, can produce physiological responses; i.e. comfort or stress. Either too cold or too hot will create thermal discomfort that may cause shoppers to leave the mall. Therefore, a thermally comfortable indoor environment has significant impacts not only on shoppers' well-being, but also the attractiveness of shopping malls. Shopping activities of tourists have been a critical component in Hong Kong's economy (Hong Kong Economy, 2007; Census and Statistics department, 2011). The attractiveness of Hong Kong's shopping malls to tourists could potentially affect its overall economic performance and many people's jobs.

A total of seven shopping malls including both local and upscale malls, located in different areas in Hong Kong, are selected as study sites. These selected malls of various price ranges may reveal response differences between local consumers and tourists, particularly visitors from mainland China. Field studies are carried out in the hot months that require air conditioning.

Field survey is the major method for data collection. Through questionnaire survey on both the visitors and the managers of selected shopping malls, the study explores the perception of the overall comfort and brightness, the preference for better indoor conditions of the shopping mall visitors, their behavioural responses, and information on the monitoring and compliance of the two voluntary agreements. The format and design of the questionnaire is based on previous thermal comfort field studies (de Dear et al., 1991; Chow and Fung, 1995; Kwok and Chun, 2003; Wong and Khoo, 2003; Zhang et al., 2007) and the theoretical framework as introduced above. The questionnaire consists of questions on thermal sensation (a 7-point scale), overall indoor

environmental comfort, thermal preferences and acceptability, clothing, behaviour, monitoring and compliance of the two voluntary agreements, and also personal information (age, gender, monthly income). In addition, to explore the relationship of expenditure and thermal conditions in shopping malls, a question on how much the shoppers spend is included for respondents in shopping malls. The detail settings are introduced in next section.

3.2. Pilot test

3.2.1. Details

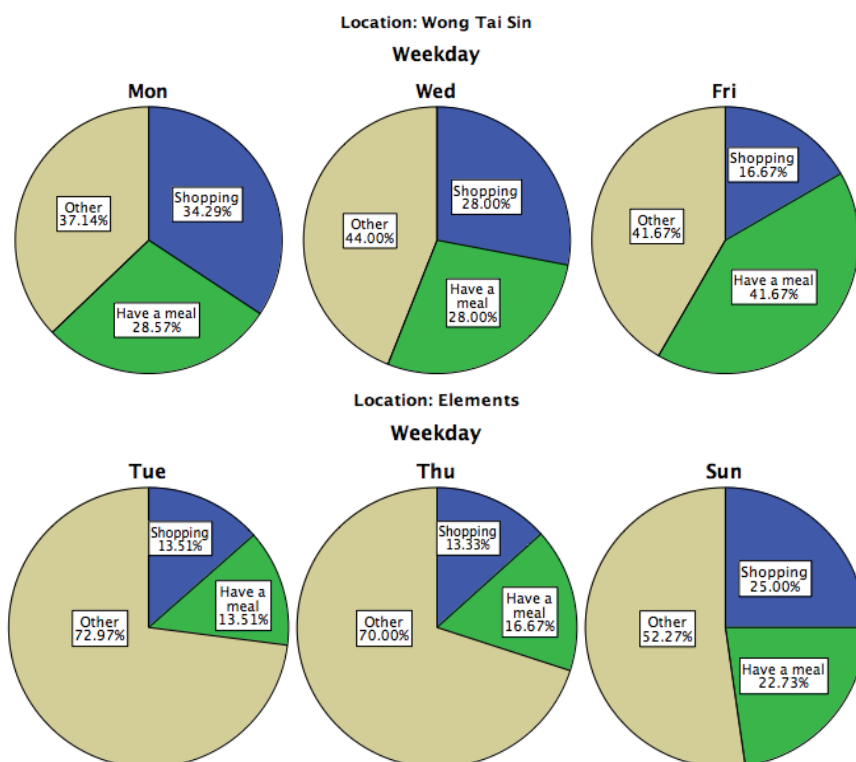
A pilot test was conducted from 8 June to 14 June, except on Saturday (13 June). Two shopping malls in Kowloon, namely Elements and Wong Tai Sin Plaza, were selected with an aim to collect data from tourist and local people as well as visitors from high-end and low-end malls. Questionnaire distribution was conducted in the same location for alternative dates and thus each shopping mall was accounted for two weekdays and one weekend for data collection. The rationale behind this arrangement is to compare the difference in the proportion of respondents, such as age group and residence, and the visitor flow across the week. The classification between weekdays and weekends in this research is based on customers' behaviours in shopping mall. Friday was classified as weekend in the pilot test to test whether Friday should be considered as weekday or weekend, since Friday evening is usually considered as the start of weekend and customers' behaviour is expected to be more similar to those in weekend.

The time for data collection was 2:00pm-8:00pm, intending to cover the hottest time of the day to examine the impact of air conditioning on visitors' shopping behaviour, and the behaviour under various external temperature conditions; as well as intending to cover the night time to study the visitors' perception to lighting. Two interviewers were placed at the exits for data collection to collect data from visitors who have finished their shopping trips for a full visiting profile and that of visitors who have just entered for the perception about external lighting. Particular concern was given to exits near MTR stations which have higher visitor usage. Random sampling was adopted with an interval of three visitors. A total of 192 samples were collected, with 183 from local residents and 9 from tourists.

Amendments to the data collection arrangement and questionnaire design were made after the pilot test.

3.2.2. Adjustments on arrangement of data collection

The date of collection was rearranged to between Mondays and Thursdays, as well as from Saturdays to Sundays, since no significant difference in terms of purpose of visiting were found between Friday and other weekdays while the responses in Sunday was significantly different.



The time of collection was rearranged from 2:00p.m. – 8:00p.m. to 2:00p.m. – 7:00p.m., since the percentage of responses dropped after 7:00 and there were fewer visitors, possibly because people were dinning. A break was set up between 4:00p.m. and 5:00p.m., when the number of responses was the lowest, since continuous working and standing is not recommended for the health of labour and a break would be preferred for condition updating and data quality checking.

Time	Frequency	Percent	Valid Percent	Cumulative Percent
14:00-14:59	53	27.6	27.6	27.6
15:00-15:59	38	19.8	19.8	47.4
16:00-16:59	14	7.3	7.3	54.7
17:00-17:59	33	17.2	17.2	71.9
18:00-18:59	31	16.1	16.1	88.0
19:00-19:59	23	12.0	12.0	100.0
Total	192	100.0	100.0	

The spots of interview were not restricted to those near MTR stations but any point within the mall since people who are leaving the mall give a lower response rate, probably because they are

in a rush, which would affect the representativeness of the sample. There is also a high proportion of visitor who are just passing by or changing between transport modes, which also affect the representativeness of the sample. There were also more cases of expulsion by the mall or MTR personnel at exits near the MTR stations since the security level was high to control the visitor flows.

After checking the visitor profiles, it was found that Elements was not serving a large number of tourists at all. The proportion of tourist to local was far from satisfactory in the pilot test that most responses were from local people. This could alter the result accuracy since there are insufficient samples from tourists. Therefore, Harbour City, another mall with similar settings: size, class and location, but significantly more tourists, was chosen to replace Elements.

Finally, the sampling method was changed from having an interval of three visitors to simple random sampling consider the low rate of response and the problem of having too few visitors at some locations in some time.

3.2.3. Adjustments on questionnaire design

The questions and sections were simplified and rearranged to reduce the length of interview from about five minutes to three minutes each, cut the redundant questions and improve the rate of response. The original questionnaire consists of thirty-four questions and was divided into six sections: shopping profile, air temperature, internal lighting, external lighting, personal information and dress code. It was reduced to fifteen questions and simplified into four sections: sensation of air temperature and lighting, voluntary agreement, personal information and clothing.

Several questions were deleted due to redundancy, vague responses and inability to pin-point to the research questions.

- Q3: Have you finished your original visiting purpose in this mall?

This is redundant since there are numerous factors for customers to leave the shopping mall before they finish their original plan, and indoor comfort may not a major factor causing their early leave. This question does not reflect the leaving of visitors due to unsatisfactory thermal and lighting conditions.

- Q6: How important is current indoor temperature in affecting your decision of visiting this shopping mall?

This question could be misleading since the visitor is unable to know about the current indoor temperature before entering the mall and, while staying in the mall, there could be numerous factors affecting the decision of staying, in which ambient environment is usually less important

and more implicit according to previous studies (Wakefield and Baker, 1998; Turley and Milliman, 2000), and this question is unable to answer the research questions.

- Q9: How easy is it to complain to the manager in this space?

Since there is only 1.69% and 5.98% of respondents would choose to complain for coldness and hotness respectively, this question gives limited explanatory power to the issue of behavioural responses of visitors toward unsatisfactory thermal conditions. The cross tabulation also shows that the difficulty of complain has no impact on the respondents' reactions to hotness and coldness. This factor is therefore not a significant one influencing the decision of the visitors.

- Q11: Do you know the air temperature in this space before you come? & Q12: How do you know?

Similar to Q6, this question fails to pin-point to the research question since whether the temperature is known to the visitor has no relation to his/her responses to the temperature adjustments under voluntary agreements. Besides, the actual temperature does not reflect the visitors' perceived thermal condition directly and this question does not reveal the visitors' perception and responses toward an unsatisfactory thermal condition, which the current study focuses on the behavioural response of visitors.

- Q16. Do you think the present indoor brightness is acceptable?

Most of the respondents' answers were acceptable (94.8%) and it is unable to test the hypothesis. There is no direct relation between the current brightness and reactions toward unsatisfactory lighting conditions, which the focus of the current study should be on the latter. Whether the internal lighting condition is satisfactory for the visitors is not of the concern of the current study either. Therefore, it is not necessary to ask for the perception on current brightness.

16. Do you think the present indoor brightness is acceptable?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Unacceptable (Too bright)	5	2.6	2.6	2.6
Unacceptable (Too dim)	5	2.6	2.6	5.2
Acceptable	182	94.8	94.8	100.0
Total	192	100.0	100.0	

- Q14, 22, 28, 31: Why do you think this shopping mall has joined 25.5°C/ De-lamp/ Earth Hour/ Voluntary Charter Scheme?

While the rationale of joining the voluntary agreements is the core research question of the current study, it is not of the visitors' concern and they may not know about the rationale behind. Instead, the information to be obtained through the questionnaire should be the visitors' behavioural responses toward the ambient environment of the malls and the malls' participation in the voluntary agreements.

Several questions were rearranged to reduce the ambiguity and increase the efficiency of the interviewing process, speeding up the process and thus increasing the rate of response.

The questions asking about the voluntary agreements were rearranged into a tabular form to simplify the operation and make it easier for the respondent to comprehend.

- Have you ever heard of 25.5°C (Q12)/ De-lamp (Q20)/ Earth Hour (Q25)/ Voluntary Charter Scheme (Q29)?
- How difficult/ easy is it to know whether this shopping mall has participated in 25.5°C (Q13)/ De-lamp (Q21)/ Earth Hour (Q26)/ Voluntary Charter Scheme (Q30)?
- How important is the participation of this shopping mall in 25.5°C (Q15) / De-lamp (Q22)/ Earth Hour (Q26)/ Voluntary Charter Scheme (Q31) affects your visit to this place?

The last question asking about the impact of the malls' participation in the voluntary agreement was modified to "would your plan of revisit be affected if the mall did not participate in the agreement?" since most respondents considered the participation in a voluntary agreement as important because this would reduce the indoor comfort and they would revisit less frequently. The concept of importance is also ambiguous, particularly to the mall managers, since no exact impact is revealed it is difficult to associate with the degree of impact on the mall. Therefore the question is changed to ask for the potential impact of the voluntary agreement on the visitor's decision instead of asking about the importance.

The questions asking about the reactions toward coldness and hotness are swapped and rephrased to "Based on your current clothing, how would you react if you feel the air temperature of this place is too COLD/HOT?" Originally, the respondent was asked for the reaction to coldness first, and the respondents answering "put on clothes" tend to answer "take off clothes" for the response to hotness, even when they have nothing to take off at all or they will be naked. This suggested that they are unaware of the question's intention of asking them for the reaction based on their current clothing condition.

Changes were also made to the income categories based on the census data to facilitate the comparison between the sample statistics and population statistics and weighting of the sample data. More options were also added to the purposes of visiting the mall based on the pilot test results. The option of "shoes without socks" was added to the respondent clothing record. The questions concerning the shopping profile: expenditure, duration of staying and purposes of visit were put together for uniformity.

3.3. Questionnaire design

The questionnaire consists of four sections. In the first section, the respondent is asked for his/her perception to the air temperature within the mall and the satisfaction to it to obtain the information about thermal comfort. The respondent is then asked for the reactions to coldness and hotness respectively for the behavioural responses to unsatisfactory thermal conditions. The respondent is also asked for the reactions should the internal lighting be too bright or too dim for the behavioural responses toward unsatisfactory lighting conditions. Finally, the respondent is asked for whether the external lighting could make her aware of the mall to check the effectiveness of external lighting. In the second section, the respondent is introduced with the four voluntary agreements. For each agreement, the respondent is asked whether he/she thinks the mall has participated in the agreements, how easy/ difficult he/she think it is to obtain the information about the mall's participation and his/her choice of resurrection should the mall did not comply with the agreement. In the third section, the respondent's expenditure, duration of staying in the mall, status as a tourist or local citizen, and family income are asked. The respondent's clothing is recorded at the end of the questionnaire by the interviewer.

In the first section, the respondent is first asked to give a vote to the current indoor temperature out of a seven-point scale based on the Predicted Mean Vote (PMV) to obtain the perceived thermal condition of the respondent to the mall.

1. Please '□' the appropriate box in the following thermal sensational scale to indicate air temperature in this shopping mall.

- | | | |
|----|--------------------------|---|
| -3 | ☐ | Cold |
| -2 | ☐ | Cool |
| -1 | ☐ | Slightly cool |
| 0 | ☐ | Neutral (Comfortable neither cool nor warm) |
| +1 | ☐ | Slightly warm |
| +2 | ☐ | Warm |
| +3 | ☐ | Hot |

The respondent is then asked whether he/she is satisfied with the current temperature. This is to examine the range of thermal sensation which people would be satisfied with and whether the visitors are more dissatisfied with coldness or hotness.

2. Are you satisfied with the current temperature?
☐ Yes ☐ No

The behavioural responses toward unsatisfactory thermal and lighting conditions are asked, and the respondent has to choose out of five (coldness and hotness) and four (brightness and darkness) options respectively. This also reveals the tolerance of the visitors toward such conditions.

3. How will you respond if you feel the air temperature in this space is COLD? (Multiple answers)
 - ☐ Do nothing ☐ Put on clothes ☐ Complain to the manager
 - ☐ Move to another location ☐ Leave the building

4. How will you respond if you feel the air temperature in this space is HOT? (Multiple answers)
 - ☐ Do nothing ☐ Put on clothes ☐ Complain to the manager
 - ☐ Move to another location ☐ Leave the building

5. How will you respond if you feel the indoor brightness in this space is BRIGHT? (Multiple answers)
 - ☐ Do nothing ☐ Complain to the manager ☐ Move to another location ☐ Leave the building

6. How will you respond if you feel the indoor brightness in this space is DARK? (Multiple answers)
 - ☐ Do nothing ☐ Complain to the manager ☐ Move to another location ☐ Leave the building

The respondent is asked whether the external lighting of the mall could raise his/her awareness to the mall to examine the ability of the external lighting and its importance to the mall in attracting public attention.

7. Is the external lighting of this shopping mall easy enough to draw your attention to this place?
 - ☐ Yes ☐ No

In the second section, the respondent is first introduced with the four voluntary agreements, and is asked for his/her awareness of the agreements, perception on the easiness of information acquisition for the mall's participation in the agreements, and the impact of the participation on his/her decision of resurrection. This is to examine the potential rate of detection and voluntary penalty to non-compliance among the public, which account for the monitoring effectiveness of public surveillance over the shopping malls.

	25.5 °C	De- lamp	Earth Hour	Voluntary Charter Scheme
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8. Do you think that this shopping mall has followed the above agreement? ☐ Yes ☐ No ☐ No Idea				
9. How difficult/ easy is it to know whether this shopping mall has participated in the above agreement? ☐ Very easy ☐ Easy ☐ Difficult ☐ Very difficult				
10. How does the participation of the agreement affect your decision of revisiting? ☐ No impact ☐ Revisit more frequently ☐ Revisit less frequently ☐ Never revisit				

In the third section, the respondent's personal information, including gender, age, family income; expenditure, duration of stay and purpose of visiting the mall, identity as a local or tourist are collected to establish the personal and shopping profile for further analysis. The origin country and duration of staying in Hong Kong are also collected for tourists.

11. Are you preparing to leave or just arrived this shopping mall?
☐ Preparing to leave ☐ Just arrived ☐ Neither preparing to leave nor just arrived
12. How long have you been in this shopping mall?
☐ Less than 0.5 hour ☐ 0.5-1 hour ☐ 1-2 hours ☐ 2-4 hours ☐ More than 4 hours
13. What is your purpose of visiting this mall? (Multiple Answers)
☐ Shopping ☐ Having meal ☐ Just pass through ☐ Work ☐ Window shopping ☐ Other:_____
14. Please indicate the amount (in HKD\$) you have spent in this mall today
☐ <\$100 ☐ \$100-\$200 ☐ \$200-\$499 ☐ \$500-\$999 ☐ \$1000-\$4999 ☐ ≥\$5000
15. Are you a Hong Kong resident or tourist?
☐ Hong Kong resident ☐ Tourist

Hong Kong resident:

- a. Gender: ☐ Male ☐ Female
- b. Age: ☐ ≤21 ☐ 22-39 ☐ 40-60 ☐ >60
- c. Household Income (HKD\$): ☐ <\$30,000 ☐ \$30,000-\$60,000 ☐ >\$60,000

Tourist:

- a. Gender: ☐ Male ☐ Female
- b. Age: ☐ ≤21 ☐ 22-39 ☐ 40-60 ☐ >60
- c. Household Income: ☐ <RMB\$5,000 ☐ RMB\$5,000-\$30,000 ☐ >RMB\$30,000

☐ <USD\$4,000 ☐ USD\$4,000-\$11,000 ☐ >USD\$11,000

d. From: _____(City)_____ (Country)

e. Duration of staying in Hong Kong in this trip: ☐ Within 1 day ☐ 2-3days ☐ 4-7days ☐ >7days

The respondent's clothing is recorded by the interviewer at the end of the questionnaire for reference

Please briefly describe interviewee's clothing today (OBSERVED BY INTERVIEWER)

Male		Female	
<u>Footwear</u>	☐	<u>Footwear</u>	☐
Shoes and socks	☐	Shoes and socks	☐
Shoes (without socks)	☐	Shoes (without socks)	☐
Sandals/thongs	☐	Sandals/thongs	☐
<u>Top*</u>		<u>Top*</u>	
Vest	☐	Vest	☐
Short sleeved shirt	☐	Short sleeved shirt	☐
Long sleeved shirt	☐	Long sleeved shirt	☐
<u>Bottom*</u>		<u>Bottom*</u>	
Pants	☐	Shorts/ Shot skirt	☐
Shorts	☐	Jeans/ Long skirt	☐
<u>Outer layers*</u>		<u>Outer layers*</u>	
Jumper/ jacket	☐	Jumper/ jacket	☐
Vest/ singlet top	☐	Vest/ singlet top	☐
*Dress: (Vest/ Short/ Long sleeved shirt) + (Short/ Long skirt)			

3.4.Site selection

A list of major shopping malls in Hong Kong with floor space above 100,000 square feet was generated from online and corporate information of major developers in Hong Kong. Fourteen malls were nominated after a primitive screening based on the floor space, proximity to MTR, visitor profile and representativeness according to the type of mall and energy usage. A field study was then conducted to examine the feasibility of data collection, based on factors including security level, location and number of entrances, visitor flow and composition, and linkage with MTR stations. Seven shopping malls distributed across the territory, namely, Uptown Plaza (Tai Po), New Town Plaza (Sha Tin), Wong Tai Sin Plaza (Wong Tai Sin), Harbour City (Tsim Sha Tsui), Festival Walk (Kowloon Tong), New Jade Shopping Arcade (Chai Wan) and Pacific Place (Admiralty) were selected for surveying.

3.5. Classification of shopping malls

The shopping malls are classified into high-end and low-end malls according to the value of goods sold, share of tourists in visitor flow and the dominant income group visiting:

- | | | |
|-----------------------------|---|---------------|
| 1. Pacific Place | } | Low-end malls |
| 2. Harbour City | | |
| 3. Festival Walk | | |
| 4. New Town Plaza | | |
| 5. Uptown Plaza | } | |
| 6. New Jade Shopping Arcade | | |
| 7. Wong Tai Sin Plaza | | |

The amount of spending in each shopping mall has justified the selection and classification of the malls. Two distinctive groups, the high-end and low-end shopping malls, are identified according to the amount of spending and share of tourist. Since the data collected is categorical, the median value of each spending category is taken to compute the mean spending of the malls.

Table 2 Average spending by visitors in different malls

Local / Tourist Location		Spending			Visitor	
		Mean (HKD)	N	Std. Deviation	Frequency	Percent (L/T)
Tourist	Uptown Plaza	860.0000	5	1225.96900	8	4.6
	New Town Plaza	1354.5455	33	1280.40299	45	10.9
	Wong Tai Sin Plaza	150.0000	1	.	3	1.3
	Harbour City	1160.0671	149	1216.82990	206	42.6
	New Jade Shopping Arcade	383.3333	3	351.18846	4	2.4
	Pacific Place	1200.0000	22	1281.73989	34	20.4
	Festival Walk	1414.2857	42	1274.29013	55	23.5
	Total	1211.5686	255	1232.01770	355	19.0
Local	Uptown Plaza	189.7436	78	477.84412	166	95.4
	New Town Plaza	325.0000	140	602.31866	367	10.9
	Wong Tai Sin Plaza	116.1905	105	300.03968	227	98.7

Harbour City	441.1972	142	784.15829	278	57.4
New Jade Shopping Arcade	222.4138	58	550.77078	163	97.6
Pacific Place	436.9048	42	856.61412	133	79.6
Festival Walk	484.8315	89	825.83995	179	76.5
Total	320.4128	654	658.06923	1513	81.0
Grand mean	570.4070	909	946.83797		

3.6.Data collection operation

The data was collected between 29 June and 16 August 2015, for every other week from Monday to Thursday and from Saturday to Sunday, between 2:00pm and 7:00pm, with a one-hour break from 4:00pm to 5:00pm. A total of twenty-four trips were taken to seven malls located across the territory. Depending on the size of the mall, four to six interviewers were deployed at different sections/ spots within the mall for each visit. Spot selection was based on the level of security and visitor flow, in which interviewers were deployed at locations with minimal security interference and acceptable flow rate of visitor for a better rate of response. The spots were updated upon evaluation during breaks and after each day's work to reduce the possibility of security interference and enhance the rate of response. Interviews were conducted on a simple random sampling basis using portable electronic devices. The respondent was given a paper questionnaire with all questions and options listed. The questions were asked by the interviewer one by one and the answers were entered to the portable device immediately after each question was answered. Data entry for analysis and quality check was conducted by three researchers after every week of data collection. A total of 1868 responses were received and are categorised as follows:

	Tourist								Local	
	Frequency				Percent					
	Chin ese	Non- Chin ese	Mi ss	Su m	Chin ese	Non- Chin ese	Mi ss	Su m	Fre que ncy	%
Uptown Plaza	6	2		8	75.0	25.0		2.3	166	11.0
New Town Plaza	36	9		45	80.0	20.0		12.7	367	24.3
Wong Tai Sin Plaza	3	0		3	100.0	.0		.8	227	15.0
Harbour City	166	34	6	20	80.6	16.5	2.	58.	278	18.

New Jade Shopping Arcade	3	1		6			9	0		4
Pacific Place	20	14		4	75.0	25.0		1.1	163	10.8
Festival Walk	44	9	2	34	58.8	41.2	3.6	15.5	133	8.8
Total	278	69	8	55	80.0	16.4	3.3	100.0	179	11.8
				35	78.3	18.4	3.3	100.0	151	100.0

Location	Date of data collection		Researchers deployed
Up Town Plaza	29 June, 1 July (2:00-4:00), 4 July		4
New Town Plaza	30 June, 1 July (5:00-7:00), 2,5 July		6
Wong Tai Sin Plaza	13, 15, 19 July		4
Harbour City	14, 16, 18 July, 11, 13, 16 August		6
New Jade Shopping Arcade	27, 29 July, 1 August		4
Pacific Place	28, 30 July, 2 August		6
Festival Walk	10, 12, 15 August		6

3.7.Data Quality control

3.7.1. Interviewer training

A briefing session was held for the interviewers on their first day on duty to instruct the process of data collection, how to use the portable device applications and remind about the ethical issue and personal safety. A short tour around the destined shopping mall was conducted on the first day of operation in each mall for the interviewers to familiarise themselves with the floor plan of the malls.

3.7.2. On site record

Data collection was conducted utilising portable electronic devices which are directly linked to an online database. This avoids the problem of losing data and miscoding of data during data input. The interviewer ID, interviewing time and location, which is recorded by the GPS system, are also embedded in the dataset such that every record could be tracked. The input data were constantly checked by a leading researcher throughout the process such that amendments could

be made immediately should a problem is detected. The interviewers stayed in contact with everyone through cell phones to report any anomalies and prevent over sampling at a certain spot.

3.7.3. External factors

By conducting the survey at selected locations throughout the summer and by multiple interviewers, it is possible to collect a more comprehensive dataset. This however could add uncertainty to the result by introducing new variables including time of response, weekday-holiday variation and individual bias of interviewers. Several multiple regressions are conducted to check the impact externalities and the result is satisfactory that the dataset could be analysed comprehensively.

There are some significant influences on a few items though but they would not have significant impact on the analysis. The significant influence of interviewer and location for the questions on the duration of staying are acceptable due to the deployment spot differences of the interviewers. The monthly and diurnal variation of tourists/ local difference is caused by the change in targeting groups for a balanced tourist/ local profile and the malls visited during August were mainly higher-end malls with more tourists while the monthly difference in expenditure could be caused by the change in tourist/local profile and the summer holiday effect.

Table 3 Multiple regression of external factors

Coefficients: Dependent Variable: Are you going to leave or just arriving this mall?					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.152	.823		.185	.853
Month	.122	.106	.077	1.155	.248
Day	.004	.005	.039	.808	.419
Time	.033	.020	.052	1.609	.108
Location	-.104	.032	-.191	-3.251	.001
Interviewer	-.048	.012	-.133	-4.035	.000

Coefficients: Dependent Variable: How long did you stay in this mall?					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.425	.883		2.746	.006

Month	-.062	.114	-.036	-.543	.587
Day	-.010	.006	-.081	-1.678	.094
Time	.019	.022	.028	.861	.389
Location	.056	.034	.097	1.638	.102
Interviewer	.061	.013	.158	4.765	.000

Coefficients: Dependent Variable: How much have you spent in this mall today? (HKD)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2.290	1.371		-1.670	.095
Month	.546	.177	.208	3.090	.002
Day	.016	.009	.086	1.768	.077
Time	.019	.034	.019	.569	.569
Location	.023	.054	.025	.425	.671
Interviewer	.048	.020	.080	2.395	.017

Coefficients: Dependent Variable: Are you a local resident or a tourist?

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.626	.366		7.179	.000
Month	-.301	.047	-.418	-6.396	.000
Day	-.010	.002	-.200	-4.258	.000
Time	.020	.009	.069	2.173	.030
Location	.034	.014	.137	2.373	.018
Interviewer	-.006	.005	-.034	-1.039	.299

3.7.4. Interviewer correlation

To further examine the externalities brought by interviewers, the results from different interviewers in different locations are compared among themselves by a one-way ANOVA test to examine whether interpersonal difference exists, so as to reduce the potential externalities caused by individual sampling bias. The result shows no significant difference among the interviewers for most questions and the results can be combined.

For some questions however, significant difference exists in ad hoc locations among the interviewers.

It was reported that significant difference exists for the questions about the perceived indoor temperature, perception on the mall's participation in the voluntary agreements and potential voluntary penalty to the malls. A difference in perceived indoor temperature could be caused by the non-uniformity of temperature within the mall since interviews were conducted in various spots. Instead of adding an uncertainty, this actually reveals a more comprehensive dataset is collected since visitors in different sections of the malls were interviewed. There is also insignificant correlation between the two factors (Table 16) which means such inter-personal difference between interviewers does not affect the quality of the data.

The difference on issues about voluntary agreements and voluntary penalty on the other hand could be a mere coincidence. Since perception is a highly personal matter, the significant difference does not imply the occurrence of a sampling bias. Given that such difference exists among all interviewers in most locations, it rules out the possibility of bias caused by the guidance of interviewers.

In general, the differences are within an acceptable range and do not affect the reliability of the dataset.

3.8.Data Processing and preparation for analysis

3.8.1. Categorising

To reduce the impact of difference in visitor backgrounds and examine their differences in behaviour, the respondents are categorised into several subgroups accordingly. There are two main ways of categorising throughout the analysis: by a dichotomy of local/ tourist and by the location of response, which is the seven malls the data is collected from. To make the result less complicated, the locations are further reduced to three categories: Hong Kong Island, Kowloon and the New Territories for the weighting of data. The respondents are also categorised according to their income level: low, middle and high, when analysing their perceptions toward voluntary agreements to examine any possible difference among them.

3.8.2. Weighting

For responses from locals, since the proportion of data collected does not match with the spatial and income distribution of population in Hong Kong, the general analyses are conducted after adding two weights to the local data: income and location, to provide a more realistic picture of the issues. With the limitation of the data collected, the location of respond is taken and visitors are assumed to visit their local malls.

For responses from tourists, since the shopping behaviour could vary with different duration of staying in Hong Kong, the tourist data is weighted by the corresponding duration of staying, which is categorised as same-day arrivals and overnight arrivals according to the Tourism Commission.

The weights are added according to the filtering status of the analysis and no weights are added for analyses that involve locational comparison. The weightings are as follows:

	Categories	Before Filtering	After Filtering
W1* (Local location)	Hong Kong Island	0.89	1.14
	Kowloon	0.67	0.59
	New Territories	1.48	1.57
W2# (Local income)	Low income	1.14	1.07
	Middle income	0.72	0.72
	High income	1.26	1.19
W3^ (Tourist duration of stay)	Same-day arrivals	1.52	1.39
	Overnight arrivals	0.71	0.75

*Population for weighting: Census and Statistics Department: The Profile of Hong Kong Population Analysed by District Council District, 2014.

#Population for weighting: Census and Statistics Department: Domestic Households by District Council District, Household Composition and Monthly Domestic Household Income.

^Population for weighting: Hong Kong Tourism Board: Research and statistics: Visitor arrivals.

3.8.3. Filtering

Consider the condition and purposes of visit in the mall, when conducting the analysis about the perceived air temperature, behavioural responses and expenditure, a filter would be applied to filter out those non-target visitors of the mall. While the shopping mall managers would have intention to maximise the visitor flow, those who are not going to shop or provide any potential revenue to the mall would be less important to the mall and their opinion would be less significant on influencing the decision of the managers. Therefore, respondents who reported passing by, working or doing other things in the mall would be filtered out. Respondents who have just arrived at the mall are also filtered since they do not have expenditure yet and no analysis could be conducted.

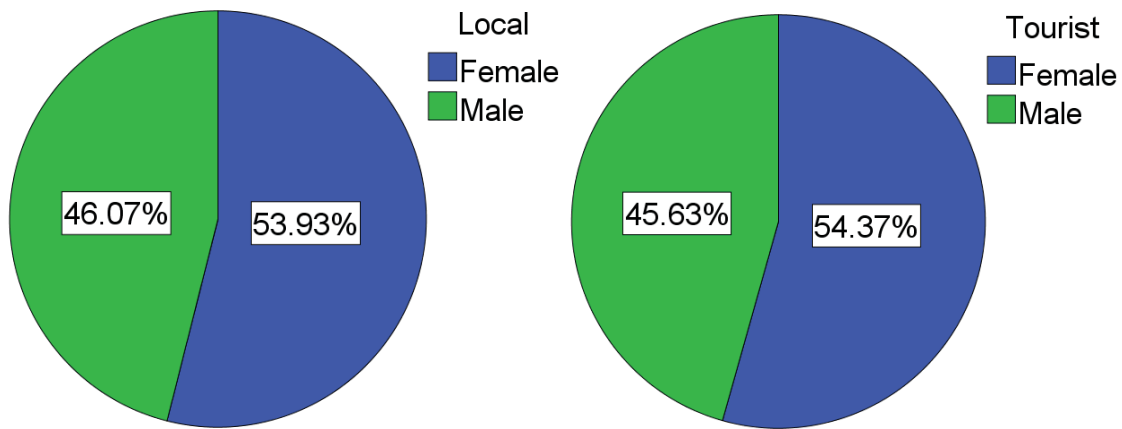
Chapter 4 Shoppers' Profile

4.1.Demographic information

The demographic information of the respondents is listed as below.

Male/ Female

		Before Filtering		After Filtering	
		Frequency	Percent	Frequency	Percent
Tourists	Female	193	54.2	145	55.3
	Male	162	45.8	117	44.7
	Total	355	100.0	262	100.0
Locals	Female	816	53.9	347	53.0
	Male	697	46.0	308	47.0
	Total	1513	100.0	655	100.0
Total		1868	100.0	917	100.0

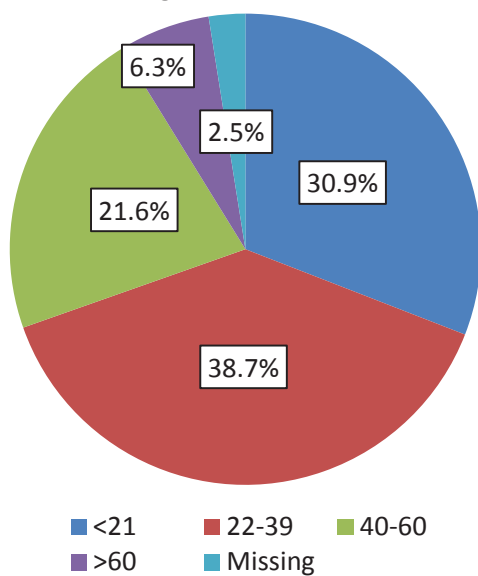


Age

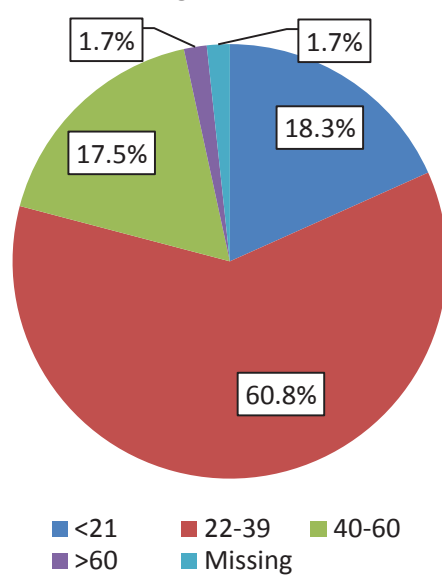
			Before Filtering			After Filtering			Hong Kong Population	
			Frequency	Percent	Valid Percent	Frequency	Percent	Valid Percent	Frequency	Percent
Local Male	<21		181	26.0	26.7	63	20.5	21.1	606500	18.0
	22-39		294	42.2	43.4	130	42.2	43.6	901300	26.8
	40-60		155	22.2	22.9	80	26.0	26.8	1095200	32.6
	>60		48	6.9	7.1	25	8.1	8.4	761000	22.6
	Total		678	97.3	100.0	298	96.8	100.0	3364000	100.0
	Miss		19	2.7		10	3.2			
	Total		697	100.0		308	100.0			
Female	<21		286	35.0	35.9	107	30.8	32.0	569200	14.5
	22-39		292	35.8	36.6	122	35.2	36.5	1193400	30.3
	40-60		172	21.1	21.6	80	23.1	24.0	1333000	33.9
	>60		47	5.8	5.9	25	7.2	7.5	839000	21.3
	Total		797	97.7	100.0	334	96.3	100.0	3934600	100.0
	Miss		19	2.3		13	3.7			
	Total		816	100.0		347	100.0			
Tourist	<21		28	17.3	17.6	21	17.9	18.1		
	22-29		92	56.8	57.9	70	59.8	60.3		
	40-60		36	22.2	22.6	23	19.7	19.8		
	>60		3	1.9	1.9	2	1.7	1.7		
	Total		159	98.1	100.0	116	99.1	100.0		
	Miss		3	1.9		1	.9			

	Total	162	100.0		117	100.0			
Female	<21	37	19.2	19.5	28	19.3	19.6		
	22-29	124	64.2	65.3	91	62.8	63.6		
	40-60	26	13.5	13.7	22	15.2	15.4		
	>60	3	1.6	1.6	2	1.4	1.4		
	Total	190	98.4	100.0	143	98.6	100.0		
	Miss	3	1.6		2	1.4			
	Total	193	100.0		145	100.0			
Total		1868	100.0		917	100.0			

Age of local residents



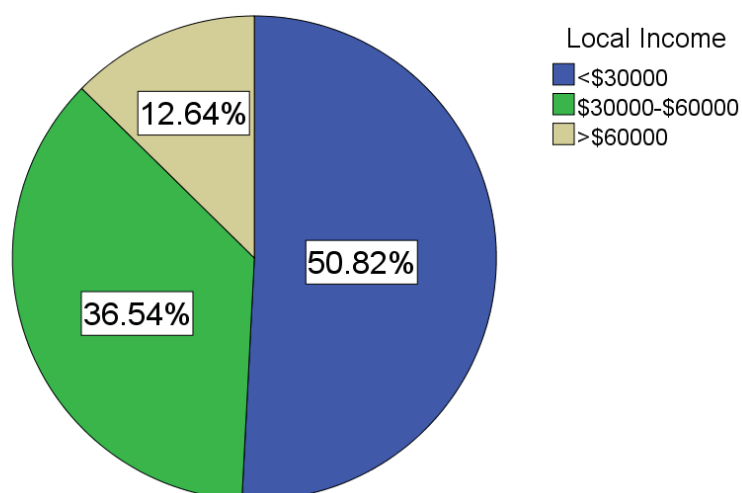
Age of tourists



Local residents income

		Before Filtering			After Filtering			Hong Kong Population Percent
		Frequency	Percent	Valid Percent	Frequency	Percent	Valid Percent	
Valid	<\$30000	619	33.1	50.8	255	27.8	48.7	57.8
	\$30000-	445	23.8	36.5	191	20.8	36.5	26.3

	\$60000						
	>\$60000	154	8.2	12.6	78	8.5	14.9
	Total	1218	65.2	100.0	524	57.1	100.0
Missi ng	System	295	16.4		393	42.9	



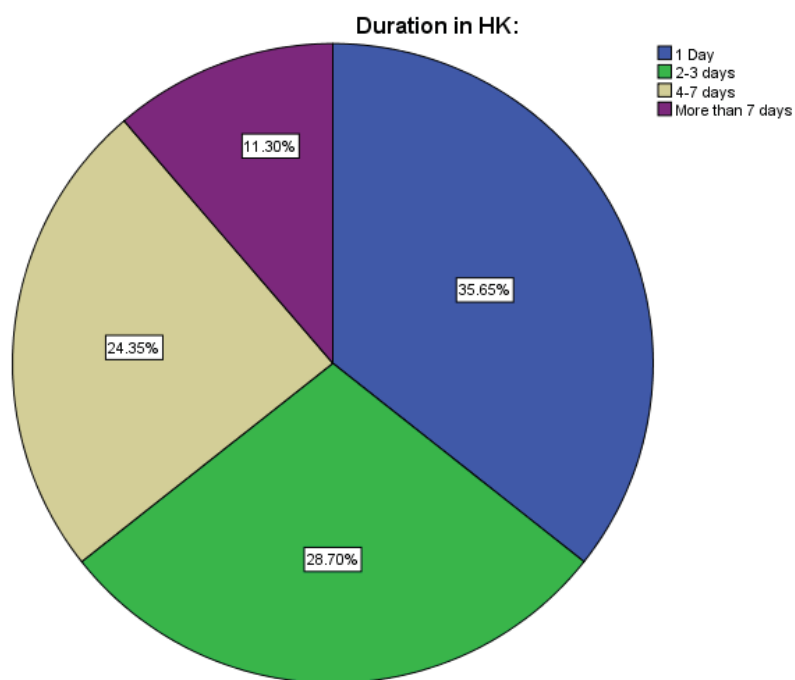
Spatial distribution of population in HK

	Statistics				Hong Kong	
	Before Filtering		After Filtering		Population	
	Frequenc y	Percen t	Frequenc y	Percen t	Frequenc y	Percent
Hong Kong Island	296	19.6	100	15.3	1248900	17.5
Kowloon	684	45.2	337	51.5	2168600	30.3
New Territories	533	35.2	218	33.3	3734500	52.2
Total	1513	100.0	655	100.0	7152000	100.0

Tourist Duration in Hong Kong

	Before Filtering			After Filtering		Hong Kong total	
	Frequen cy	Percen t	Valid Percent	Frequen cy	Percent	Frequen cy	Percent
Valid 1 Day	123	6.6	35.7	99	39.0	3306837	54.4
2-3 days	99	5.3	28.7	75	28.3	2777045	45.6
4-7 days	84	4.5	24.3	62	24.4	9 (sum	
> than 7	39	2.1	11.3	21	8.3	of	

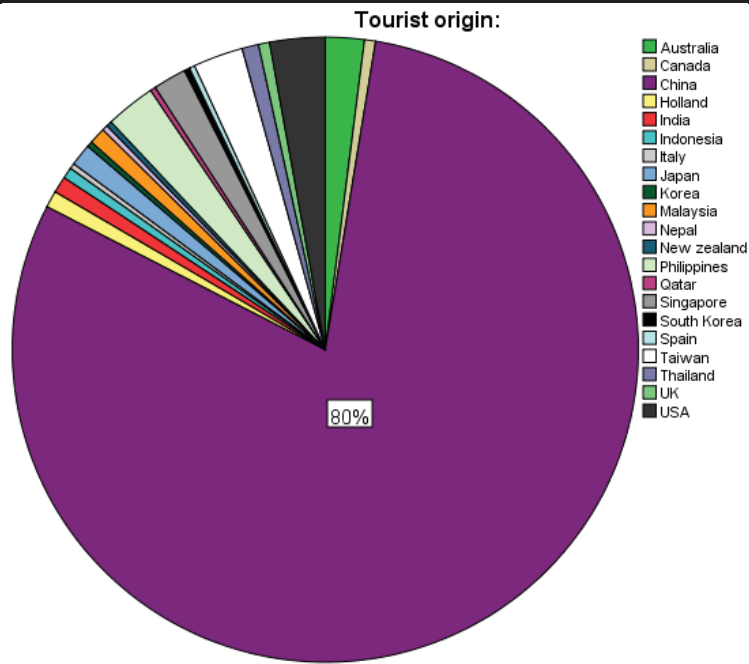
	days						overnight)	
	Total	345	18.5	100.0	254	100.0	60838836	100.0
Missing	System	10	2.8					



Tourist origin

	Frequency	Percent	Valid Percent	Cumulative Percent
Missing	5	1.4	1.4	1.4
Australia	7	2.0	2.0	3.4
Canada	2	.6	.6	3.9
China	280	78.9	78.9	82.8
Holland	3	.8	.8	83.7
India	3	.8	.8	84.5
Indonesia	2	.6	.6	85.1
Italy	1	.3	.3	85.4
Japan	4	1.1	1.1	86.5
Korea	1	.3	.3	86.8
Malaysia	3	.8	.8	87.6
Nepal	1	.3	.3	87.9
New Zealand	1	.3	.3	88.2
Philippines	9	2.5	2.5	90.7

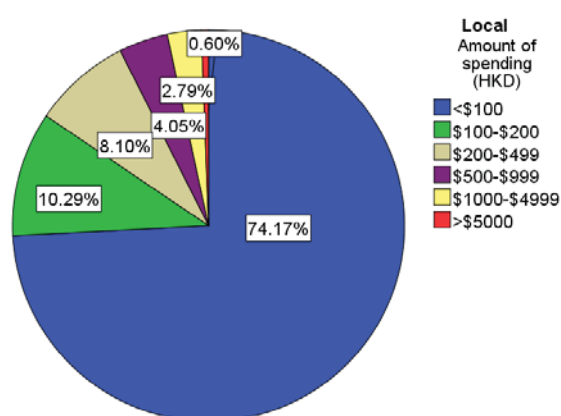
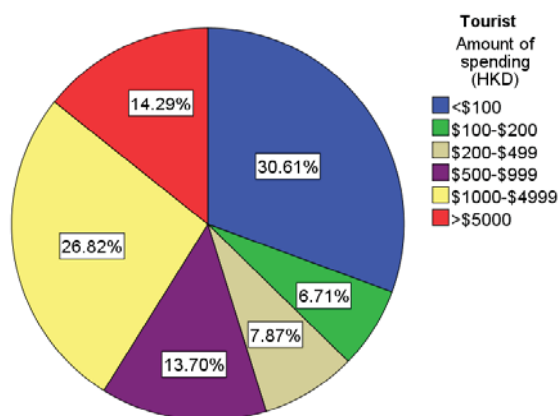
Qatar	1	.3	.3	91.0
Singapore	6	1.7	1.7	92.7
South Korea	1	.3	.3	93.0
Spain	1	.3	.3	93.2
Taiwan	9	2.5	2.5	95.8
Thailand	3	.8	.8	96.6
UK	2	.6	.6	97.2
USA	10	2.8	2.8	100.0
Total	355	100.0	100.0	



Amount of spending in the mall (HKD)

	Before Filtering			After Filtering		
	Frequency	Percent	Valid Percent	Frequency	Percent	Valid Percent
Tourist <\$100	105	105	29.6	44	16.8	17.3
\$100-\$200	23	23	6.5	19	7.3	7.5
\$200-\$499	27	27	7.6	24	9.2	9.4
\$500-\$999	47	47	13.2	46	17.6	18.0
\$1000-\$4999	92	92	25.9	80	30.5	31.4
>\$5000	49	49	13.8	42	16.0	16.5
Total	343	343	96.6	255	97.3	100.0

	Missing	12	3.4		7	2.7	
	Total	355	100.0		262	100.0	
Local	<\$100	1117	73.8	74.2	356	54.4	54.4
	\$100-\$200	155	10.2	10.3	115	17.6	17.6
	\$200-\$499	122	8.1	8.1	95	14.5	14.5
	\$500-\$999	61	4.0	4.1	49	7.5	7.5
	\$1000-\$4999	42	2.8	2.8	34	5.2	5.2
	>\$5000	9	.6	.6	5	.8	.8
	Total	1506	99.5	100.0	654	99.8	100.0
	Missing	7	.5		1	.2	
	Total	1513	100.0		655	100.0	



4.2. Visitor behaviour

4.2.1. Importance of different visitors

Visitors are not necessarily having equal importance to the shopping mall. Rather, it depends on the potential revenue that the mall can capture from them, which means the amount of money spent by the visitors and this is related to the purpose of visit. Given that visitor who are just passing by and working have a much less significant amount of spending then visitors who are shopping, dining and window shopping, the former groups of visitors could be excluded in the analyses since they are somehow “less important” to the mall.

Table 4 Amount of spending sorted by purpose of visit

			Q14. How much have you spent in this mall today? (HKD)						Total
			<\$100	\$100-\$200	\$200-\$499	\$500-\$999	\$1000-\$4999	>\$5000	
Purpose of visit ^a	Others	Count	93	14	8	7	5	2	129
		%	72.1%	10.9%	6.2%	5.4%	3.9%	1.6%	
	Working	Count	50	3	1	1	1	0	56
		%	89.3%	5.4%	1.8%	1.8%	1.8%	0.0%	
	Passing by	Count	213	11	6	5	2	0	237
		%	89.9%	4.6%	2.5%	2.1%	0.8%	0.0%	
	Window shopping	Count	152	38	29	8	15	5	247
		%	61.5%	15.4%	11.7%	3.2%	6.1%	2.0%	
	Dining	Count	145	57	58	30	24	14	328
		%	44.2%	17.4%	17.7%	9.1%	7.3%	4.3%	
Total		Count	614	109	88	46	41	19	917

Percentages and totals are based on respondents.

a. Group

4.2.2. Types of visitor

When holding other externalities constant, it is evident that tourist and local people are two distinct groups of visitors which have different expenditures and duration of staying in mall, in which those of tourists are significantly higher and longer. However, there is no significant difference between tourists of different origins: mainland China and other countries, and a split between local and tourist would suffice.

Table 5 Independent sample T-test of spending by tourists and locals

Group Statistics									
		N	Mean	Std. Deviation	Std. Error Mean				
Q14. How much have you spent	Local	654	1.937	1.2562	.0491				
in this mall today? (HKD)	Tourist	255	3.882	1.7074	.1069				

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q14. How much have you	Equal variances assumed	52.614	.000	-18.854	907	.000	-1.9450	.1032	-2.1475	-1.7426
spent in this mall today? (HKD)	Equal variances not assumed			-16.530	366.185	.000	-1.9450	.1177	-2.1764	-1.7137

Table 6 Multiple regression of local/ tourist split on expenditure and duration of staying in mall

Duration of staying in mall

Expenditure

Model Summary					Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.414 ^a	.171	.164	.9771	1	.547 ^a	.299	.293	1.3855

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, External Temperature (Degree C), Holiday, Location, Month					a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, External Temperature (Degree C), Holiday, Location, Month				
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ANOVA ^a						ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.	Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	179.033	8	22.379	23.440	.000 ^b	1 Regression	737.274	8	92.159	48.008	.000 ^b
Residual	866.887	908	.955			Residual	1727.711	900	1.920		
Total	1045.919	916				Total	2464.986	908			

a. Dependent Variable: Q12. How long did you stay in this mall?						a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)					
b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, External Temperature (Degree C), Holiday, Location, Month						b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, External Temperature (Degree C), Holiday, Location, Month					

Coefficients ^a						Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients			Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.		B	Std. Error	Beta	t	Sig.
1 (Constant)	4.454	1.553		2.868	.004	1 (Constant)	1.520	2.219		.685	.494
Month	-.315	.126	-.185	-2.491	.013	Month	.051	.181	.019	.280	.779
Day	-.019	.006	-.152	-3.054	.002	Day	5.603E-5	.009	.000	.006	.995
Time	.036	.020	.054	1.767	.077	Time	.057	.029	.055	1.958	.051
Holiday	.007	.070	.003	.094	.925	Holiday	-.055	.100	-.017	-.553	.581
Location	.086	.032	.148	2.657	.008	Location	.077	.047	.085	1.651	.099
External Temperature (Degree C)	.006	.025	.010	.246	.806	External Temperature (Degree C)	.020	.037	.021	.534	.593
Interviewer	.056	.012	.145	4.687	.000	Interviewer	.041	.017	.067	2.352	.019
Q15. Are you a local resident or a tourist?	-.895	.074	-.379	-12.032	.000	Q15. Are you a local resident or a tourist?	-1.901	.106	-.519	-17.908	.000

a. Dependent Variable: Q12. How long did you stay in this mall?						a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)					
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4.2.3. Determining factors of expenditure in shopping mall

Given that the expenditure of visitors is a factor of high concern by shopping mall owners, for it determines the sales volume of shop tenants and the rental value of the mall, it is crucial to examine the external factors that determines the visitors' expenditure before digging into the influences of air temperature and lighting conditions on the visitors' expenditure, such that a more comprehensive picture can be obtained.

Table 7 Multiple regression summary of external factors influencing expenditure for local and tourist

Local sub-group: Weight = None

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.452 ^a	.204	.187	1.1390

a. Predictors: (Constant), Q12. How long did you stay in this mall?, Month, Time, HK_M/F, HK_Income, HK_Age, Interviewer, Holiday, External Temperature, Day, Location

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	169.818	11	15.438	11.901	.000 ^b
Residual	662.890	511	1.297		
Total	832.707	522			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?, Month, Time, HK_M/F, HK_Income, HK_Age, Interviewer, Holiday, External Temperature, Day, Location

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
1 (Constant)	-4.287	2.621		-1.636	.102
Month	.361	.230	.178	1.569	.117
Day	.015	.010	.112	1.531	.126
Time	.004	.031	.005	.115	.909
Holiday	-.047	.114	-.018	-.410	.682
Location	.014	.059	.020	.239	.811
External Temperature	.050	.041	.062	1.203	.230
Interviewer	-.008	.022	-.016	-.374	.709
HK_M/F	.001	.102	.000	.012	.991
HK_Age	.092	.059	.063	1.557	.120
HK_Income	.291	.072	.166	4.065	.000
Q12. How long did you stay in this mall?	.466	.054	.358	8.696	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Local sub-group: Weight = W1

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.435 ^a	.189	.172	1.1092

a. Predictors: (Constant), Q12. How long did you stay in this mall?, HK_M/F, Holiday, Time, HK_Income, HK_Age, External Temperature, Interviewer, Day, Location, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	148.372	11	13.488	10.963	.000 ^b
Residual	635.256	516	1.230		
Total	783.628	527			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?, HK_M/F, Holiday, Time, HK_Income, HK_Age, External Temperature, Interviewer, Day, Location, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
1 (Constant)	-1.674	3.051		-.548	.584
Month	.128	.269	.066	.477	.634
Day	.009	.011	.083	.862	.389
Time	-.013	.030	-.018	-.441	.659
Holiday	-.063	.119	-.026	-.531	.595
Location	.055	.066	.080	.831	.406
External Temperature	.030	.049	.034	.608	.543
Interviewer	-.012	.022	-.023	-.537	.591
HK_M/F	.033	.099	.013	.333	.739
HK_Age	.108	.056	.079	1.930	.054
HK_Income	.277	.069	.164	4.019	.000
Q12. How long did you stay in this mall?	.434	.051	.355	8.570	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Local sub-group: Weight = W2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.454 ^a	.206	.189	1.1111

a. Predictors: (Constant), Q12. How long did you stay in this mall?, Month, Time, HK_MF, HK_Income,

HK_Age, Interviewer, Holiday, External Temperature, Day, Location

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	163.716	11	14.883	12.056	.000 ^b
Residual	630.159	510	1.235		
Total	793.875	521			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?, Month, Time, HK_MF, HK_Income,

HK_Age, Interviewer, Holiday, External Temperature, Day, Location

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-3.871	2.585		-1.497	.135
Month	.316	.227	.159	1.389	.165
Day	.011	.010	.084	1.137	.256
Time	-.006	.030	-.008	-.191	.848
Holiday	.028	.112	.011	.247	.805
Location	.027	.058	.040	.464	.643
External Temperature	.051	.041	.064	1.257	.209
Interviewer	-.004	.022	-.008	-.185	.853
HK_MF	.029	.099	.012	.288	.773
HK_Age	.096	.056	.069	1.708	.088
HK_Income	.289	.068	.175	4.265	.000
Q12. How long did you stay in this mall?	.443	.052	.350	8.508	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Tourist sub-group: Weight = None

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.590 ^a	.348	.301	1.3904

a. Predictors: (Constant), Q12. How long did you stay in this mall?, Day, ChineseNonChinese, Location,

NHK_Age, Time, Interviewer, NHK_MF, Holiday, Duration in HK, NHK_Income, External Temperature, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	183.805	13	14.139	7.314	.000 ^b
Residual	344.112	178	1.933		
Total	527.917	191			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?, Day, ChineseNonChinese, Location, NHK_Age, Time, Interviewer, NHK_MF, Holiday, Duration in HK, NHK_Income, External Temperature, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.400	4.673		.728	.468
Month	-.164	.318	-.062	-.517	.606
Day	.001	.020	.003	.033	.974
Time	.022	.069	.020	.320	.750
Holiday	.197	.224	.059	.879	.381
Location	.141	.096	.134	1.472	.143
External Temperature	-.081	.078	-.099	-1.040	.300
Interviewer	.013	.046	.018	.279	.780
NHK_MF	.157	.216	.047	.728	.467
NHK_Age	.182	.194	.060	.938	.350
NHK_Income	.421	.183	.156	2.302	.022
Duration in HK	-.263	.115	-.152	-2.282	.024
ChineseNonChinese	-.143	.364	-.026	-.392	.696
Q12. How long did you stay in this mall?	.812	.101	.512	8.009	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Tourist sub-group: Weight = W3

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.603 ^a	.364	.318	1.3799

a. Predictors: (Constant), Q12. How long did you stay in this mall?, Day, ChineseNonChinese, Location,

NHK_Age, Interviewer, NHK_MF, Time, Holiday, NHK_Income, Duration in HK, External Temperature, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	198.650	13	15.281	8.025	.000 ^b
Residual	347.731	183	1.904		
Total	546.381	196			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?, Day, ChineseNonChinese, Location, NHK_Age, Interviewer, NHK_MF, Time, Holiday, NHK_Income, Duration in HK, External Temperature, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.570	4.597		.559	.577
Month	-.077	.311	-.030	-.249	.803
Day	.004	.019	.015	.190	.850
Time	-.004	.069	-.004	-.057	.955
Holiday	.353	.227	.103	1.554	.122
Location	.135	.095	.133	1.430	.154
External Temperature	-.073	.078	-.089	-.936	.350
Interviewer	.010	.046	.013	.214	.831
NHK_MF	.249	.214	.074	1.162	.247
NHK_Age	.244	.193	.078	1.267	.207
NHK_Income	.424	.183	.152	2.315	.022
Duration in HK	-.272	.120	-.150	-2.275	.024
ChineseNonChinese	-.139	.414	-.022	-.336	.737
Q12. How long did you stay in this mall?	.836	.099	.535	8.459	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

4.2.3.1.Duration of staying in mall

The duration of staying is a major predictor of the expenditure in mall for both local and tourist (Table 7). There is a significant positive correlation between the duration of stay and expenditure

by a visitor in the shopping mall ($R=0.494-0.530$, depends on weighting), i.e. visitors who stay for a longer time would have more spending. While there are significant differences of the duration of staying and expenditure between different malls' visitors, the correlation remains significant in nearly all shopping malls. This implies that by extending the visitors' duration of staying, more revenue could be captured, and the manager would try to reduce the possibility of immature leaving to raise the mall revenue.

Table 8 Regression of the time and money spent in the mall

Weight = None

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.494 ^a	.244	.244	1.4330

a. Predictors: (Constant), Q12.How long did you stay in this mall?

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	602.405	1	602.405	293.346	.000 ^b
	Residual	1862.581	907	2.054		
	Total	2464.986	908			

a. Dependent Variable: Q14.How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12.How long did you stay in this mall?

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.507	.125		4.061	.000
Q12.How long did you stay in this mall?	.761	.044	.494	17.127	.000

a. Dependent Variable: Q14.How much have you spent in this mall today? (HKD)

Weight = W1 & W3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.493 ^a	.244	.243	1.4303

a. Predictors: (Constant), Q12. How long did you stay in this mall?

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	592.999	1	592.999	289.872	.000 ^b
	Residual	1842.246	901	2.046		
	Total	2435.246	902			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.553	.123		4.488	.000
	Q12. How long did you stay in this mall?	.743	.044	.493	17.026	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Weight = W2 & W3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.530 ^a	.281	.280	1.4404

a. Predictors: (Constant), Q12. How long did you stay in this mall?

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	623.891	1	623.891	300.712	.000 ^b
	Residual	1593.119	768	2.075		
	Total	2217.011	769			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.368	.138		2.669	.008
	Q12. How long did you stay in this mall?	.841	.048	.530	17.341	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Table 9 Regression of the time and money spent in the mall sorted by location (Weight = None)

Model Summary

Location	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uptown Plaza	1	.403 ^a	.162	.152	.9480
New Town Plaza	1	.440 ^a	.194	.189	1.3263
Wong Tai Sin Plaza	1	.258 ^a	.067	.058	.6816
Harbour City	1	.443 ^a	.196	.194	1.6187
New Jade Shopping Arcade	1	.411 ^a	.169	.155	.9912
Pacific Place	1	.510 ^a	.260	.248	1.5060
Festival Walk	1	.438 ^a	.191	.185	1.5513

a. Predictors: (Constant), Q12. How long did you stay in this mall?

ANOVA^a

Location	Model		Sum of Squares	df	Mean Square	F	Sig.
Uptown Plaza	1	Regression	14.080	1	14.080	15.668	.000 ^b
		Residual	72.788	81	.899		
		Total	86.867	82			
New Town Plaza	1	Regression	72.255	1	72.255	41.073	.000 ^b
		Residual	300.820	171	1.759		
		Total	373.075	172			
Wong Tai Sin Plaza	1	Regression	3.454	1	3.454	7.434	.008 ^b
		Residual	48.320	104	.465		
		Total	51.774	105			
Harbour City	1	Regression	185.012	1	185.012	70.612	.000 ^b
		Residual	757.215	289	2.620		
		Total	942.227	290			
New Jade Shopping Arcade	1	Regression	11.801	1	11.801	12.011	.001 ^b
		Residual	57.970	59	.983		
		Total	69.770	60			
Pacific Place	1	Regression	49.496	1	49.496	21.824	.000 ^b
		Residual	140.613	62	2.268		
		Total	190.109	63			
Festival Walk	1	Regression	73.515	1	73.515	30.547	.000 ^b
		Residual	310.454	129	2.407		
		Total	383.969	130			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?

Coefficients^a

Location	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
Uptown Plaza	1	(Constant)	.755	.249		3.031	.003
		Q12. How long did you stay in this mall?	.425	.107	.403	3.958	.000
New Town Plaza	1	(Constant)	.792	.280		2.826	.005
		Q12. How long did you stay in this mall?	.573	.089	.440	6.409	.000
Wong Tai Sin Plaza	1	(Constant)	.952	.157		6.067	.000
		Q12. How long did you stay in this mall?	.202	.074	.258	2.726	.008
Harbour City	1	(Constant)	.769	.288		2.673	.008
		Q12. How long did you stay in this mall?	.806	.096	.443	8.403	.000
New Jade Shopping Arcade	1	(Constant)	.763	.287		2.660	.010
		Q12. How long did you stay in this mall?	.534	.154	.411	3.466	.001
Pacific Place	1	(Constant)	.227	.556		.409	.684
		Q12. How long did you stay in this mall?	.920	.197	.510	4.672	.000
Festival Walk	1	(Constant)	.550	.461		1.193	.235
		Q12. How long did you stay in this mall?	.837	.151	.438	5.527	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

4.2.3.2.Income

It is expected that the amount of income could affect the shopping behaviour and expenditure of the visitor in the shopping mall. While it was expected that such effect would be applicable to local visitors only since tourist would tend to spend more regardless of their income condition, the regression result suggests income is a predictor of the expenditure in mall for both groups. When breaking down into individual malls, the result seems more complicated. While there is a slightly positive correlation between income and expenditure in mall in general and when location is held as a constant factor (Table 9), when the malls are considered separately, the correlation is insignificant in some of the malls (Table 10). Besides, the nature of the mall also seems to play a part in influencing the expenditure of visitors particularly that of the lower income class that they tend to spend more in higher class malls (Table 11). In contrast, the expenditure by the higher income class is steadier regardless of the type of mall. While it is acceptable that income is a factor affecting the expenditure, a more concrete result could be obtained considering the different shopper profiles of the malls, in which there are substantially fewer high income visitors in the “low-end malls” (Table 12)

Table 10 Regression of income level and expenditure in mall sorted by location

Model Summary					
Location	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uptown Plaza	1	.275 ^a	.075	.062	.8656
New Town Plaza	1	.063 ^a	.004	-.004	1.1525
Wong Tai Sin Plaza	1	.090 ^a	.008	-.003	.7149
Harbour City	1	.228 ^a	.052	.044	1.3064
New Jade Shopping Arcade	1	.184 ^a	.034	.006	1.1292
Pacific Place	1	.466 ^a	.217	.173	1.5430
Festival Walk	1	.179 ^a	.032	.016	1.5499

a. Predictors: (Constant), HK_Income

Coefficients ^a						
Location	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Uptown Plaza	1 (Constant)	1.015	.233		4.356	.000
	HK_Income	.352	.146	.275	2.402	.019
New Town Plaza	1 (Constant)	1.993	.245		8.148	.000
	HK_Income	.097	.140	.063	.695	.488
Wong Tai Sin Plaza	1 (Constant)	1.178	.197		5.995	.000
	HK_Income	.119	.137	.090	.870	.387
Harbour City	1 (Constant)	1.447	.298		4.848	.000
	HK_Income	.394	.158	.228	2.490	.014
New Jade Shopping Arcade	1 (Constant)	1.255	.442		2.837	.008
	HK_Income	.322	.292	.184	1.103	.278
Pacific Place	1 (Constant)	.363	.836		.434	.669
	HK_Income	.870	.389	.466	2.238	.038
Festival Walk	1 (Constant)	1.883	.475		3.962	.000
	HK_Income	.327	.233	.179	1.402	.166

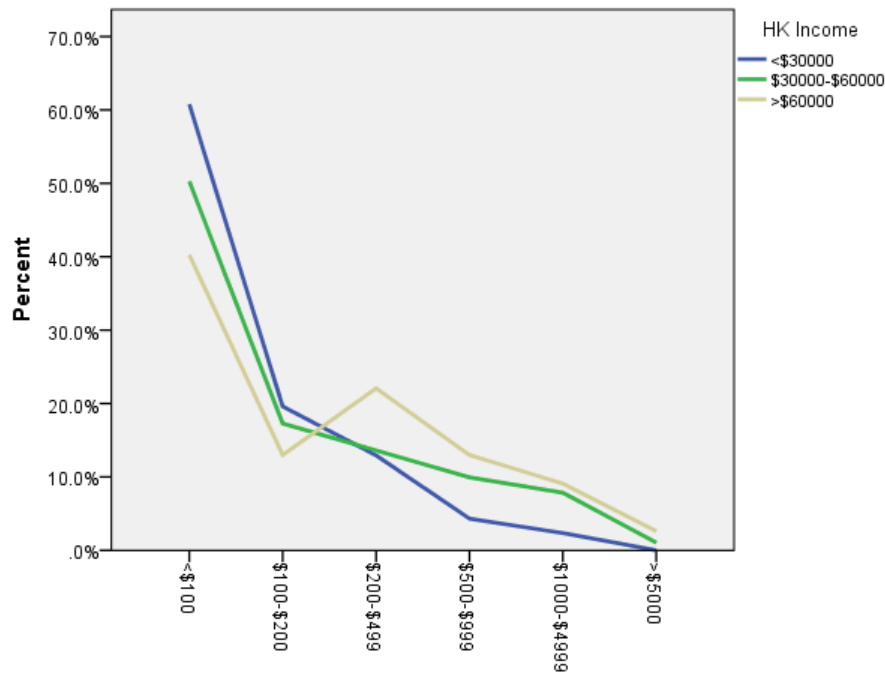
a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Table 11 Mean level of spending of different income groups in different malls

Location	HK Income	N	Minimum	Maximum	Mean	Std. Deviation
Uptown Plaza	<\$30000	50	1.0	4.0	1.333	.6854
	\$30000-\$60000	14	1.0	5.0	1.950	1.3305
	>\$60000	9	1.0	3.0	1.875	.8308
New Town Plaza	<\$30000	70	1.0	5.0	2.119	1.1293
	\$30000-\$60000	33	1.0	4.0	2.065	1.1284
	>\$60000	19	1.0	5.0	2.389	1.2873
Wong Tai Sin Plaza	<\$30000	66	1.0	4.0	1.304	.6574
	\$30000-\$60000	24	1.0	5.0	1.382	.8219
	>\$60000	3	1.0	3.0	1.667	1.1370
Harbour City	<\$30000	55	1.0	4.0	1.739	.9278
	\$30000-\$60000	38	1.0	6.0	2.528	1.6065
	>\$60000	22	1.0	5.0	2.381	1.4632
New Jade Shopping Arcade	<\$30000	26	1.0	5.0	1.591	1.0498
	\$30000-\$60000	7	1.0	5.0	1.800	1.3459
	>\$60000	3	1.0	4.0	2.333	1.5041
Pacific Place	<\$30000	8	1.0	1.0	1.000	.0000
	\$30000-\$60000	4	1.0	5.0	3.000	1.8625
	>\$60000	7	1.0	6.0	2.714	2.0480
Festival Walk	<\$30000	27	1.0	5.0	2.261	1.4161
	\$30000-\$60000	16	1.0	6.0	2.364	1.5744
	>\$60000	18	1.0	6.0	2.941	1.7455

Table 12 Number of visitors in different malls sorted by income level

Location		Frequenc y	Percent			Frequenc y	Percent
Uptown Plaza	<\$30000	50	68.5	New Town Plaza	<\$30000	70	57.2
	\$30000-\$60000	14	19.8		\$30000-\$60000	33	27.1
	>\$60000	9	11.7		>\$60000	19	15.7
	Total	73	100.0		Total	122	100.0
Wong Tai Sin Plaza	<\$30000	66	70.6	Harbour City	<\$30000	55	47.4
	\$30000-\$60000	24	26.0		\$30000-\$60000	38	33.2
	>\$60000	3	3.4		>\$60000	22	19.5
	Total	94	100.0		Total	115	100.0
New Jade Shopping Arcade	<\$30000	26	71.5	Pacific Place	<\$30000	8	41.3
	\$30000-\$60000	7	19.7		\$30000-\$60000	4	21.5
	>\$60000	3	8.8		>\$60000	7	37.2
	Total	37	100.0		Total	20	100.0
				Festival Walk	<\$30000	27	43.8
					\$30000-\$60000	16	25.4
					>\$60000	19	30.8
					Total	62	100.0



Q14. How much have you spent in this mall today? (HKD)

Figure 2 Local visitor expenditure of different income groups

4.2.3.3.Type of tourist

It is expected that tourists of different origins would have different amount of expenditure given the varied economic conditions of different countries. While the result seems to be significant when the origin factor stands alone, it turns out to be the duration of staying in Hong Kong that is the determining factor of the expenditure by tourists, in which over-night tourists tend to spend less in the mall. In addition, when splitting between China origin and non-China origin, it reveals that it was actually on the Chinese tourists that such a correlation exists. In contrast, the expenditure of tourist from other countries/ regions cannot be projected by any predictors in the present dataset.

Table 13 Independent sample T-test on the expenditure and duration of staying in Hong Kong

Group Statistics					
	Duration in HK:	N	Mean	Std. Deviation	Std. Error Mean
Q14. How much have you spent in this mall today? (HKD)	Overnight	112	3.707	1.7068	.1612
	1 Day	135	4.227	1.6338	.1405

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	1.186	.277	-2.443	245	.015	-.5201	.2129	-.9395	-.1008
	Equal variances not assumed			-2.433	232.874	.016	-.5201	.2138	-.9414	-.0989

Table 14 Multiple regression summary of external factors influencing expenditure for tourist categorised by origin

Model Summary				
Origin	Model	R	R Square	Adjusted R Square
Chinese	1	.617 ^a	.380	.336
Non-Chinese	1	.830 ^a	.689	-1.223

a. Predictors: (Constant), Q12. How long did you stay in this mall?, NHK_Income, Day, Duration in HK, Interviewer, NHK_Age, Location, Time,

NHK_M/F, Holiday, External Temperature, Month

b. Predictors: (Constant), Q12. How long did you stay in this mall?, Interviewer, Month, Time, NHK_M/F, Duration in HK, NHK_Age, Day, Holiday, External Temperature, NHK_Income, Location

ANOVA ^{a,b}						
Origin	Model		Sum of Squares	df	Mean Square	F
Chinese	1	Regression	193.763	12	16.147	8.623
		Residual	315.813	169	1.873	
		Total	509.576	181		
Non-Chinese	1	Regression	23.801	12	1.983	.360
		Residual	10.736	2	5.503	
		Total	34.536	14		

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q12. How long did you stay in this mall?, NHK_Income, Day, Duration in HK, Interviewer, NHK_Age, Location, Time,

NHK_M/F, Holiday, External Temperature (Degree C), Month

c. Predictors: (Constant), Q12. How long did you stay in this mall?, Interviewer, Month, Time, NHK_M/F, Duration in HK, NHK_Age, Day, Holiday, External Temperature (Degree C), NHK_Income, Location

Coefficients ^a						
Origin	Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
Chinese	1 (Constant)	3.156	4.696		.672	.502
	Month	-.069	.317	-.026	-.219	.827
	Day	.008	.020	.032	.384	.702
	Time	-.040	.073	-.036	-.543	.588
	Holiday	.483	.239	.140	2.021	.045
	Location	.135	.096	.133	1.408	.161
	External Temperature	-.086	.079	-.106	-1.093	.276
	Interviewer	-.017	.049	-.021	-.341	.733
	NHK_M/F	.266	.221	.078	1.203	.231
	NHK_Age	.304	.199	.097	1.530	.128
	NHK_Income	.430	.190	.149	2.260	.025
	Duration in HK	-.272	.125	-.137	-2.169	.031
	Q12. How long did you stay in this mall?	.851	.102	.548	8.311	.000
Non-Chinese	1 (Constant)	-45.345	55.184		-.822	.499
	Month	4.420	5.676	1.664	.779	.519
	Day	.111	.249	.574	.443	.702
	Time	.207	.476	.217	.436	.706
	Holiday	.259	2.001	.085	.129	.909
	Location	-.720	1.644	-.661	-.438	.705
	External Temperature	.321	.741	.371	.432	.709
	Interviewer	.466	.526	.797	.886	.471
	NHK_M/F	-.348	1.888	-.114	-.184	.871
	NHK_Age	-1.833	2.281	-.615	-.804	.508
	NHK_Income	1.031	1.953	.502	.528	.651
	Duration in HK	.810	1.516	.474	.534	.648
	Q12. How long did you stay in this mall?	.644	1.265	.385	.509	.662

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

4.2.3.4. Gender difference on expenditure and duration of staying

There has been a perception that male and female have distinct shopping behaviours which could lead to varied amount of expenditure and duration of staying in the mall. However, the result shows that there is no significant difference between local male and female on the duration of staying in all locations regardless of weighting. There is also no significant difference on their expenditure in nearly all locations except Wong Tai Sin Plaza. The same applies to the tourists

that no significant difference on the expenditure and duration is found between male and female tourists in all locations, regardless of the weighting condition. This suggests that gender difference is not a significant factor in affecting the expenditure of visitor and does not predict the expenditure.

4.2.4. Determining factors of duration of staying in shopping mall

Given that the duration of staying in shopping mall is a determining factor of expenditure, it is also crucial to examine the external factors that would influence the duration of staying of a visitor. This is in particular interest for the shopping mall management team since one of their jobs would be to maintain a pleasant environment to attract and retain visitors, so as to boost the revenue of the shops.

Table 15 Multiple regression summary of external factors influencing duration of staying

General:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.419 ^a	.176	.167	.9754

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Q2. Are you satisfied with the current indoor temperature?, Time, External_Temperature (Degree C), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3), Holiday, Location, Month

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	183.897	10	18.390	19.328	.000 ^b
	Residual	862.022	906	.951		
	Total	1045.919	916			

a. Dependent Variable: Q12. How long did you stay in this mall?

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Q2. Are you satisfied with the current indoor temperature?, Time, External_Temperature (Degree C), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3), Holiday, Location, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	4.433	1.557		2.847	.005
Month	-.319	.126	-.188	-2.528	.012
Day	-.019	.006	-.159	-3.179	.002
Time	.034	.020	.051	1.684	.092
Holiday	.001	.070	.001	.015	.988
External_Temperature (Degree C)	.006	.025	.009	.224	.823
Location	.083	.032	.143	2.568	.010
Interviewer	.058	.012	.150	4.820	.000
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.057	.029	-.061	-1.939	.053
Q2. Are you satisfied with the current indoor temperature?	-.092	.091	.031	1.009	.313
Q15. Are you a local resident or a tourist?	-.865	.076	-.366	-11.342	.000

a. Dependent Variable: Q12. How long did you stay in this mall?

Local sub-group:

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.881	2.169		.868	.386
Month	-.179	.190	-.115	-.940	.348
Day	-.011	.008	-.102	-1.292	.197
Time	.020	.026	.033	.769	.442
Holiday	-.004	.094	-.002	-.041	.967
External Temperature	.018	.034	.029	.522	.602
Location	.061	.049	.114	1.249	.212
Interviewer	.082	.018	.205	4.581	.000
HK_M/F	-.031	.084	-.016	-.367	.714
HK_Age	.115	.049	.103	2.362	.019
HK_Income	.117	.059	.087	1.975	.049
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.006	.040	-.006	-.145	.885
Q2. Are you satisfied with the current indoor temperature?	.086	.124	.030	.695	.488

a. Dependent Variable: Q12. How long did you stay in this mall?

Tourist sub-group:

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	6.252	3.370		1.855	.065
Month	-.515	.223	-.310	-2.304	.022
Day	-.028	.014	-.188	-1.960	.052
Time	.114	.050	.168	2.299	.023
Holiday	.116	.163	.055	.711	.478
Location	.111	.068	.167	1.632	.104
External Temperature	-.037	.057	-.070	-.642	.522
Interviewer	.034	.034	.075	.999	.319
NHK_M/F	-.317	.155	-.151	-2.050	.042
NHK_Age	.128	.139	.067	.920	.359
NHK_Income	-.120	.129	-.071	-.926	.356
Duration in HK:	-.034	.085	-.031	-.395	.693
ChineseNonChinese	-.097	.261	-.029	-.371	.711
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.140	.065	-.161	-2.156	.032
Q2. Are you satisfied with the current indoor temperature?	.231	.214	.082	1.078	.283

a. Dependent Variable: Q12. How long did you stay in this mall?

One major predictor would be the nature of visitor as a local citizen or tourist, in which tourists tend to stay for a significantly longer period of time in the mall. This is reasonable for the resurrection rate of tourists would be much lower than that of locals.

Table 16 Independent sample T-test on duration of staying between local and tourist

Group Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Q12. How long did you stay in this mall? Local	655	2.357	.9911	.0387
Tourist	262	3.210	1.0123	.0625

Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Q12. How long did you stay in this mall?	Equal variances assumed	.169	.681	-11.697	915	.000	-.8527	.0729	-.9957 -.7096
	Equal variances not assumed			-11.592	471.836	.000	-.8527	.0736	-.9972 -.7081

It is interesting to find that interviewer could be a predictor, which could suggest a sampling bias. This would not be the case though since interviewers are deployed at different spots within the mall, and those deployed at the entrances would be surveying visitors going to leave the mall, which would have had a longer duration of stay.

Other than these, there seems to be no explicit external factors that would affect the duration of staying of the visitors and the dataset could be merged together.

Chapter 5 Indoor Air Temperature

In this section, the visitors' perception and satisfaction levels on indoor temperature, as well as their responses to unsatisfactory temperature conditions are analysed.

5.1. Perception on indoor temperature

This section is intended to explore the perceived air temperature of the shopping mall by the visitors.

Consider the adaptive process of human to the ambient temperature, that the experience in the previous location would affect the perception of the current temperature, as pointed out by Baker (1996) that the "subjects'" responses are dependent on their thermal history, visitors who have just entered the mall are excluded in this section's analysis. This is to reduce the impact of external temperature on the perception on indoor temperature, particularly when the thermal gap between the two is great. To further examine the impact of air temperature on the time and money spent in the mall, visitors who are not intended to stay and shop are excluded as well, including those who are reported to be just passing-by, working in the mall and coming for other reasons. This is to reduce the bias caused by the short staying time and insignificant spending from these purposes when analysing the correlation of energy consumption and time/money spent. The number of valid responses after the filtering is 917 (n=917). Two distinct groups, local people (n=655) and tourists (n=262), are identified to examine the possible variation of the range of thermal comfort between the two groups given this is a determining factor of the difference on temperature perception (Table 16), and facilitate further analysis on the impact of tourism development on local shopping malls' energy policies.

Table 17 Multiple regression summary of external factors influencing perceived air temperature

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.272 ^a	.074	.066	1.1123

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, External_Temperature (Degree C), Holiday, Location, Month

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	89.697	8	11.212	9.063	.000 ^b
Residual	1123.378	908	1.237		
Total	1213.075	916			

a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, External_Temperature (Degree C), Holiday, Location, Month

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.218 ^a	.048	.029	1.0547

a. Predictors: (Constant), HK_Income, HK_Age, Holiday, Time, HK_MF, External_Temperature (Degree C), Interviewer, Day, Location, Month

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	28.485	10	2.849	2.561	.005 ^b
Residual	570.645	513	1.112		
Total	599.130	523			

a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

b. Predictors: (Constant), HK_Income, HK_Age, Holiday, Time, HK_MF, External_Temperature (Degree C), Interviewer, Day, Location, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.004	1.767		1.134	.257
Month	-.117	.144	-.064	-.811	.417
Day	-.013	.007	-.102	-1.929	.054
Time	-.034	.023	-.048	-1.478	.140
Holiday	-.076	.080	-.033	-.958	.339
External Temperature	-.030	.029	-.046	-1.040	.299
Location	-.039	.037	-.062	-1.057	.291
Interviewer	.014	.014	.033	1.014	.311
Q15. Are you a local resident or a tourist?	.581	.085	.228	6.858	.000

a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	5.516	2.416		2.283	.023
Month	-.449	.213	-.261	-2.110	.035
Day	-.025	.009	-.221	-2.763	.006
Time	-.024	.029	-.037	-.846	.398
Holiday	-.034	.106	-.016	-.327	.744
External Temperature	-.072	.038	-.108	-1.901	.058
Location	.034	.055	.059	.632	.528
Interviewer	.008	.020	.018	.397	.691
HK_MF	.152	.094	.071	1.608	.108
HK_Age	.137	.054	.111	2.526	.012
HK_Income	.093	.066	.063	1.409	.159

a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

The descriptive statistics for the perception on indoor air temperature shows most of the respondents chose normal (54.2%), while the proportion of respondent who feel cold (31.1%) is higher than those who feel hot (14.1%).

Table 18 Frequency of respondents on perception on indoor air temperature

	Weight = None			Weight = W1 & W3			Weight = W2 & W3		
	Frequen cy	Percen t		Frequen cy	Percen t		Frequen cy	Percen t	
-3 Cold	32	3.5	31.1	28	3.0	29.9	27	3.5	32.5
-2 Cool	106	11.6		97	10.7		93	11.9	
-1 Slightly Cool	147	16.0		148	16.2		133	17.1	
0 Neutral	497	54.2	54.2	500	55.0	55.0	417	53.7	53.7
1 Slightly Warm	87	9.5	14.7	85	9.4	15.0	72	9.3	13.8
2 Warm	20	2.2		22	2.4		16	2.0	
3 Hot	28	3.1		30	3.2		19	2.5	
Total	917	100.0		910	100.0		777	100.0	

The result shows a roughly normal distribution of perceptions toward indoor air temperature. Compare between the two sub-groups, while the local group has a smaller mean difference and a mean value equals zero ($x=0$), which means neutral value ($p<0.05$), the tourist group has a larger mean difference and a negative mean value, which means coldness (table 18). This suggests that the two groups are significantly different groups in terms of air temperature sensation (Table 19)

and, by conducting a multiple regression and holding the externalities constant, it is evident that the distinction lies within the two groups themselves (Table 20). The higher variation of perception among the tourists could be a result of varied origins while the lower mean value suggests that local shopping malls are generally cold for tourists. Consider the perception difference between locals and tourists it could be argued that there is a cultural difference on temperature sensation, which could be caused by the thermal experience in different cities that local people are more adapted to a cold shopping mall.

Table 19 One sample T-test of temperature perception sorted by tourists and locals

Weight = None

	N	Mean	Std. Deviation	Std. Error Mean	Test Value = 0					
					t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Tourists Q1. please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	262	-.698	1.1893	.0735	-9.506	261	.000	-.6985	-.843	-.554
Locals Q1. please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	655	-.093	1.0888	.0425	-2.189	654	.029	-.0931	-.177	-.010

Weight = W1 & W3

Q15. Are you a local resident or a tourist?	N	Mean	Std. Deviation	Std. Error Mean	Test Value = 0					
					t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Tourist Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	254	-.675	1.1695	.0734	-9.196	253	.000	-.6749	-.819	-.530
Local Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	656	-.054	1.0783	.0421	-1.287	655	.199	-.0542	-.137	.028

Weight = W2 & W3

Q15. Are you a local resident or a tourist?	N	Mean	Std. Deviation	Std. Error Mean	Test Value = 0					
					t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Tourist Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	254	-.675	1.1695	.0734	-9.196	253	.000	-.6749	-.819	-.530
Local Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	524	-.129	1.0616	.0464	-2.778	523	.006	-.1289	-.220	-.038

Table 20 Independent sample T-test of temperature perception between tourists and locals

Weight = None

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Q1. please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed	22.562	.000	7.404	915	.000	.6053	.0818	.4449	.7658
	Equal variances not assumed			7.130	445.358	.000	.6053	.0849	.4385	.7722

Weight = W1 & W3

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed	22.945	.000	7.604	908	.000	.6207	.0816	.4605	.7809
	Equal variances not assumed			7.336	428.999	.000	.6207	.0846	.4544	.7870

Weight = W2 & W3

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed	18.051	.000	6.503	775	.000	.5460	.0840	.3812	.7109
	Equal variances not assumed			6.289	459.995	.000	.5460	.0868	.3754	.7167

Table 21 Multiple regression of local/ tourist split on perception on indoor air temperature

Weight = None

Weight = W1 & W3

Model Summary						Model Summary							
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	Model		R	R Square	Adjusted R Square	Std. Error of the Estimate		
1		.270 ^a	.073	.066	1.1123	1		.274 ^a	.075	.068	1.0994		
a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month						a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month							
ANOVA ^a						ANOVA ^a							
Model		Sum of Squares	df	Mean Square	F	Sig.	Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.360	7	12.623	10.202	.000 ^b	1	Regression	88.109	7	12.587	10.415	.000 ^b
	Residual	1124.716	909	1.237				Residual	1089.726	902	1.209		
	Total	1213.075	916					Total	1177.834	909			
a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).						a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).							
b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month						b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month							
Coefficients ^a						Coefficients ^a							
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta					B	Std. Error	Beta		
1 (Constant)		.462	.962		.480	.631	1 (Constant)		-.237	1.022		-.232	.817
Month		-.039	.123	-.021	-.318	.750	Month		.058	.133	.033	.436	.663
Day		-.011	.006	-.081	-1.656	.098	Day		-.008	.006	-.071	-1.280	.201
Time		-.035	.023	-.049	-1.518	.129	Time		-.036	.023	-.051	-1.574	.116
Holiday		-.071	.080	-.031	-.890	.374	Holiday		-.007	.083	-.003	-.082	.935
Location		-.043	.037	-.068	-1.161	.246	Location		-.048	.039	-.080	-1.239	.216
Interviewer		.014	.014	.032	.988	.323	Interviewer		.007	.014	.016	.498	.619
Q15. Are you a local resident or a tourist?		.582	.085	.228	6.867	.000	Q15. Are you a local resident or a tourist?		.603	.088	.238	6.871	.000
a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).						a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).							

Weight = W2 & W3

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.256 ^a	.065	.057	1.0943

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Time, Interviewer, Location, Holiday, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	64.363	7	9.195	7.678	.000 ^b
Residual	921.453	769	1.198		
Total	985.816	776			

a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Time, Interviewer, Location, Holiday, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.529	1.013		-.522	.602
Month	.086	.128	.049	.668	.504
Day	-.008	.007	-.063	-1.224	.221
Time	-.031	.025	-.044	-1.252	.211
Holiday	-.001	.086	.000	-.012	.990
Location	-.051	.039	-.082	-1.300	.194
Interviewer	.012	.016	.026	.720	.471
Q15. Are you a local resident or a tourist?	.546	.088	.227	6.199	.000

a. Dependent Variable: Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Impact of gender difference

Previous studies have suggested a significant difference in the temperature sensation and range of thermal comfort between male and female (Karjalainen, 2007; Lan *et al*, 2008). While male tends to perceive a slightly higher temperature than female, such difference is statistically insignificant in the present data findings, regardless of weighting and location. This could be attributed to the difference in the body temperature and the activity condition of the respondent, which are not recorded in this study. It is also beyond the scope of the present study to examine the physical difference on temperature sensation between male and female. This nevertheless suggests that gender difference does not necessarily predict a difference in temperature sensation during shopping.

Impact of external temperature

Previous studies have suggested a correlation exists between the external temperature and preferred indoor temperature (Baker, 1996; Humphreys, 2013). Based on this conclusion, it can be expected that a static operating indoor temperature would eventually drop below the range of thermal comfort of people as the external temperature rises and the thermal gap between the indoor and outdoor temperatures widens, and more people would report feeling too cold as a result.

However, such phenomenon is absent in the present data and no correlation between the external temperature and perceived indoor temperature is found. While the two variables are correlated in general, such correlation is absent when the dataset is divided according to the location, and there is a strong correlation between the external temperature and the location of interview, which suggested that the correlation is an illusion by the locational difference. The correlation is also insignificant when the group of respondents who just arrived, that are supposed to be most influenced by the external temperature, are singled out for analysis.

One reason for the insignificant influence could be the insignificant temperature variation during the data collection process. Therefore, this factor is excluded in the upcoming analyses.

Linkage to MTR

While the direct experience of the outdoor temperature could cause a significant difference to the perceived indoor temperature based on the ideas of thermal gap and thermal history, the result shows no significant difference on the perceived indoor temperature between malls with and without direct access from the MTR, in which visitors would be unable to experience the outdoor heat should they enter the mall directly from the MTR. There is a significant difference between the perceived indoor air temperatures of different malls though, while such difference is no longer significant when the group of respondents who just arrived at the mall were singled out for analysis. This suggests that the thermal history and access from MTR have no significant influence on the perceived indoor temperature of a visitor.

5.2.Satisfaction on indoor air temperature

This section is intended to explore the level of satisfaction with the indoor air temperature of visitors, so as to establish a profile of the human perception on hotness and coldness under a certain air temperature with reference to the previous section. Only filtered responses (n=917) are utilised for consistency with the previous section to facilitate the analysis.

In term of level of satisfaction towards indoor air temperature in the shopping mall, 85.28% of respondents are satisfied while 14.27% of them are dissatisfied. The perceived indoor air temperature is recognised as a factor influencing the satisfaction toward the temperature, particularly within the two sub-groups (Table 21). There is a significant difference between the perceived air temperature of those who are satisfied and those who are not ($p < 0.05$) (Table 22). Among those satisfied, 61.1% considered the temperature as 0, which is neutral. In contrast, the perceived temperatures of the dissatisfied group are rather extreme, with 54.9% voted 2 warm, 3 hot, -2 cool or 3 cold (Figure 3). This implies that within one's "range of comfort"¹ (Rohles, 2007, p.14), an individual would feel comfortable and satisfied with the temperature. Only when the temperature is significantly beyond the "range of comfort" then one would perceive the temperature as unsatisfactory.

Table 22 Multiple regression summary of factors influencing satisfaction to indoor air temperature

¹ "Range of comfort", also "thermal comfort", refers to "the condition of mind which express satisfaction with the thermal environment and is assessed by subjective evaluation" (Rohles, 2007, p.14)

Local sub-group

Tourist sub-group

Model Summary						Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.251 ^a	.063	.041	.3355		1	.369 ^a	.136	.080	.3592	
a. Predictors: (Constant), HK_Income, HK_Age, Holiday, Time, HK_MF, Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3), Q12. How long did you stay in this mall?, External_Temperature (Degree C), Interviewer, Day, Location, Month						a. Predictors: (Constant), NHK_Income, Holiday, Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3), Q12. How long did you stay in this mall?, Day, External_Temperature (Degree C), NHK_Age, NHK_MF, Interviewer, Time, Location, Month					
ANOVA ^a						ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.	Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	3.876	12	.323	2.870	.001 ^b	1 Regression	3.733	12	.311	2.411	.006 ^b
Residual	57.504	511	.113			Residual	23.739	184	.129		
Total	61.380	523				Total	27.472	196			
a. Dependent Variable: Q2. Are you satisfied with the current indoor temperature?						a. Dependent Variable: Q2. Are you satisfied with the current indoor temperature?					
b. Predictors: (Constant), HK_Income, HK_Age, Holiday, Time, HK_MF, Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3), Q12. How long did you stay in this mall?, External_Temperature (Degree C), Interviewer, Day, Location, Month						b. Predictors: (Constant), NHK_Income, Holiday, Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3), Q12. How long did you stay in this mall?, Day, External_Temperature (Degree C), NHK_Age, NHK_MF, Interviewer, Time, Location, Month					
Coefficients ^a						Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients			Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.		B	Std. Error	Beta	t	Sig.
1 (Constant)	1.149	.773		1.486	.138	1 (Constant)	2.022	1.186		1.705	.090
Month	.006	.068	.010	.084	.933	Month	-.056	.080	-.094	-.702	.484
Day	.001	.003	.033	.418	.676	Day	.001	.005	.013	.136	.892
Time	-.001	.009	-.003	-.071	.943	Time	-.012	.018	-.049	-.668	.505
Holiday	.016	.034	.024	.481	.631	Holiday	.028	.056	.037	.504	.615
External Temperature	-.009	.012	-.040	-.710	.478	External Temperature	-.021	.020	-.112	-1.046	.297
Location	.002	.017	.012	.128	.898	Location	-.001	.024	-.004	-.039	.969
Interviewer	-.008	.007	-.056	-1.218	.224	Interviewer	-.032	.011	-.205	-2.817	.005
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.067	.014	-.211	-4.803	.000	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.083	.022	.266	3.723	.000
Q12. How long did you stay in this mall?	.011	.016	.031	.695	.488	Q12. How long did you stay in this mall?	.040	.026	.112	1.533	.127
HK_MF	-.003	.030	-.004	-.098	.922	NHK_MF	.088	.054	.118	1.626	.106
HK_Age	-.011	.018	-.027	-.608	.543	NHK_Age	.022	.049	.032	.453	.651
HK_Income	-.029	.021	-.061	-1.361	.174	NHK_Income	.009	.045	.015	.204	.839
a. Dependent Variable: Q2. Are you satisfied with the current indoor temperature?						a. Dependent Variable: Q2. Are you satisfied with the current indoor temperature?					

Table 23 Independent T-test of temperature perception between those satisfied and dissatisfied with the current temperature (Weight = None)

	Q2. Are you satisfied with the current indoor temperature?	N	Mean	Std. Deviation	Std. Error Mean
Q1. please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Satisfied	781	-.301	.9131	.0327
	Not satisfied	136	-.066	2.0302	.1741

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Q1. please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed	332.353	.000	-2.200	915	.028	-.2347	.1067	Lower	-.4441
	Equal variances not assumed			-1.325	144.647	.187	-.2347	.1771	Upper	-.0253

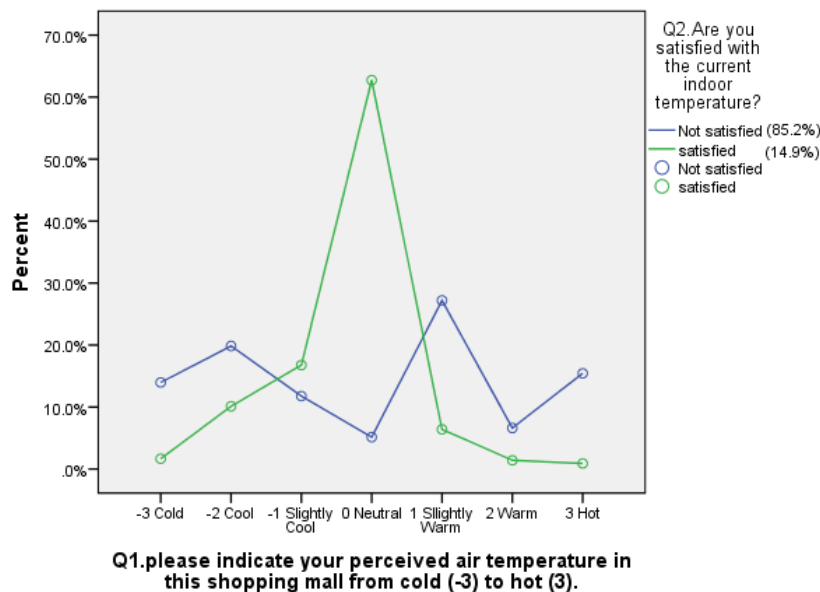


Figure 3 Relation between temperature satisfaction and temperature perception (Weight = None)

Table 24 Independent T-test of temperature perception between those satisfied and dissatisfied with the current temperature (Weight = W1 & W3)

Q15. Are you a local resident or a tourist?		Q2. Are you satisfied with the current indoor temperature?		N	Mean	Std. Deviation	Std. Error Mean
Tourist	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	satisfied		217	-.559	.9657	.0655
		Not satisfied		36	-1.366	1.8679	.3093
Local	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	satisfied		565	-.192	.8627	.0363
		Not satisfied		90	.807	1.7191	.1810

Q15. Are you a local resident or a tourist?			Levene's Test for Equality of Variances		t-test for Equality of Means					
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Tourist	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed	32.965	.000	3.968	252	.000	.8072	.2034	.4066 1.2078
		Equal variances not assumed			2.553	38.714	.015	.8072	.3161	.1676 1.4468
Local	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed	101.645	.000	-8.608	654	.000	-.9981	.1159	-1.2257 -.7704
		Equal variances not assumed			-5.407	96.527	.000	-.9981	.1846	-1.3644 -.6317

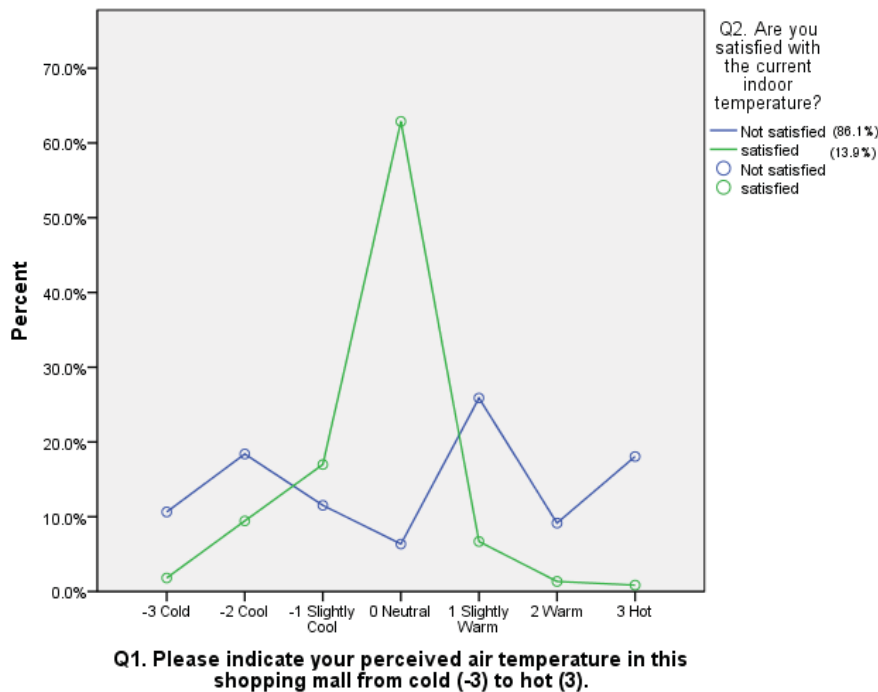
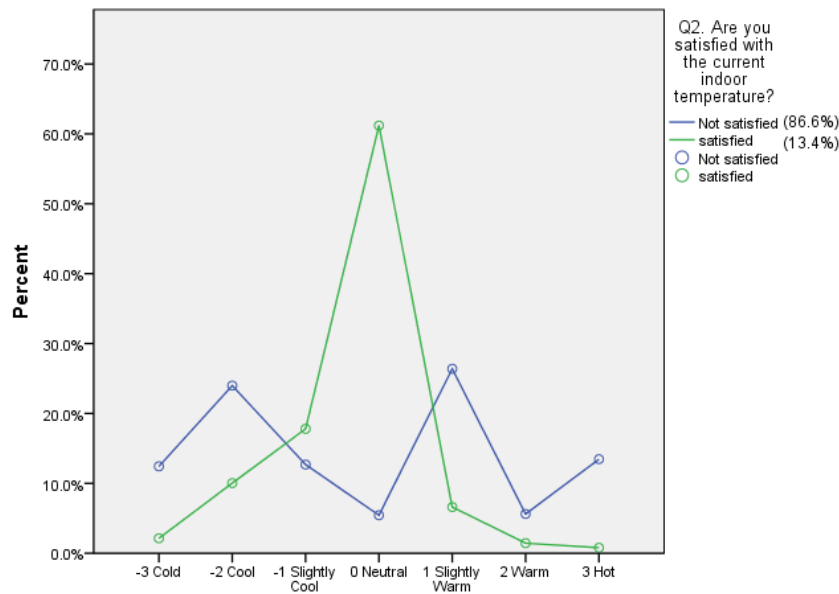


Figure 4 Relation between temperature satisfaction and temperature perception (Weight = W1 & W3)

Table 25 Independent T-test of temperature perception between those satisfied and dissatisfied with the current temperature (Weight = W2 & W3)

Q15. Are you a local resident or a tourist ?	Q2. Are you satisfied with the current indoor temperature?	N	Mean	Std. Deviation	Std. Error Mean
Tourist Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	satisfied	217	-.559	.9657	.0655
	Not satisfied	36	-1.366	1.8679	.3093
Local Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	satisfied	455	-.212	.8902	.0417
	Not satisfied	68	.424	1.7452	.2112

Q15. Are you a local resident or a tourist ?			Levene's Test for Equality of Variances		t-test for Equality of Means					
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Tourist Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed		32.965	.000	3.968	252	.000	.8072	.2034	.4066 1.2078
	Equal variances not assumed				2.553	38.714	.015	.8072	.3161	.1676 1.4468
Local Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	Equal variances assumed		93.932	.000	-4.706	522	.000	-.6357	.1351	-.9011 -.3703
	Equal variances not assumed				-2.952	72.587	.004	-.6357	.2153	-1.0649 -.2065



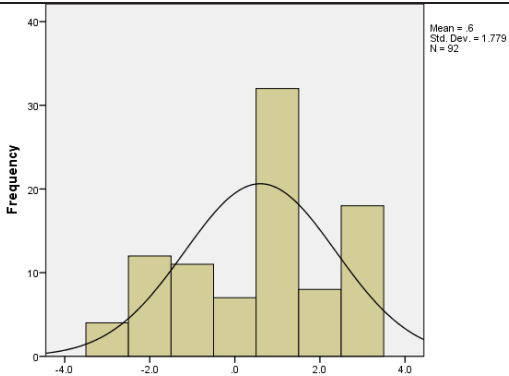
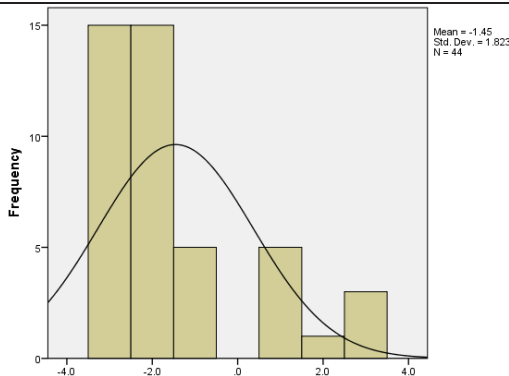
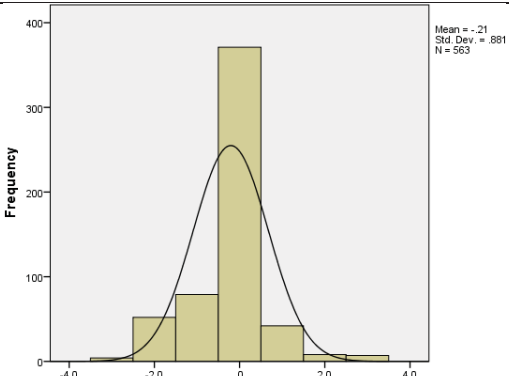
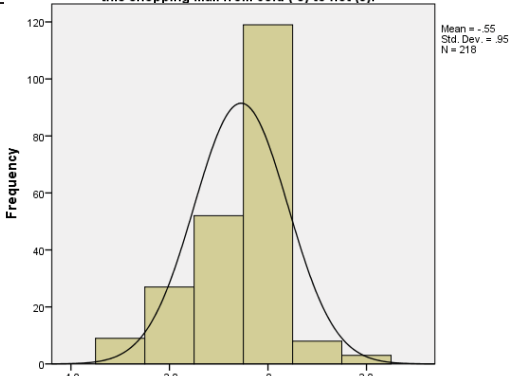
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Figure 5 Relation between temperature satisfaction and temperature perception (Weight = W2 & W3)

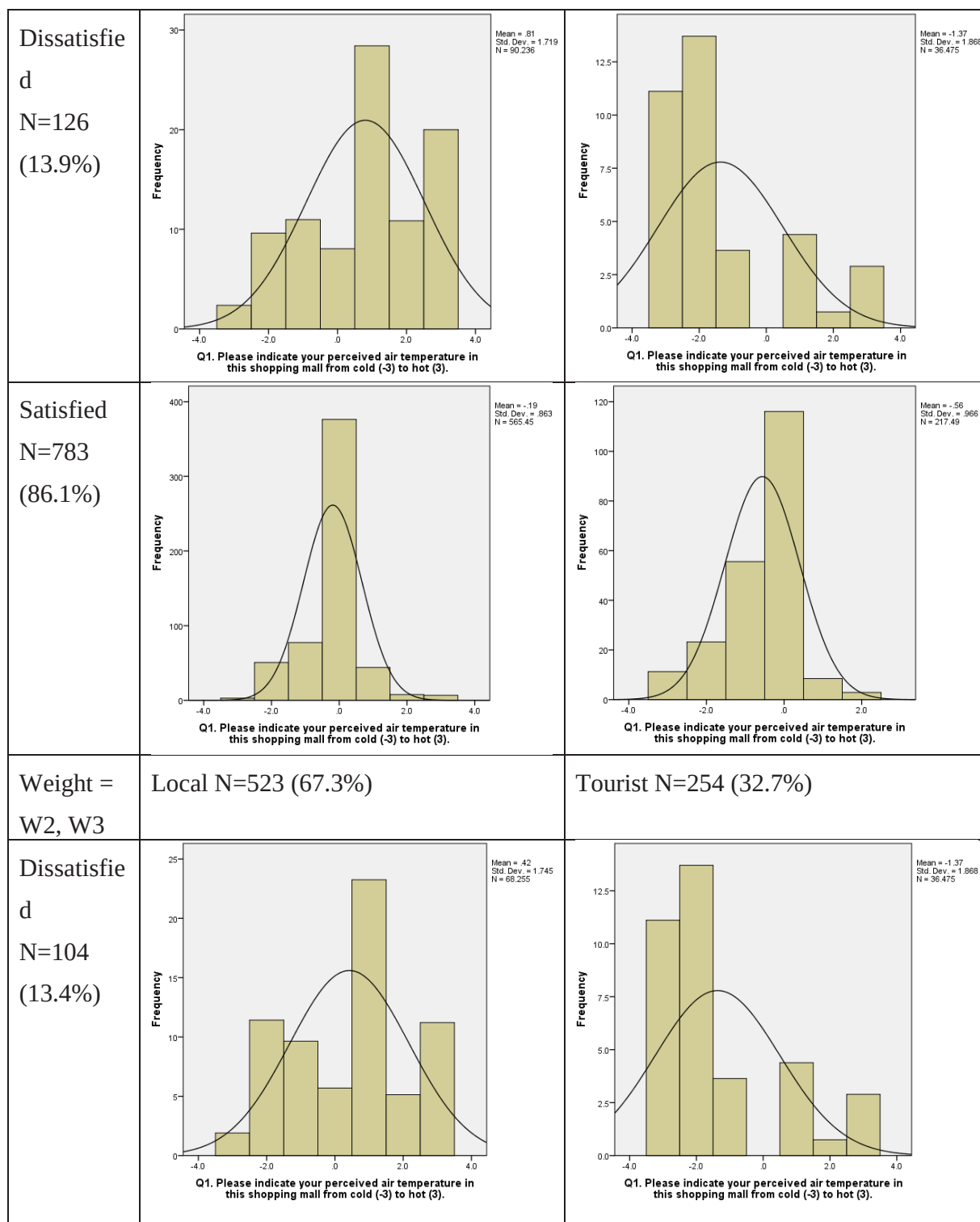
Besides, there is also a significant difference between the corresponding perceived air temperatures of the two sub-groups among those who are dissatisfied with the indoor temperature ($p < 0.05$) (Figure 6). From the graphs in following table, it is illustrated that locals tended to dissatisfy with hotness, while tourists dissatisfy with coldness (Figure 6). By conducting dummy variables regression, it is also inferred that locals perceived the temperature higher than tourists in the same setting with coefficient of 0.228 (Table 11). The predictability of the values given by the visitor would be limited though, varying from 0.254 to 0.273 with different weightings.

This difference between locals and tourists in temperature dissatisfaction may probably be associated with their previous experience of temperature condition in shopping malls. Repeated experiences in a certain building with similar temperature would influence individuals' future expectation and corresponding adaptive behaviours (Brager and de Dear, 1998). It was also mentioned that whether an individual would be disappointed with a temperature depends on the range of variation between expected and actual temperatures. Hence, the difference between the general indoor temperature in Hong Kong and Mainland China would vary the expectation of temperature between locals and Chinese tourists, which accounts for 80.1% of tourist in the survey. In Hong Kong, indoor temperature is usually reported to be too cold by environmental organization like Green Sense. Hong Kong people have also generally accepted the indoor temperature to be cool to cold. It is also common to find people wearing outdoorwear indoors in summer as adaptive behaviours (Green Sense, 2011). While in Mainland China, due to the

restriction of indoor temperature standard², indoor temperature in all publicly accessed buildings must not below 26°C during summer and 20°C during winter (Ministry of Housing and Urban-Rural Development of the People's Republic of China, 2008). As a result, temperature expectation and thermal comfort of Hong Kong people tilted towards coldness, while Chinese tourists' tilted towards hotness.

Weight = None	Local N=655 (71.4%)	Tourist N=262 (28.6%)
Dissatisfied N=136 (14.8%)	 Q1.please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	 Q1.please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).
Satisfied N=781 (85.2%)	 Q1.please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	 Q1.please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).
Weight = W1, W3	Local N=655 (72.1%)	Tourist N=254 (27.9%)

² 公共建築空調溫度控制標準



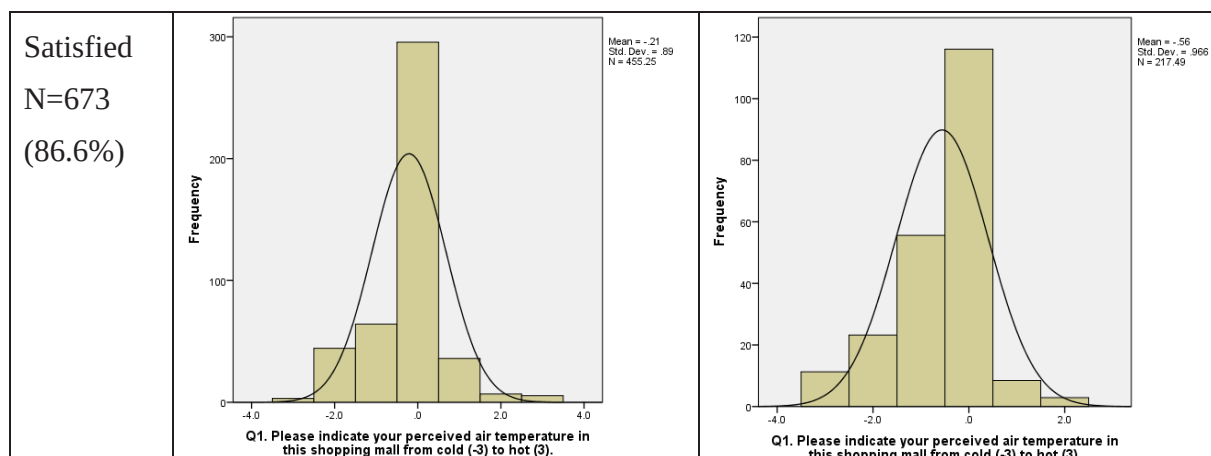


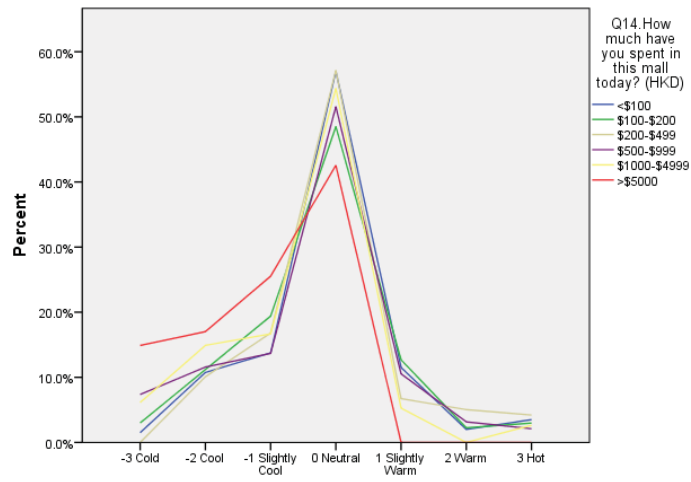
Figure 6 Relationship between temperature satisfaction and temperature perception (Categorized by locals and tourists)

5.3. Temperature sensation and shopping related behaviour

This section is intended to explore the possible correlation between the perception and satisfaction on air temperature and two shopping related behaviours: expenditure and duration of staying in the shopping mall, to examine the potential impact of temperature adjustment on the visitor flow and potential revenue of the mall. Only filtered responses (n=917) are utilised since respondents working, passing by and having other purposes are not the target customers in the malls, hence their behaviour, such as time spent and expenditure, would not reflect the utility of the malls. Given the difference in temperature sensation among the two sub-groups of tourists and locals, independent sample tests are conducted to examine whether this would contribute to their difference in expenditure and duration of staying. To reduce the externalities, the data is further divided according to the location to reduce the potential impact from the locational difference caused by the different in nature of the malls.

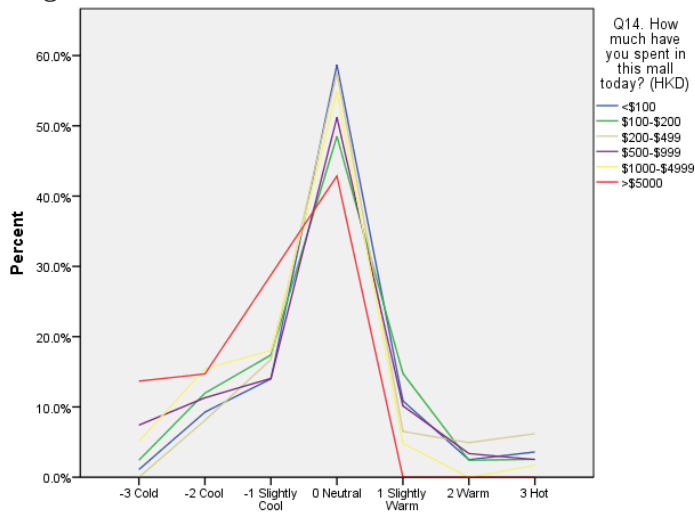
5.3.1. Perception on air temperature and expenditure

Weight = None



Q1. please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Weight = W1 & W3



Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Weight = W2 & W3

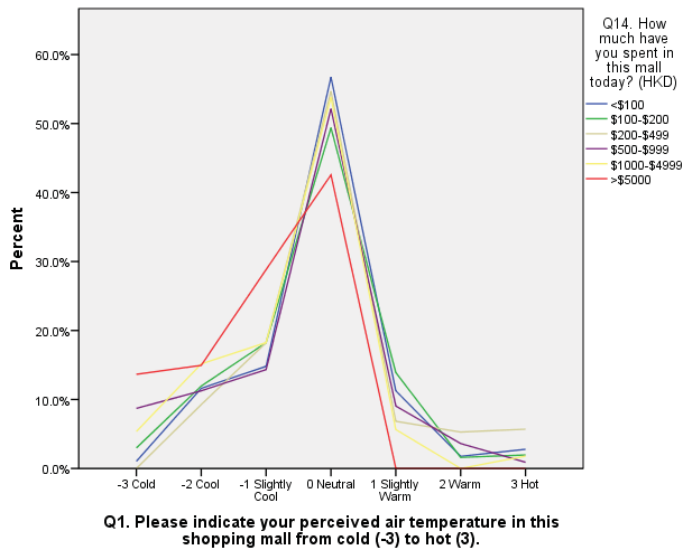


Figure 7 Respondents' perception on indoor air temperature (categorized by expenditure)

Figure 7 demonstrates the relationship between perception in indoor air temperature and money spent in the shopping malls. In general, perception of indoor temperature shows similar trend for different spending groups, which most of the people feel that the temperature is normal. Yet, it can be noted that respondents with high expenditure, i.e. more than \$5000, tend to perceive the mall temperature to be below neutral (-1 to -3) rather than above neutral (1 to 3).

Besides, there is no distinctive difference between the perception of indoor air temperature for local residents and tourists with respect to different expenditure groups, having the most respondents perceiving the temperature as normal in both groups (Table 25). In addition, there is no tourist or local residents who spent more than \$5000 perceive the mall to be too hot, having no vote for warm (2) and hot (3) in both groups. However, among tourists with high spending (>\$499), a larger proportion of respondents believe the shopping mall has a below neutral than above neutral temperature.

Table 26 Cross tabulation of perceived indoor air temperature and expenditure of tourists and locals

Q15. Are you a local resident or a tourist?			Q14. How much have you spent in this mall today? (HKD)						Total
			<\$100	\$100-\$200	\$200-\$499	\$500-\$999	\$1000-\$4999	>\$5000	
Tourist	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-3 Cold	1	2	0	6	7	7	23
		-2 Cool	10	1	4	6	14	7	42
		-1 Slightly Cool	9	5	9	8	15	10	56
		0 Neutral	22	6	10	19	39	18	114
		1 Slightly Warm	1	4	0	4	4	0	13
		2 Warm	0	0	1	3	0	0	4
		3 Hot	1	1	0	0	1	0	3
		Total	44	19	24	46	80	42	255
Local	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-3 Cold	5	2	0	1	0	0	8
		-2 Cool	33	14	8	5	3	1	64
		-1 Slightly Cool	46	21	11	5	4	2	89
		0 Neutral	206	59	58	30	23	2	378
		1 Slightly Warm	45	13	8	6	2	0	74
		2 Warm	8	3	5	0	0	0	16
		3 Hot	13	3	5	2	2	0	25
		Total	356	115	95	49	34	5	654

Table 27 Regression on perception on indoor air temperature and expenditure

Weight = None

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.162 ^a	.026	.025	1.6267

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	64.910	1	64.910	24.530	.000 ^b
Residual	2400.075	907	2.646		
Total	2464.986	908			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.422	.055		43.761	.000
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.232	.047	-.162	-4.953	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Weight = W1 & W3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.177 ^a	.031	.030	1.6186

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	75.941	1	75.941	28.986	.000 ^b
	Residual	2359.305	901	2.620		
	Total	2435.246	902			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.429	.055		44.238	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.255	.047	-.177	-5.384	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Weight = W2 & W3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.165 ^a	.027	.026	1.6759

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.421	1	60.421	21.513	.000 ^b
	Residual	2156.590	768	2.809		
	Total	2217.011	769			

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.506	.063		40.074	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.249	.054	-.165	-4.638	.000

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

The linear regression test depicts a negative relationship between the perception of indoor temperature and money spent with a coefficient of -0.162 ($p < 0.05$) (Table 26). However, the result becomes insignificant when split between the two sub-groups: tourists and locals, suggesting a fundamental difference between the two sub-groups, which is probably the

difference in expenditure as mentioned in the previous section (Tables 5 & 6), would have influenced the general result. Besides, the results also become insignificant when split between different locations (Table 27). This suggests that nature of the mall could be a result of the apparently significant influence of perceived air temperature on expenditure. As suggested in Table 7 in previous section, perception toward indoor air temperature is an insignificant factor in influencing expenditure when considering other variables. Therefore the test is not significant enough to draw a conclusion upon the relationship between the two variables.

Table 28 Regression on perception on indoor air temperature and expenditure (categorized by shopping malls)

Weight = None

Model Summary ^a					
Location	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uptown Plaza	1	.069 ^a	.005	-.007	1.0331
New Town Plaza	1	.191 ^a	.036	.031	1.4499
Wong Tai Sin Plaza	1	.034 ^a	.001	-.008	.7052
Harbour City	1	.109 ^a	.012	.009	1.7948
New Jade Shopping Arcade	1	.106 ^a	.011	-.005	1.0813
Pacific Place	1	.040 ^a	.002	-.015	1.7497
Festival Walk	1	.095 ^a	.009	.001	1.7174

a. Predictors: (Constant), Q1.please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a					
Location	Model		Unstandardized Coefficients		Sig.
			B	Std. Error	
Uptown Plaza	1	(Constant)	1.661	.115	.000
		Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).	.081	.130	.533
New Town Plaza	1	(Constant)	2.460	.110	.000
		Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).	-.230	.090	.012
Wong Tai Sin Plaza	1	(Constant)	1.340	.069	.000
		Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).	-.022	.064	.729
Harbour City	1	(Constant)	2.968	.114	.000
		Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).	-.167	.089	.062
New Jade Shopping Arcade	1	(Constant)	1.679	.141	.000
		Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).	-.127	.154	.415
Pacific Place	1	(Constant)	2.644	.236	.000
		Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).	-.057	.184	.756
Festival Walk	1	(Constant)	2.919	.162	.000
		Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).	-.145	.134	.280

a. Dependent Variable: Q14.How much have you spent in this mall today? (HKD)

Weight = W1 & W3

Model Summary					
Location	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uptown Plaza	1	.075 ^a	.006	-.002	1.0205
New Town Plaza	1	.185 ^a	.034	.031	1.4218
Wong Tai Sin Plaza	1	.036 ^a	.001	-.015	.7097
Harbour City	1	.095 ^a	.009	.005	1.8208
New Jade Shopping Arcade	1	.134 ^a	.018	.003	1.0605
Pacific Place	1	.068 ^a	.005	-.012	1.7070
Festival Walk	1	.166 ^a	.027	.017	1.7672

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a						
Location	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Uptown Plaza	1 (Constant)	1.656	.091		18.202	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.087	.102	.075	.848	.398
New Town Plaza	1 (Constant)	2.396	.089		26.982	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.220	.073	-.185	-3.009	.003
Wong Tai Sin Plaza	1 (Constant)	1.342	.089		14.995	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.024	.084	-.036	-.282	.779
Harbour City	1 (Constant)	3.201	.132		24.335	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.147	.103	-.095	-1.429	.154
New Jade Shopping Arcade	1 (Constant)	1.658	.130		12.799	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.158	.143	-.134	-1.105	.273
Pacific Place	1 (Constant)	2.500	.231		10.840	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.101	.188	-.068	-.535	.594
Festival Walk	1 (Constant)	3.169	.199		15.899	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.266	.164	-.166	-1.625	.108

a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

Weight = W2 & W3

Model Summary					
Location	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uptown Plaza	1	.036 ^a	.001	-.012	1.0492
New Town Plaza	1	.212 ^a	.045	.039	1.4948
Wong Tai Sin Plaza	1	.001 ^a	.000	-.011	.7174
Harbour City	1	.078 ^a	.006	.002	1.8002
New Jade Shopping Arcade	1	.169 ^a	.028	.003	1.1554
Pacific Place	1	.084 ^a	.007	-.023	1.9796
Festival Walk	1	.165 ^a	.027	.018	1.7828

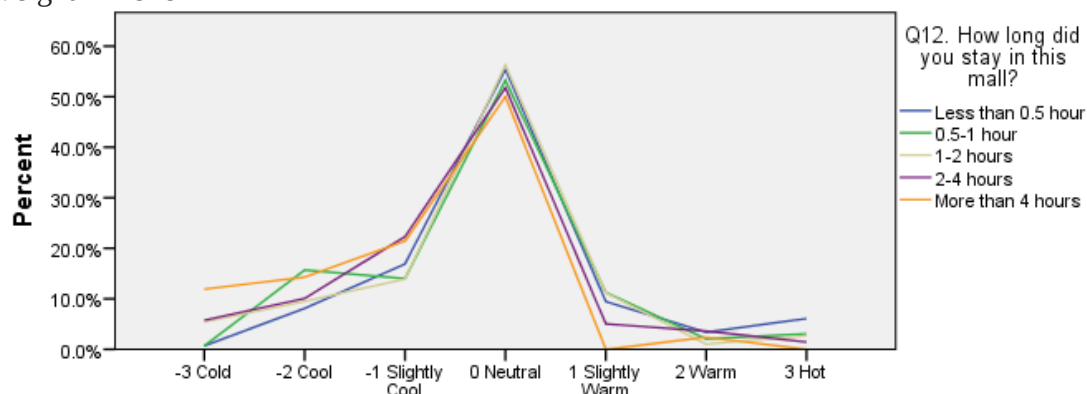
a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

		Coefficients ^a				
Location	Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
			B	Std. Error	Beta	
Uptown Plaza	1	(Constant)	1.660	.119		.000
		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.041	.131	.036	.756
New Town Plaza	1	(Constant)	2.597	.119		.000
		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.259	.095	-.212	.007
Wong Tai Sin Plaza	1	(Constant)	1.342	.074		.000
		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.001	.076	.001	.989
Harbour City	1	(Constant)	3.038	.124		.000
		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.124	.100	-.078	.214
New Jade Shopping Arcade	1	(Constant)	1.780	.188		.000
		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.188	.180	-.169	.302
Pacific Place	1	(Constant)	2.749	.367		.000
		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.141	.291	-.084	.632
Festival Walk	1	(Constant)	3.170	.188		.000
		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.267	.159	-.165	.095

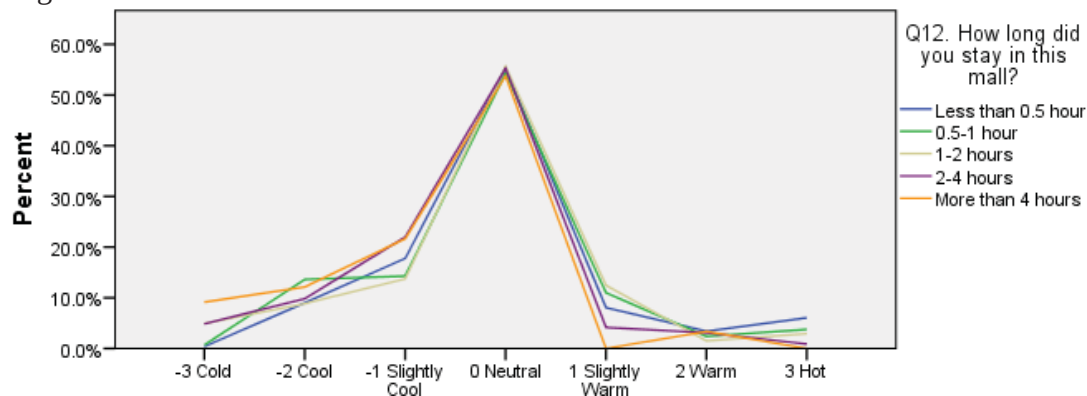
a. Dependent Variable: Q14. How much have you spent in this mall today? (HKD)

5.3.2. Perception on air temperature and time spent in mall

Weight = None



Weight = W1 & W3



Weight = W2 & W3

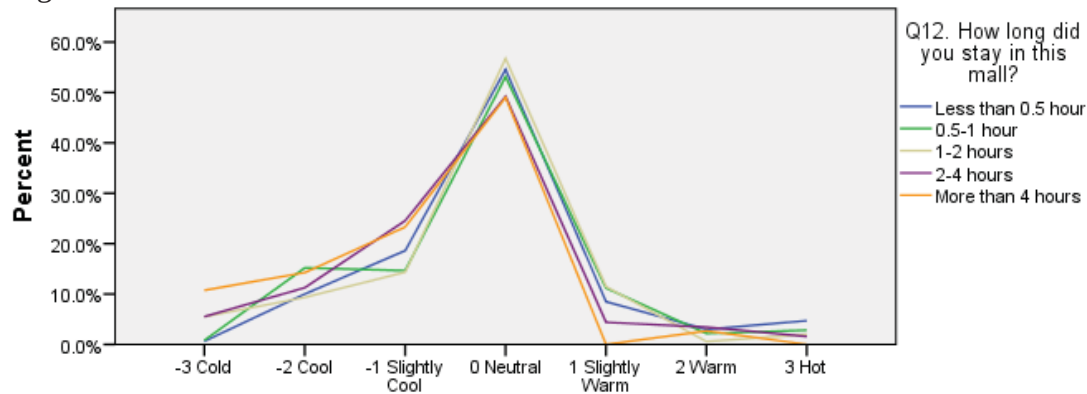


Figure 8 Respondents' perception on indoor air temperature (categorized by duration of staying)

Figure 8 demonstrates the relationship between perception in indoor air temperature and duration of stay in the shopping malls. In general, perception of indoor temperature shows similar trend for different duration groups, which most of the people feel that the temperature is normal. Besides, respondents tends to perceive the temperature to be below neutral (-1 to -3) rather than above neutral (1-3). The same result is also revealed when split between two sub-groups of local and tourist (table 28).

Table 29 Cross tabulation of perceived indoor air temperature and duration of staying of tourists and locals

Q15. Are you a local resident or a tourist?			Q12. How long did you stay in this mall?					Total
			Less than 0.5 hour	0.5-1 hour	1-2 hours	2-4 hours	More than 4 hours	
Tourist	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-3 Cold	0	1	10	8	5	24
		-2 Cool	2	12	14	8	6	42
		-1 Slightly Cool	2	10	17	20	8	57
		0 Neutral	1	28	53	24	13	119
		1 Slightly Warm	1	5	5	2	0	13
		2 Warm	1	1	0	2	0	4
		3 Hot	0	2	1	0	0	3
		Total	7	59	100	64	32	262
Local	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-3 Cold	1	1	6	0	0	8
		-2 Cool	10	34	14	6	0	64
		-1 Slightly Cool	23	31	24	11	1	90
		0 Neutral	81	128	113	48	8	378
		1 Slightly Warm	13	28	28	5	0	74
		2 Warm	4	5	3	3	1	16
		3 Hot	9	7	7	2	0	25
		Total	141	234	195	75	10	655

Table 30 Regression on perception on indoor air temperature and duration of staying

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.139 ^a	.019	.018	1.0588

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA ^a					
Model		Sum of Squares	df	Mean Square	Sig.
1	Regression	20.161	1	20.161	.000 ^b
	Residual	1025.758	915	1.121	
	Total	1045.919	916		

a. Dependent Variable: Q12. How long did you stay in this mall?

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
1	(Constant)	2.567	.036		.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.129	.030	-.139	.000

a. Dependent Variable: Q12. How long did you stay in this mall?

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.128 ^a	.016	.015	1.0803

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA ^a					
Model		Sum of Squares	df	Mean Square	Sig.
1	Regression	17.685	1	17.685	.000 ^b
	Residual	1059.342	908	1.167	
	Total	1077.026	909		

a. Dependent Variable: Q12. How long did you stay in this mall?

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
1	(Constant)	2.575	.037		.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.123	.031	-.128	.000

a. Dependent Variable: Q12. How long did you stay in this mall?

Weight = None

Weight = W1 & W3

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.128 ^a	.016	.015	1.0603

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.551	1	14.551	12.944	.000 ^b
	Residual	871.797	775	1.124		
	Total	886.348	776			

a. Dependent Variable: Q12. How long did you stay in this mall?

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.598	.039		65.909	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.121	.034	-.128	-3.598	.000

a. Dependent Variable: Q12. How long did you stay in this mall?

Weight = W2 & W3

The regression test depicts a negative relationship between the perception of indoor temperature and duration of staying with a coefficient of -0.139 ($p < 0.05$) (Table 29). However, the result is insignificant for locals, though still significant for tourists, suggesting a fundamental difference between the two sub-groups, in which tourists tend to stay longer, would have influenced the general result (Table 30). Besides, the results also become insignificant when split between different locations. This suggests that locational variation could be a result of the apparently significant influence of perceived air temperature on duration of staying. Therefore the test is not significant enough to draw a conclusion upon the relationship between the two variables, matching the result in previous section (Table 14) that satisfaction is not an influential factor to the duration of staying.

Table 31 Regression on perception on indoor air temperature and duration of staying of tourists and locals

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Tourist 1	.177 ^a	.031	.028	.9982
Local 1	.006 ^a	.000	-.001	.9918

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
Tourist 1	Regression	8.369	1	8.369	8.398	.004 ^b
	Residual	259.085	260	.996		
	Total	267.454	261			
Local 1	Regression	.023	1	.023	.023	.879 ^b
	Residual	642.380	653	.984		
	Total	642.403	654			

a. Dependent Variable: Q12. How long did you stay in this mall?

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
Tourist 1	(Constant)	3.105	.072		.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.151	.052	-.177	.004
Local 1	(Constant)	2.357	.039		.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.005	.036	-.006	.879

a. Dependent Variable: Q12. How long did you stay in this mall?

Table 32 Independent sample T-test on the duration of stay by local/ tourist

Group Statistics					
		N	Mean	Std. Deviation	Std. Error Mean
Q12. How long did you stay in this mall?	Local	524	2.359	.9757	.0426
	Tourist	254	3.205	1.0264	.0644

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q12. How long did you stay in this mall?	Equal variances assumed	.029	.865	-11.150	775	.000	-.8462	.0759	-.9952	-.6972
	Equal variances not assumed			-10.955	478.791	.000	-.8462	.0772	-.9980	-.6945

Table 33 Regression on perception on indoor air temperature and duration of stay (categorized by shopping malls)

Weight = None

Model Summary				
Location	Model	R	R Square	Adjusted R Square
Uptown Plaza	1	.017 ^a	.000	-.012
New Town Plaza	1	.128 ^a	.016	.011
Wong Tai Sin Plaza	1	.148 ^a	.022	.012
Harbour City	1	.153 ^a	.023	.020
New Jade Shopping Arcade	1	.213 ^a	.045	.029
Pacific Place	1	.032 ^a	.001	-.015
Festival Walk	1	.063 ^a	.004	-.003

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients^a

Location	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Uptown Plaza	1 (Constant)	2.111	.109		19.377	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.019	.123	.017	.152	.879
New Town Plaza	1 (Constant)	2.921	.086		34.134	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.118	.070	-.128	-1.686	.094
Wong Tai Sin Plaza	1 (Constant)	1.917	.086		22.174	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.124	.081	-.148	-1.521	.131
Harbour City	1 (Constant)	2.770	.062		44.782	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.128	.048	-.153	-2.650	.008
New Jade Shopping Arcade	1 (Constant)	1.637	.107		15.305	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.196	.117	.213	1.676	.099
Pacific Place	1 (Constant)	2.669	.131		20.370	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.026	.102	.032	.255	.800
Festival Walk	1 (Constant)	2.888	.083		34.718	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.051	.070	-.063	-.732	.466

a. Dependent Variable: Q12. How long did you stay in this mall?

Weight = W1 & W3

Model Summary

Location	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uptown Plaza	1	.020 ^a	.000	-.007	.9736
New Town Plaza	1	.128 ^a	.016	.012	1.1144
Wong Tai Sin Plaza	1	.148 ^a	.022	.006	.8949
Harbour City	1	.131 ^a	.017	.013	.9959
New Jade Shopping Arcade	1	.188 ^a	.035	.021	.8062
Pacific Place	1	.049 ^a	.002	-.014	.9405
Festival Walk	1	.152 ^a	.023	.013	.8851

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients^a

Location	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Uptown Plaza	1 (Constant)	2.101	.087		24.200	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.022	.098	.020	.224	.823
New Town Plaza	1 (Constant)	2.887	.070		41.476	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.118	.057	-.128	-2.052	.041
Wong Tai Sin Plaza	1 (Constant)	1.917	.113		16.994	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.124	.106	-.148	-1.165	.249
Harbour City	1 (Constant)	2.829	.071		39.623	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.111	.056	-.131	-1.996	.047
New Jade Shopping Arcade	1 (Constant)	1.627	.098		16.523	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.171	.109	.188	1.571	.121
Pacific Place	1 (Constant)	2.593	.127		20.406	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.039	.104	.049	.379	.706
Festival Walk	1 (Constant)	2.910	.099		29.531	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.124	.082	-.152	-1.510	.134

a. Dependent Variable: Q12. How long did you stay in this mall?

Weight = W2 & W3

Model Summary					
Location	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uptown Plaza	1	.032 ^a	.001	-.012	1.0243
New Town Plaza	1	.150 ^a	.023	.016	1.1099
Wong Tai Sin Plaza	1	.051 ^a	.003	-.008	.8652
Harbour City	1	.105 ^a	.011	.007	.9857
New Jade Shopping Arcade	1	.240 ^a	.058	.033	.8129
PacificPlace	1	.097 ^a	.009	-.021	1.0440
Festival Walk	1	.102 ^a	.010	.001	.9051

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a						
Location	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Uptown Plaza	1 (Constant)	2.141	.117		18.367	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.036	.128	-.032	-.282	.779
New Town Plaza	1 (Constant)	2.956	.088		33.435	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.135	.071	-.150	-1.904	.059
Wong Tai Sin Plaza	1 (Constant)	1.938	.089		21.709	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.045	.092	-.051	-.490	.626
Harbour City	1 (Constant)	2.810	.067		41.706	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.092	.054	-.105	-1.709	.089
New Jade Shopping Arcade	1 (Constant)	1.790	.132		13.547	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.192	.127	.240	1.514	.139
PacificPlace	1 (Constant)	2.378	.194		12.284	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.086	.153	-.097	-.558	.581
Festival Walk	1 (Constant)	2.886	.094		30.653	.000
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.085	.080	-.102	-1.054	.294

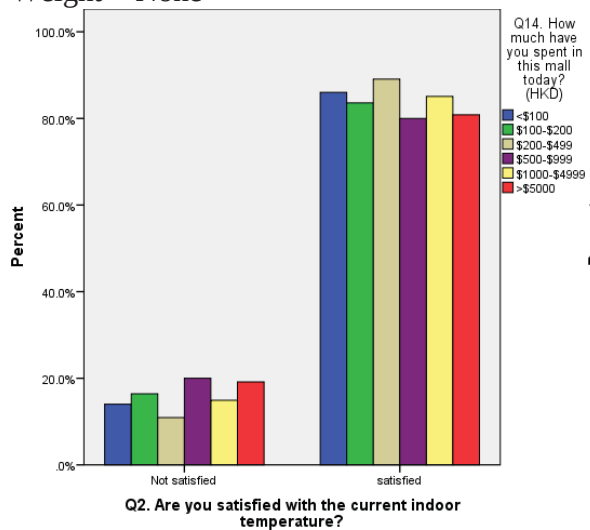
a. Dependent Variable: Q12. How long did you stay in this mall?

In conclusion, respondents' perceptions on indoor air temperature are alike among different categories of time spent, suggesting that the influence of perception on indoor temperature is similar regardless of location, which is, insignificant. While there is a significant correlation between the two variables in general analysis, the sub-group analyses suggest this could be an illusion from the locational difference in which the average duration of staying in different malls vary. Most of the respondents perceive the temperature to be normal regardless of their time spent in the shopping malls. Therefore, perception on indoor air temperature is not a major factor affecting the time spent. The regression tests have also show there is no significant relationship between the two variables. Nevertheless, the insignificance of the results sorted by shopping malls could be caused by the insufficient amount of samples to deduce a strong signal for analysis.

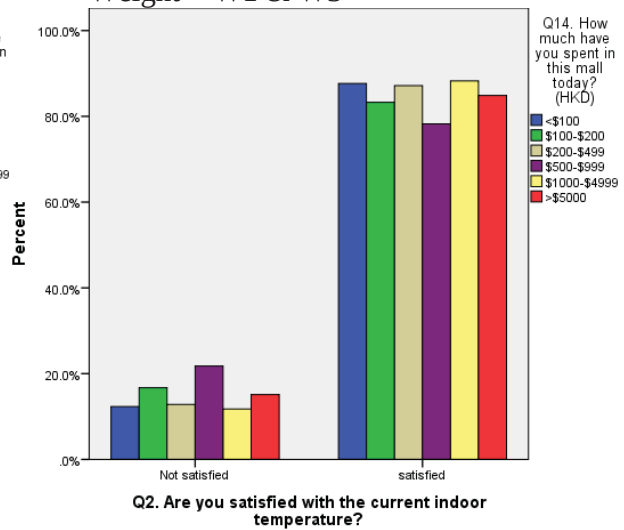
Satisfaction with indoor air temperature and expenditure

With respect to the satisfaction to indoor air temperature, the number of respondents satisfied with it outweighs those who are dissatisfied for each expenditure category, standing at 80% regardless of the expenditure (Figure 9). An independent T test is then conducted to look at the difference between the spending for those who are satisfied and dissatisfied with the indoor air temperature. Similar to perceived temperature, the result suggests that whether the respondent is satisfied with the indoor air temperature has little impact on the expenditure in mall and the correlation between them is insignificant ($p < 0.05$) (Table 33). The result is also insignificant when split among tourists/ locals and different locations (Table 34). Weighting does not play a significant role here and the result is unaltered regardless of the weightings. Consider the result of multiple regression in previous section (Table 7), it could then be concluded that there is an insignificant correlation between the two variables.

Weight = None



Weight = W1 & W3



Weight = W2 & W3

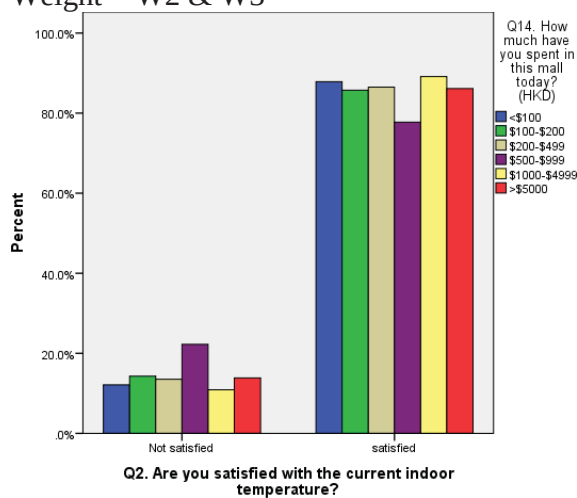


Figure 9 Respondents' satisfaction on indoor air temperature (Categorised by expenditure)

Table 34 Independent T test for satisfaction on indoor air temperature and expenditure

Weight = None

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	1.208	.272	-.921	907	.357	-.1411	.1532	-.4418	.1596
	Equal variances not assumed			-.895	181.524	.372	-.1411	.1576	-.4521	.1699

Weight = W1 & W3

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.056	.813	-.738	901	.461	-.1163	.1575	-.4254	.1929
	Equal variances not assumed			-.746	170.746	.457	-.1163	.1559	-.4240	.1914

Weight = W2 & W3

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.193	.661	-.634	768	.526	-.1132	.1786	-.4638	.2373
	Equal variances not assumed			-.645	140.237	.520	-.1132	.1755	-.4602	.2337

Table 35 Independent sample T-test for satisfaction on indoor air temperature and expenditure (By mall, local/tourist)

Weight = None

				Independent Samples Test ^a							
				Levene's Test for Equality of Variances		t-test for Equality of Means					
Location				F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Uptown Plaza	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.120	.730	-1.663	76	.100	-.6528	.3924	-1.4344 .1288
			Equal variances not assumed			-1.570	5.753	.170	-.6528	.4157	-1.6808 .3752
New Town Plaza	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.497	.486	1.692	31	.101	1.5333	.9064	-.3154 3.3820
			Equal variances not assumed			2.124	2.745	.132	1.5333	.7220	-.8898 3.9565
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.035	.851	-.313	138	.755	-.0817	.2614	-.5986 .4351
			Equal variances not assumed			-.330	37.351	.743	-.0817	.2479	-.5839 .4204
Wong Tai Sin Plaza	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.065	.800	.000	103	1.000	.0000	.1828	-.3625 .3625
			Equal variances not assumed			.000	28.590	1.000	.0000	.1602	-.3279 .3279
Harbour City	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	2.894	.091	-1.036	147	.302	-.3643	.3517	-1.0593 .3307
			Equal variances not assumed			-1.090	53.056	.281	-.3643	.3342	-1.0346 .3060
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	2.393	.124	1.947	140	.054	.6222	.3195	-.0095 1.2539
			Equal variances not assumed			1.979	33.570	.056	.6222	.3144	-.0170 1.2614
NewJade Shopping Arcade	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	4.537	.038	1.086	56	.282	.4872	.4485	-.4113 1.3857
			Equal variances not assumed			2.172	15.410	.046	.4872	.2243	.0102 .9642
Pacific Place	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	1.051	.318	-.232	20	.819	-.2083	.8993	-2.0843 1.6676
			Equal variances not assumed			-.201	7.147	.846	-.2083	1.0377	-2.6518 2.2352
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.173	.680	-1.260	40	.215	-.9474	.7521	-2.4675 .5728
			Equal variances not assumed			-1.273	3.679	.278	-.9474	.7443	-3.0869 1.1922
Festival Walk	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	5.748	.021	-.876	40	.386	-.8205	.9366	-2.7134 1.0724
			Equal variances not assumed			-3.195	38.000	.003	-.8205	.2568	-1.3404 -.3006
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.202	.654	-.833	87	.407	-.4278	.5137	-1.4489 .5933
			Equal variances not assumed			-.784	9.615	.452	-.4278	.5458	-1.6505 .7950

a. No statistics are computed for one or more splitfiles

Weight = W1 & W3

				Independent Samples Test ^a							
				Levene's Test for Equality of Variances		t-test for Equality of Means					
Location				F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Uptown Plaza	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.180	.672	-2.034	114	.044	-.6528	.3209	-1.2884 -.0171
			Equal variances not assumed			-1.969	9.161	.080	-.6528	.3315	-1.4006 .0951
New Town Plaza	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.272	.605	1.610	37	.116	1.6929	1.0516	-.4380 3.8239
			Equal variances not assumed			1.837	1.308	.270	1.6929	.9216	-5.1445 8.5304
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.053	.819	-.382	206	.703	-.0817	.2142	-.5040 .3405
			Equal variances not assumed			-.404	56.362	.688	-.0817	.2024	-.4872 .3237
Wong Tai Sin Plaza	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.043	.837	.000	68	1.000	.0000	.2243	-.4476 .4476
			Equal variances not assumed			.000	18.430	1.000	.0000	.1980	-.4153 .4153
Harbour City	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	2.099	.150	-.283	144	.777	-.1034	.3650	-.8250 .6181
			Equal variances not assumed			-.292	43.463	.772	-.1034	.3543	-.8176 .6108
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	1.593	.210	1.589	93	.116	.6222	.3916	-.1555 1.3999
			Equal variances not assumed			1.605	21.899	.123	.6222	.3876	-.1818 1.4261
NewJade Shopping Arcade	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	4.034	.050	1.024	50	.311	.4872	.4757	-.4684 1.4427
			Equal variances not assumed			2.037	13.220	.062	.4872	.2391	-.0285 1.0029
Pacific Place	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.166	.691	-.635	12	.537	-.8004	1.2615	-3.5417 1.9409
			Equal variances not assumed			-.498	2.286	.662	-.8004	1.6077	-6.9509 5.3501
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.154	.697	-1.187	36	.243	-.9474	.7984	-2.5674 .6726
			Equal variances not assumed			-1.181	3.131	.320	-.9474	.8025	-3.4417 1.5470
Festival Walk	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	5.212	.027	-.667	43	.508	-.6007	.9005	-2.4172 1.2157
			Equal variances not assumed			-2.539	40.718	.015	-.6007	.2366	-1.0786 -.1229
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.134	.715	-.678	58	.501	-.4278	.6310	-1.6911 .8355
			Equal variances not assumed			-.623	5.991	.556	-.4278	.6864	-2.1080 1.2525

a. No statistics are computed for one or more splitfiles

Weight = W2 & W3

				Independent Samples Test ^a								
				Levene's Test for Equality of Variances				t-test for Equality of Means				
Location				F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
											Lower	Upper
Uptown Plaza	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.020	.888	-1.965	70	.053	-.7038	.3581	-1.4180	.0104
			Equal variances not assumed			-1.774	6.585	.122	-.7038	.3968	-1.6541	.2465
New Town Plaza	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.272	.605	1.610	37	.116	1.6929	1.0516	-.4380	3.8239
			Equal variances not assumed			1.837	1.308	.270	1.6929	.9216	-5.1445	8.5304
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.188	.665	-.707	121	.481	-.1977	.2798	-.7516	.3562
			Equal variances not assumed			-.761	30.141	.452	-.1977	.2597	-.7281	.3326
Wong Tai Sin Plaza	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.025	.874	-.227	90	.821	-.0494	.2181	-.4827	.3838
			Equal variances not assumed			-.241	16.456	.813	-.0494	.2054	-.4838	.3849
Harbour City	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	2.099	.150	-.283	144	.777	-.1034	.3650	-.8250	.6181
			Equal variances not assumed			-.292	43.463	.772	-.1034	.3543	-.8176	.6108
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	8.541	.004	2.433	115	.017	.7985	.3282	.1484	1.4486
			Equal variances not assumed			3.232	38.122	.003	.7985	.2471	.2984	1.2986
New Jade Shopping Arcade	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	2.258	.142	.819	34	.418	.5420	.6618	-.8029	1.8870
			Equal variances not assumed			1.587	5.553	.168	.5420	.3416	-.3105	1.3946
Pacific Place	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	.166	.691	-.635	12	.537	-.8004	1.2615	-3.5417	1.9409
			Equal variances not assumed			-.498	2.286	.662	-.8004	1.6077	-6.9509	5.3501
Festival Walk	Tourist	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	5.212	.027	-.667	43	.508	-.6007	.9005	-2.4172	1.2157
			Equal variances not assumed			-2.539	40.718	.015	-.6007	.2366	-1.0786	-.1229
	Local	Q14. How much have you spent in this mall today? (HKD)	Equal variances assumed	3.014	.088	-1.820	61	.074	-1.1870	.6522	-2.4910	.1170
			Equal variances not assumed			-2.302	7.461	.053	-1.1870	.5157	-2.3914	.0174

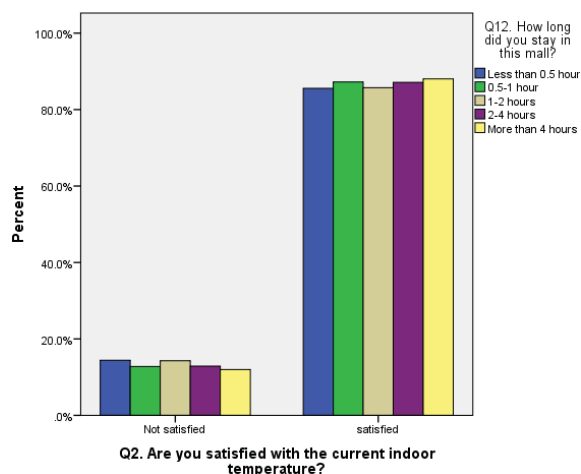


Figure 10 Respondents' satisfaction on indoor air temperature (Categorised by time spent)

For the time spent in mall, a majority of the respondents are satisfied with the indoor air temperature (> 80%) regardless of the time spent in the shopping malls. For respondents who are satisfied with the indoor temperature, there is no significant variation in time spent, and this pattern is also applicable to those who are dissatisfied with it. This implies there are other factors affecting the duration of staying in the shopping malls and temperature is a trivial factor in affecting the visiting decision. For instance, some of the stores in the sampling sites are having sales and discounts which have attracted people to stay longer; thus implies that their purpose of visiting the shopping malls, including shopping and dining, would be more influential to their spent time. The pattern for the satisfaction on indoor air temperature is similar for locals and tourists in the sense that both groups have a higher satisfaction rate than dissatisfaction rate, and the ratio for the two satisfaction categories are similar for the two groups.

Table 36 Independent T test for satisfaction on indoor air temperature and time spent

Weight = None

Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Q12.How long did you stay in this mall?	Equal variances assumed	.089	.766	.236	915	.813	.0235	.0993	-.1715 .2184
	Equal variances not assumed			.232	182.520	.817	.0235	.1011	-.1761 .2230

Weight = W1 & W3

Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Q12. How long did you stay in this mall?	Equal variances assumed	.031	.861	.561	908	.575	.0585	.1043	-.1462 .2632
	Equal variances not assumed			.563	169.324	.575	.0585	.1040	-.1468 .2638

Weight = W2 & W3

Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Q12. How long did you stay in this mall?	Equal variances assumed	.024	.877	.225	775	.822	.0252	.1123	-.1952 .2457
	Equal variances not assumed			.226	138.516	.822	.0252	.1117	-.1957 .2462

The independent sample T test has confirmed there is no significant difference in the amount of time spent by the two groups, those who are satisfied and those who are dissatisfied with the indoor temperature ($p < 0.05$). Therefore, there is no difference on the time spent in the shopping mall with respect to the satisfaction on indoor air temperature, affirming the result in Table 14.

Table 37 Regression on indoor air temperature and time spent

Weight = None

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.139 ^a	.019	.018	1.0588

a. Predictors: (Constant), Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	20.161	1	20.161	17.984	.000 ^b
Residual	1025.758	915	1.121		
Total	1045.919	916			

a. Dependent Variable: Q12.How long did you stay in this mall?

b. Predictors: (Constant), Q1.please indicate your perceived air temperature in this mall from cold (-3) to hot (3).

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.567	.036		71.516	.000
Q1.please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.129	.030	-.139	-4.241	.000

a. Dependent Variable: Q12.How long did you stay in this mall?

Weight =W1 & W3

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.128 ^a	.016	.015	1.0803	

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	17.685	1	17.685	15.152	.000 ^b
Residual	1059.342	908	1.167		
Total	1077.026	909			

a. Dependent Variable: Q12. How long did you stay in this mall?

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
1	(Constant)	2.575	.037		70.490
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.123	.031	-.128	.000

a. Dependent Variable: Q12. How long did you stay in this mall?

Weight = W2 & W3

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.128 ^a	.016	.015	1.0603	

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	14.551	1	14.551	12.944	.000 ^b
Residual	871.797	775	1.124		
Total	886.348	776			

a. Dependent Variable: Q12. How long did you stay in this mall?

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
1	(Constant)	2.598	.039		65.909
	Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.121	.034	-.128	.000

a. Dependent Variable: Q12. How long did you stay in this mall?

5.4.Reaction to hotness and coldness

This section is intended to explore the reaction of visitors to unacceptable indoor air temperatures, to examine whether a difference between the reactions toward coldness and hotness exist, thereby explore the possible cost of compliance for malls to raise the indoor air temperature in terms of the reduction of visitor flow and time of staying.

Same as the previous parts, visitors who have just entered the mall and those expected to spend are filtered. As those just arrived would bear a much higher cost to leave the mall, i.e. need to give up the initial purpose of visit. Those not expected to spend are filtered as they are not the target customers of the shopping malls, as mentioned in previous parts. Besides, the purpose like work or just pass through would affect the ability for reacting subjectively.

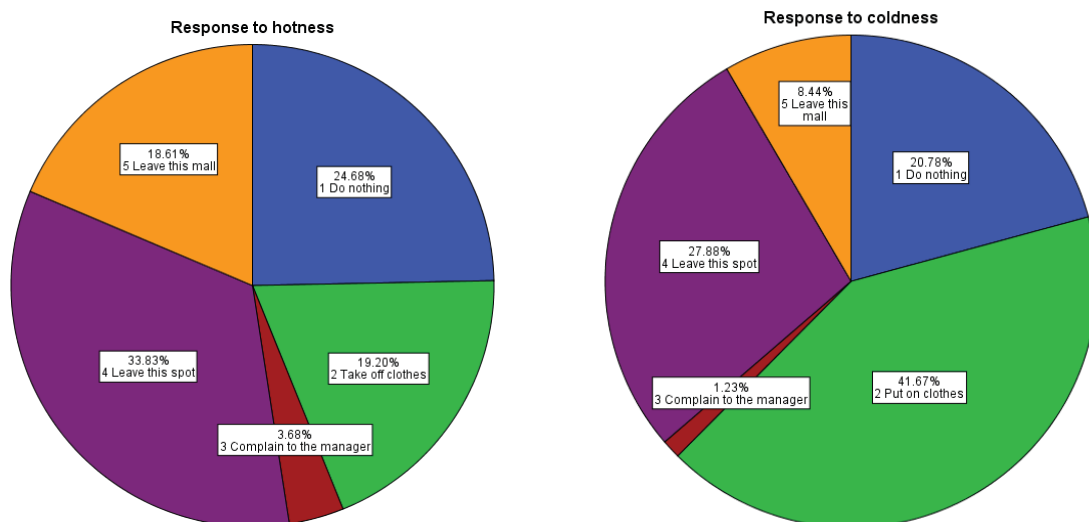
Reactions to hotness and coldness are quantified based on the level of negative impacts to shopping mall. Instead of the sales revenue generated by tenants, shopping mall management aims to enhance its ability in attracting and retaining customers, which determine tenants' leasing decision and rental value (Pitt & Musa, 2009). Hence, responses like “leave this shopping mall” would probably generate the most serious impact to the shopping malls. In contrast, responses like “complain with the manager” and “put on/ off clothes” that do not actually affect customer flow have a lower level of negative impacts (Table 38).

Table 38 Reactions to hotness/ coldness and its level of negative impacts to shopping malls

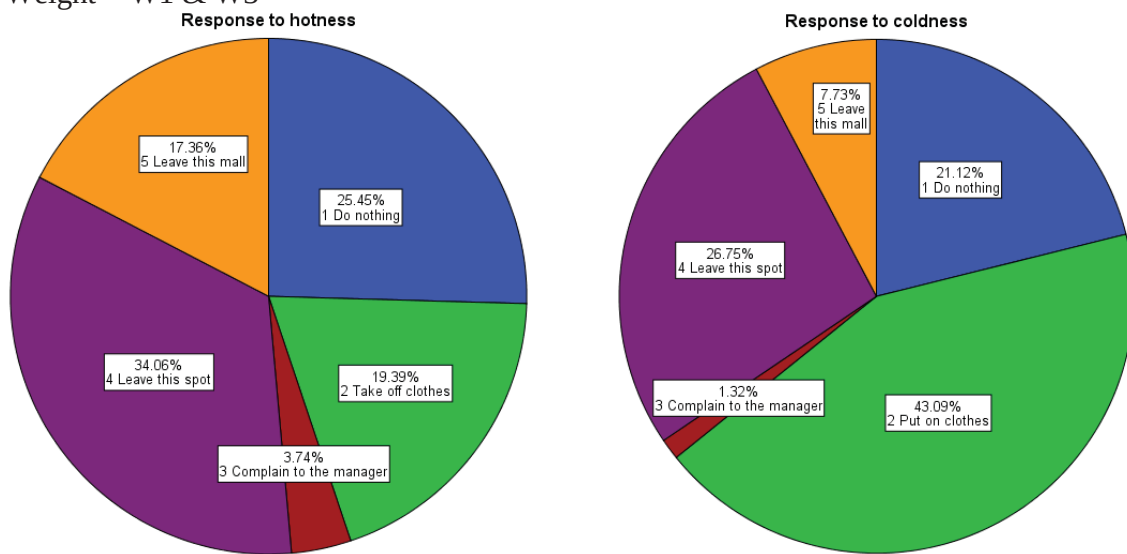
Q3. Reactions to hotness	Impact level	Q4 Reaction to coldness	Impact level
Leave this shopping mall	5	Leave this shopping mall	5
Leave this location	4	Leave this location	4
Complain with the manager	3	Complain with the manager	3
Put on clothes	2	Take off clothes	2
No response and continue current activities	1	No response and continue current activities	1

The responses are illustrated in Figure 11. When feeling hot, people tend to leave the location or just neglect the hotness, which accounted for 33.83% and 24.68% respectively; while when feeling cold, people are likely to put on clothes or leave the location, i.e. 41.67% and 27.88% respectively. Besides, the mean level of reaction to hotness is significantly higher than that to coldness ($p>0.05$) by conducting paired T-test (Table 39; Figure 12). This implies the level of negative impacts is more serious when customers perceive indoor temperature to be hot than to be cold. Hence, managers of shopping malls would tend to adjust the thermostat setting to a lower level to prevent the potential loss of visitors induced by hotness.

Weight = None



Weight = W1 & W3



Weight = W2 & W3

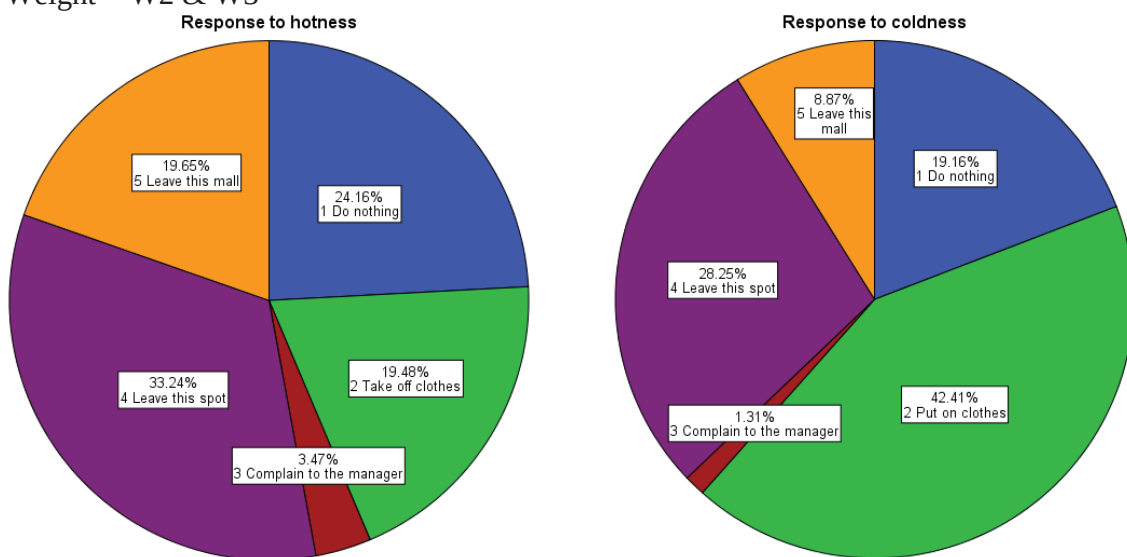
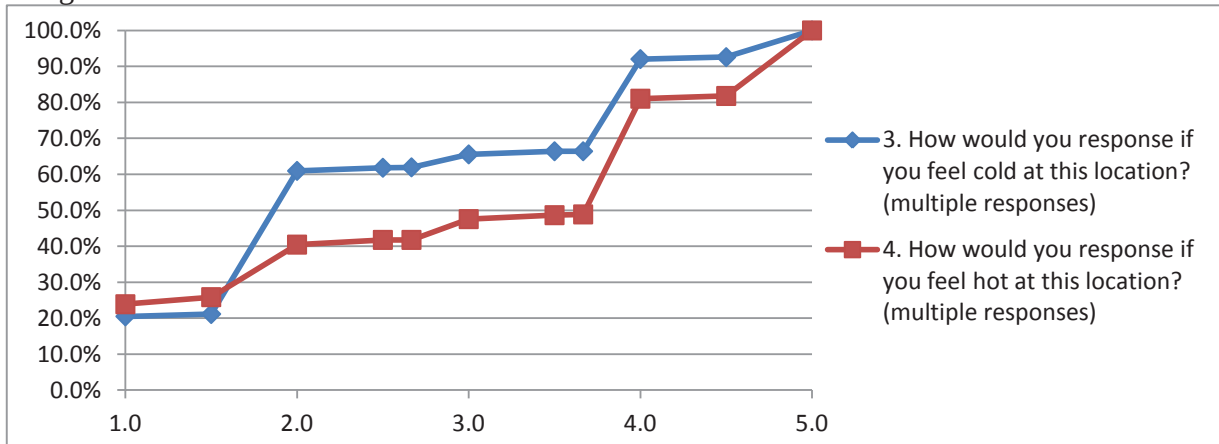
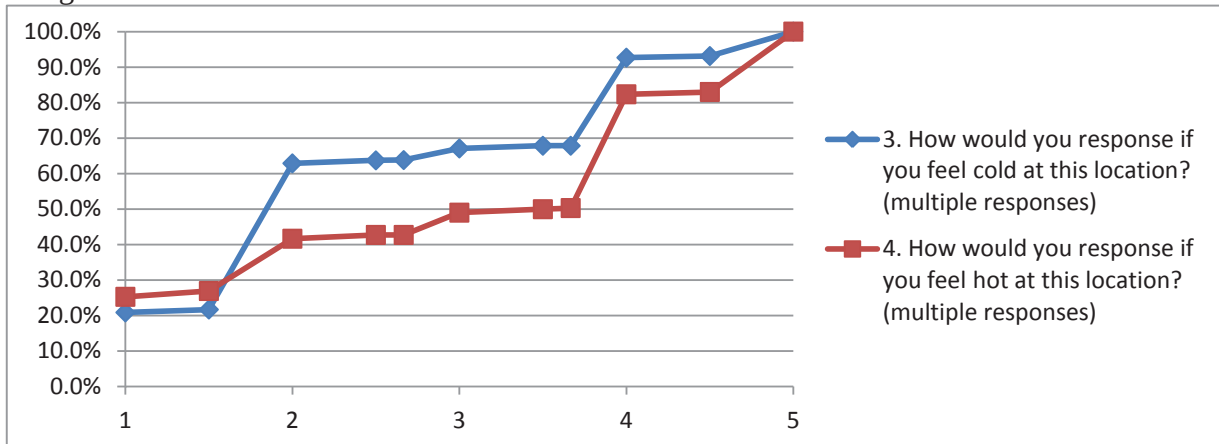


Figure 11 Frequency of reaction to coldness and hotness

Weight = None



Weight = W1 & W3



Weight = W2 & W3

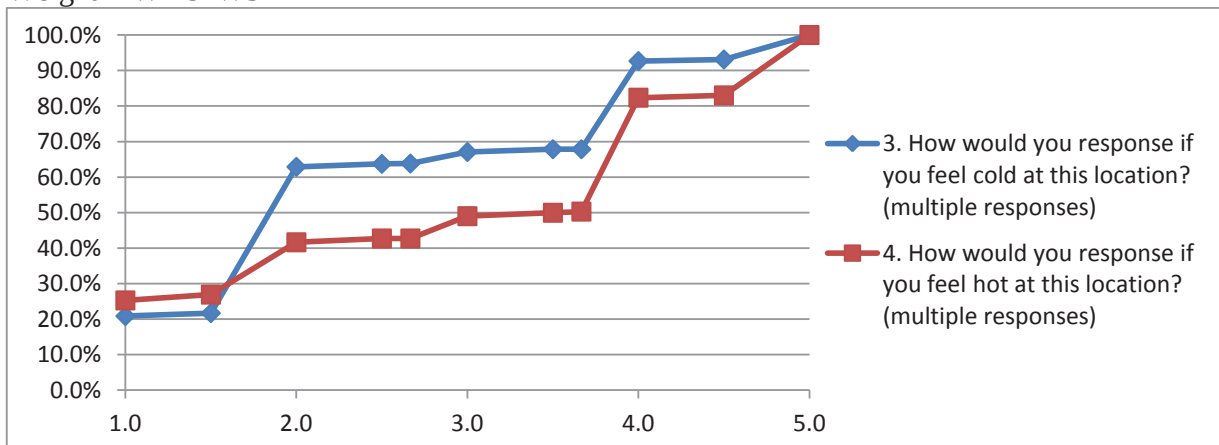


Figure 12 Reaction when feeling cold and hot in the interview location

Table 39 Paired samples test for reaction when feeling cold and hot

Weight = None

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 3. How would you response if you feel cold at this location? (multiple responses)	2.5945	917	1.28056	.042288
4. How would you response if you feel hot at this location? (multiple responses)	3.0445	917	1.49008	.049207

Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 3. How would you response if you feel cold at this location? (multiple responses) & 4. How would you response if you feel hot at this location? (multiple responses)	917	.335	.000

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 3. How would you response if you feel cold at this location? (multiple responses) - 4. How would you response if you feel hot at this location? (multiple responses)	-.4500	1.6073	.0531	-.5542	-.3459	-8.479	916	.000

Weight = W1 & W3

Weight W1 & WS

Paired Samples Statistics					
	Mean	N	Std. Deviation	Std. Error Mean	
Pair 1	3. How would you response if you feel cold at this location? (multiple responses)	2.5508	910	1.2659	.04197
	4. How would you response if you feel hot at this location? (multiple responses)	2.9952	910	1.4897	.04939

Paired Samples Correlations				
	N	Correlation	Sig.	
Pair 1	3. How would you response if you feel cold at this location? (multiple responses) & 4. How would you response if you feel hot at this location? (multiple responses)	910	.327	.000

Paired Samples Test									
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	3. How would you response if you feel cold at this location? (multiple responses) - 4. How would you response if you feel hot at this location? (multiple responses)	-.4443	1.6088	.05334	-.5490	-.3397	-8.330	909	.000

Weight = W2 & W3

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 3. How would you response if you feel cold at this location? (multiple responses)	2.63146	777	1.2712	.04559
4. How would you response if you feel hot at this location? (multiple responses)	3.06199	777	1.4913	.05348

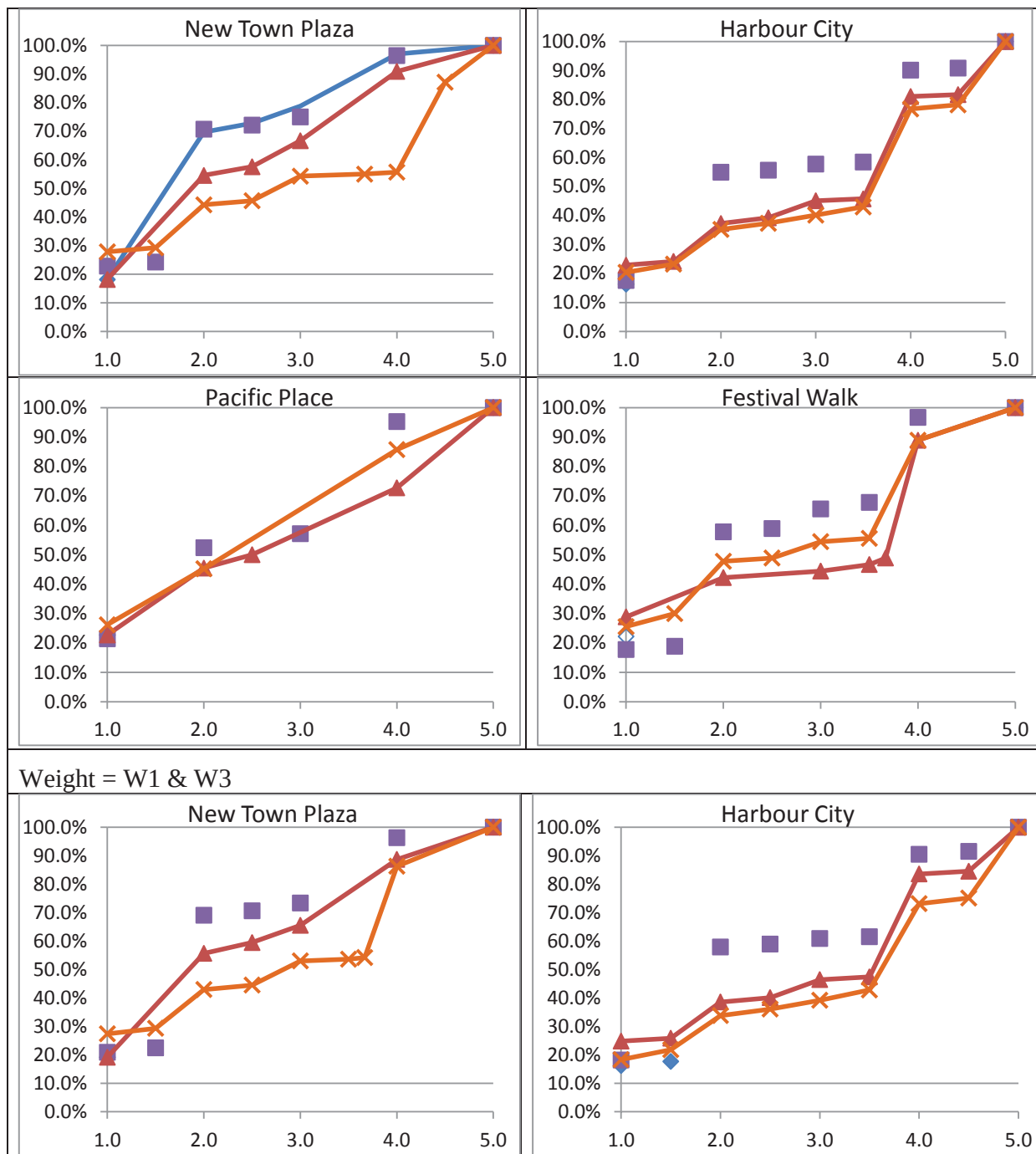
Paired Samples Correlations			
	N	Correlation	Sig.
Pair 1 3. How would you response if you feel cold at this location? (multiple responses) & 4. How would you response if you feel hot at this location? (multiple responses)	777	.306	.000

Paired Samples Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 3. How would you response if you feel cold at this location? (multiple responses) - 4. How would you response if you feel hot at this location? (multiple responses)	-.4305	1.6369	.05871	-.5458	-.3153	-7.334	776	.000

It is also observed that the locals' responses to coldness and hotness are much more diverse than that of tourists. Based on the result of paired T-test, tourists' reaction to coldness and hotness are not significantly different in all shopping mall with significant level of $p > 0.05$ (Table 39). While the locals' responses are significantly different in most of the shopping malls, except in Pacific Place and Festival Walk.

There are two possible explanations. One is due to the high cost of tourist to response to temperature in a more serious way. Since it is more difficult for tourist to revisit the shopping mall than locals, tourists would tends follow their planned itinerary and overlook the temperature. Another explanation is the limited number of samples collected. The number of tourists interviewed in New Town Plaza, Pacific Place and Festival Walk are less than 50; hence, it may be unable to generate a significant enough signal to reflect the difference.

Legend	
	Tourist: How would you response if you feel cold at this location?
	Local: How would you response if you feel cold at this location?
	Tourist: How would you response if you feel hot at this location?
	Local: How would you response if you feel hot at this location?
Weight = None	



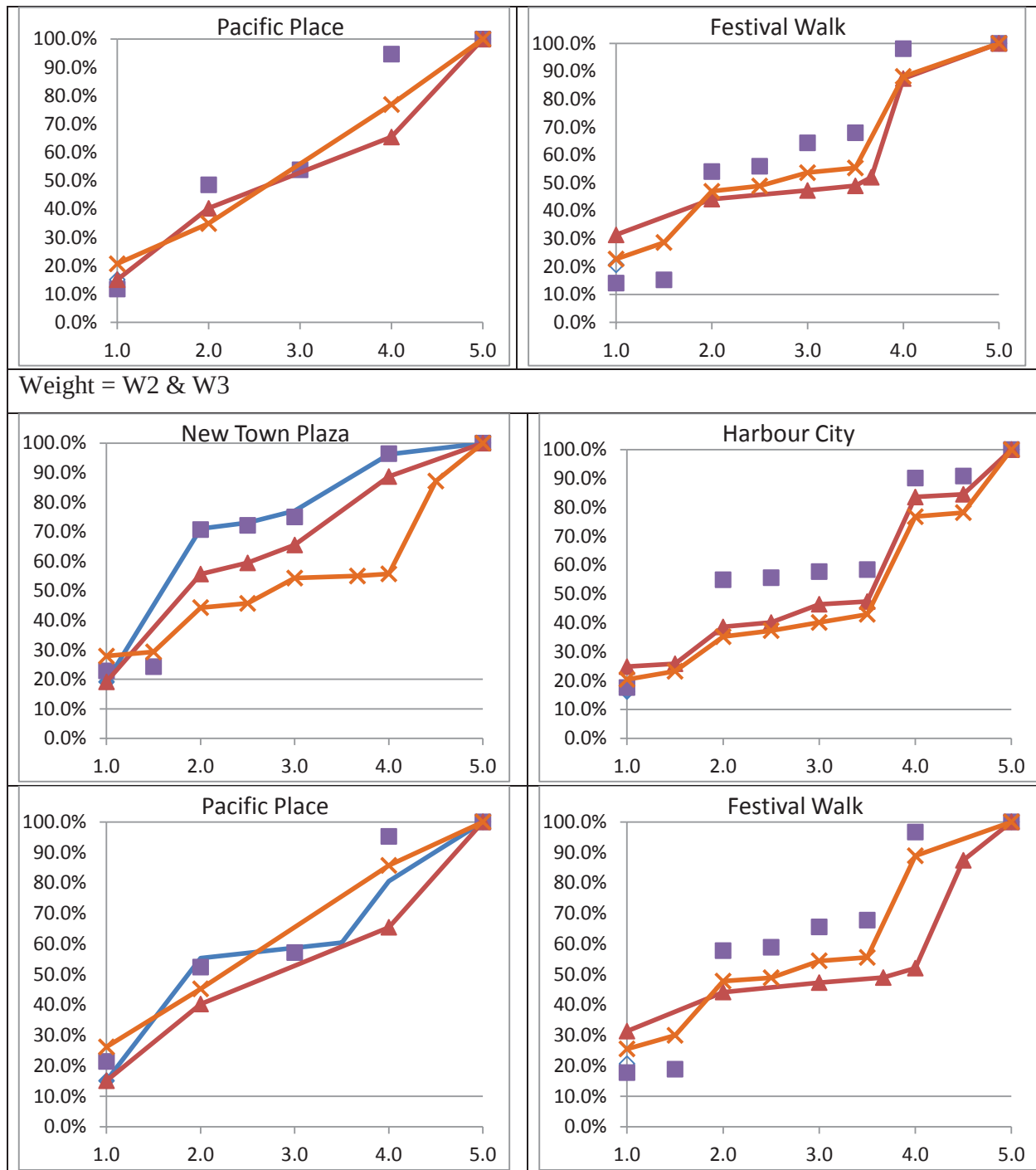


Figure 13 Reaction when feeling cold and hot in interview location (Categorized by location)

Table 40 Paired samples test for reaction when feeling cold and hot (Categorized by location)

Weight = None

Paired Samples Statistics						
Location				Mean	N	Std. Deviation
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.34848	33	1.0788
			4. How would you response if you feel hot at this location?	2.68181	33	1.2858
	Harbour City	Pair 1	3. How would you response if you feel cold at this location?	2.7527	153	1.3129
			4. How would you response if you feel hot at this location?	3.1144	153	1.4773
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location?	2.613636	22	1.4136
			4. How would you response if you feel hot at this location?	3.068181	22	1.6058
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location?	2.6	45	1.30384048
			4. How would you response if you feel hot at this location?	2.9370370	45	1.48106
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.4872	78	1.2867
			4. How would you response if you feel hot at this location?	2.9615	78	1.5327
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.3357	140	1.1575
			4. How would you response if you feel hot at this location?	2.8440	140	1.4575
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.6238	105	1.3530
			4. How would you response if you feel hot at this location?	3.3667	105	1.5068
	Harbour City	Pair 1	3. How would you response if you feel cold at this location?	2.7852	142	1.3212
			4. How would you response if you feel hot at this location?	3.2289	142	1.4895
	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location?	2.3621	58	1.3072
			4. How would you response if you feel hot at this location?	3.0172	58	1.5949
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location?	2.7381	42	1.3078
			4. How would you response if you feel hot at this location?	2.9762	42	1.5059
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location?	2.6	90	1.1880
			4. How would you response if you feel hot at this location?	2.8	90	1.4375

Paired Samples Correlations						
Location				N	Correlation	Sig.
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	33	.623	.000
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	153	.295	.000
Local	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	22	.390	.073
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	45	.338	.023
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	78	.243	.032
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	140	.336	.000
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	105	.272	.005
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	142	.276	.001
Local	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	58	.275	.037
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	42	.430	.004
Local	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	90	.510	.000

Paired Samples Test						
Location				Paired Differences		Sig. (2-tailed)
				Mean	Std. Deviation	
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3333	1.0433	.076
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3617	1.6618	.008
Local	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4545	1.6755	.217
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3370	1.6090	.167
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4744	1.7449	.019
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.5083	1.5268	.000
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.7429	1.7294	.000
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4437	1.6970	.002
	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.6552	1.7627	.006
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.2391	1.5111	.313
Local	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.2	1.3171	.153

Weight = W1 & W3

Paired Samples Statistics						
Location				Mean	N	Std. Deviation
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.3551	37	1.1179
			4. How would you response if you feel hot at this location?	2.6914	37	1.3333
	Harbour City	Pair 1	3. How would you response if you feel cold at this location?	2.7271	147	1.3011
			4. How would you response if you feel hot at this location?	3.043+	147	1.4713
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location?	2.9110	15	1.4611
			4. How would you response if you feel hot at this location?	3.3892	15	1.5834
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location?	2.6464	45	1.3007
			4. How would you response if you feel hot at this location?	2.8787	45	1.5149
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.4872	122	1.2837
			4. How would you response if you feel hot at this location?	2.9615	122	1.5291
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.3357	219	1.1560
			4. How would you response if you feel hot at this location?	2.8440	219	1.4556
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.6238	62	1.3575
			4. How would you response if you feel hot at this location?	3.3667	62	1.5118
	Harbour City	Pair 1	3. How would you response if you feel cold at this location?	2.7852	84	1.3246
			4. How would you response if you feel hot at this location?	3.2289	84	1.4931
	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location?	2.3621	66	1.3057
			4. How would you response if you feel hot at this location?	3.0172	66	1.5931
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location?	2.7381	48	1.3056
			4. How would you response if you feel hot at this location?	2.9762	48	1.5036
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location?	2.6000	53	1.1926
			4. How would you response if you feel hot at this location?	2.8000	53	1.4431

a. The correlation and t cannot be computed because the sum of caseweights is less than or equal to 1.

b. The correlation and t cannot be computed because the standard error of the difference is 0.

Paired Samples Correlations ^a				N	Correlation	Sig.
Location						
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	37	.610	.000
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	147	.287	.000
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	15	.353	.199
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	45	.313	.036
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	122	.243	.007
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	219	.336	.000
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	62	.272	.032
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	84	.276	.011
	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	66	.275	.025
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	48	.430	.002
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	53	.510	.000

				Paired Differences				t	df	Sig. (2-tailed)
				Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference			
Location							Lower	Upper		
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3363	1.1002	.18094	-.7032	.03073	-1.858	.071
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3164	1.6613	.1370	-.5872	-.04570	-2.310	.022
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4782	1.7340	.4500	-1.4442	.4878	-1.063	.306
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.2325	1.6590	.2471	-.7302	.2656	-.940	.352
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4744	1.7408	.1574	-.7860	-.1627	-3.013	.003
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.5083	1.5247	.1029	-.7112	-.3055	-4.939	.000
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.7429	1.7352	.2200	-1.1828	-.3029	-3.376	.001
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4437	1.7012	.1855	-.8126	-.07471	-2.392	.019
	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.6552	1.7607	.2162	-1.0869	-.2235	-3.031	.003
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.2381	1.5088	.2177	-.6760	.1998	-1.094	.280
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.2000	1.3223	.1811	-.5634	.1634	-1.104	.275

Weight = W2 & W3

Paired Samples Statistics						
Location				Mean	N	Std. Deviation
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.3551	37	1.1179
			4. How would you response if you feel hot at this location?	2.6914	37	1.3333
	Harbour City	Pair 1	3. How would you response if you feel cold at this location?	2.7271	147	1.3011
			4. How would you response if you feel hot at this location?	3.0436	147	1.4713
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location?	2.9110	15	1.4611
			4. How would you response if you feel hot at this location?	3.3892	15	1.5834
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location?	2.6464	45	1.3006
			4. How would you response if you feel hot at this location?	2.8787	45	1.5149
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.5565	73	1.3236
			4. How would you response if you feel hot at this location?	2.8249	73	1.5480
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.3887	122	1.1644
			4. How would you response if you feel hot at this location?	2.8811	122	1.4687
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location?	2.6652	94	1.3410
			4. How would you response if you feel hot at this location?	3.3882	94	1.4824
	Harbour City	Pair 1	3. How would you response if you feel cold at this location?	2.7123	115	1.3089
			4. How would you response if you feel hot at this location?	3.2986	115	1.4899
	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location?	2.7446	37	1.3692
			4. How would you response if you feel hot at this location?	3.1383	37	1.6056
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location?	2.9104	20	1.2363
			4. How would you response if you feel hot at this location?	3.3258	20	1.5243
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location?	2.6600	62	1.1290
			4. How would you response if you feel hot at this location?	2.8367	62	1.4294

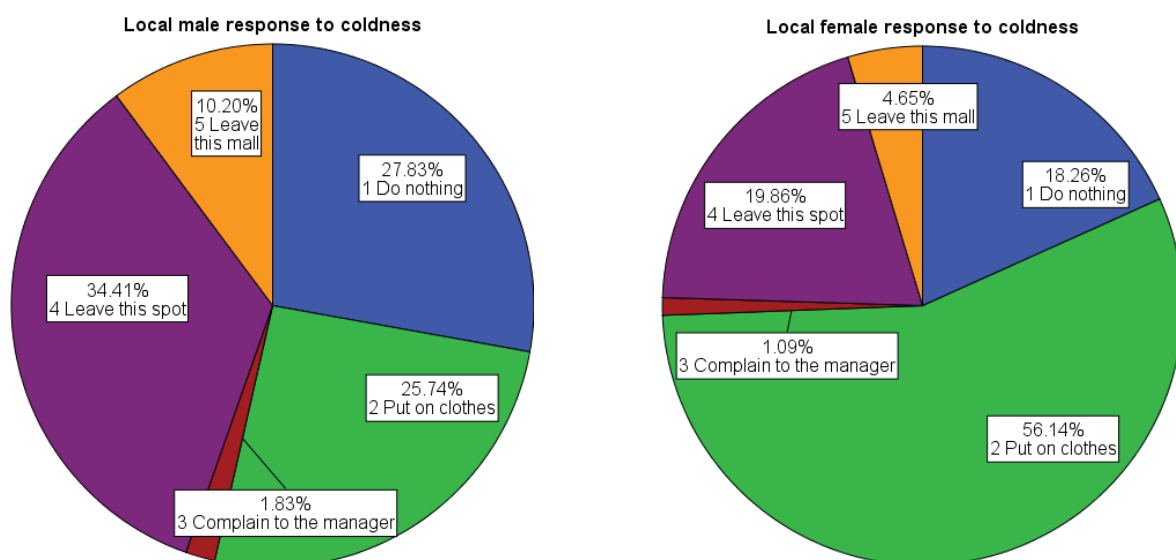
Paired Samples Correlations ^a						
Location				N	Correlation	Sig.
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	37	.610	.000
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	147	.287	.000
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	15	.353	.199
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	45	.313	.036
Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	73	.296	.011
	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	122	.353	.000
	Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	94	.213	.039
	Harbour City	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	115	.286	.002
	New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	37	.138	.420
	Pacific Place	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	20	.075	.753
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? & 4. How would you response if you feel hot at this location?	62	.435	.000

4. How would you response if you feel hot at this location?												
Paired Samples Test ^a												
Location				Paired Differences				t	df	Sig. (2-tailed)		
				Mean	Std. Error	Std. Error	95% Confidence Interval of the Difference					
				Mean	Mean	Lower	Upper					
Tourist	New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3363	1.1002	.1809	-.7032	.03073	-1.858	36	.071	
	HarbourCity	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3164	1.6613	.1370	-.5872	-.04570	-2.310	146	.022	
	PacificPlace	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4782	1.7340	.4500	-1.4442	.4878	-1.063	14	.306	
	Festival Walk	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.2323	1.6590	.2471	-.7302	.2656	-.940	44	.352	
	Local	Uptown Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.2684	1.7128	.2007	-.6686	.1318	-1.337	72	.186
		New Town Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4924	1.5183	.1372	-.7641	-.2207	-3.588	121	.000
		Wong Tai Sin Plaza	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.7230	1.7747	.1829	-1.0862	-.3598	-3.953	93	.000
		HarbourCity	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.5863	1.6789	.1564	-.8962	-.2764	-3.748	114	.000
New Jade Shopping Arcade	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.3937	1.9614	.3246	-1.0523	.2649	-1.213	36	.233		
PacificPlace	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.4154	1.8894	.4214	-1.2971	.4663	-.986	19	.337		
Festival Walk	Pair 1	3. How would you response if you feel cold at this location? - 4. How would you response if you feel hot at this location?	-.1767	1.3836	.1752	-.5270	.1736	-1.009	61	.317		

Gender differences

It is evident that the temperature sensation of male and female varies as mentioned in previous studies. While such a gender difference is insignificant enough to alter the perceived indoor air temperature as mentioned in previous section, the results do show that there is a significant difference in the reactions toward coldness between local male and female, and that gender is a determining variable on the reaction toward coldness for locals with a strong predictability of the reaction (Table 41). While male has more extreme reactions of either doing nothing (27.83%) or leaving the location (34.41%) should they feel cold, female would simply add more clothes (56.14%). In general, however, male tends to react more strongly than female ($p < 0.05$) regardless of the weighting condition. Similar pattern of reactions also exist for the tourist group, that male tends to react more strongly. However, the reactions by female are also much stronger compare to locals, and the resultant signal is not strong enough to show a significant difference between male and female among tourists. In contrast, there is no significant difference on the reactions toward hotness between male and female in both sub-groups. In both groups, male still tends to have a stronger reaction to hotness, but the reactions by female also become stronger compare to that toward coldness.

Such difference on reactions toward coldness could be attributed to the gender difference in behaviour of locals. While female are more used to bringing additional clothing out, such as scarf or light jacket, this is not a practice for local male as it would be considered clumsy or not fashionable. The difference in shopping behaviour in which male tends to shop more quickly could also attribute to such difference. The lower tolerance to coldness by female tourists could reflect their demand for better services and shopping environment compare to locals, given that their primary aim is to maximise their utility of visiting.



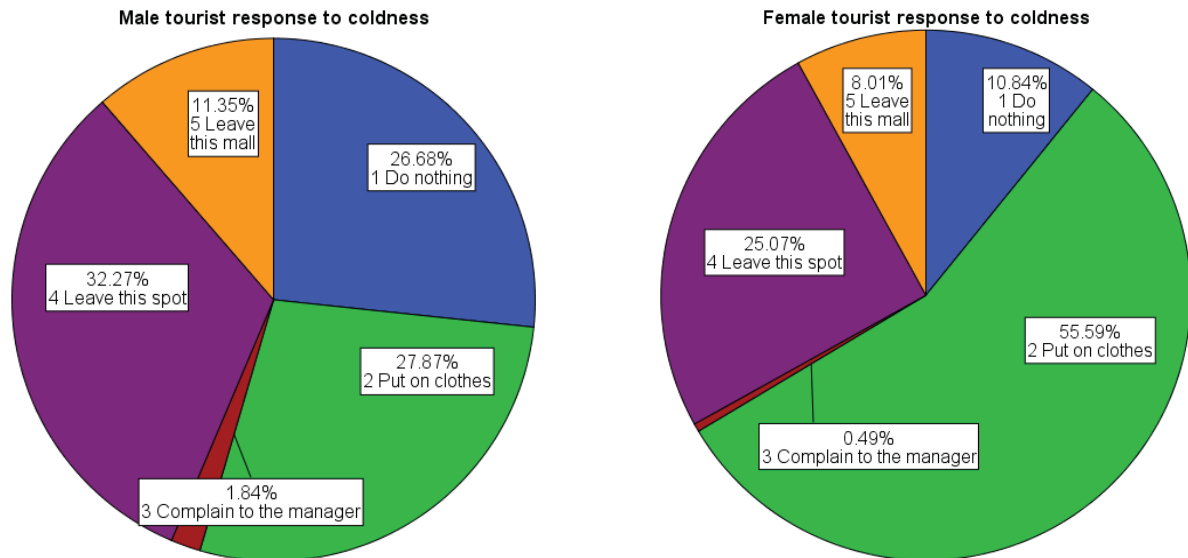


Figure 14 Responses to coldness and hotness by male and female (categorised by local/ tourist)

Table 41 Multiple regression on reaction to hotness and coldness of male/ female

Local sub-group: coldness

Model	Coefficients ^a		Standardized Coefficients	t	Sig.
	Unstandardized Coefficients	Std. Error			
1 (Constant)	-2.793	2.874		-.972	.332
Month	.564	.253	.277	2.229	.026
Day	.020	.011	.147	1.829	.068
Time	-.032	.034	-.041	-.944	.346
Holiday	.094	.125	.037	.752	.452
External Temperature	.049	.045	.062	1.082	.280
Location	-.075	.065	-.108	-1.158	.247
Interviewer	-.010	.024	-.020	-.433	.665
HK_M/F	.325	.112	.129	2.907	.004
HK_Age	.092	.065	.063	1.417	.157
HK_Income	-.039	.078	-.022	-.502	.616
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.084	.052	.071	1.598	.111

a. Dependent Variable: 3. How would you response if you feel cold at this location? (multiple responses)

Local sub-group: hotness

Model	Coefficients ^a		Standardized Coefficients	t	Sig.
	Unstandardized Coefficients	Std. Error			
1 (Constant)	-4.601	3.428		-1.342	.180
Month	.764	.302	.317	2.533	.012
Day	.023	.013	.145	1.784	.075
Time	-.005	.041	-.005	-.123	.902
Holiday	.241	.149	.080	1.614	.107
External Temperature	.062	.054	.066	1.146	.252
Location	-.136	.077	-.166	-1.766	.078
Interviewer	-.029	.028	-.047	-1.019	.309
HK_M/F	.141	.133	.047	1.053	.293
HK_Age	.188	.077	.108	2.428	.016
HK_Income	-.001	.093	-.001	-.014	.989
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.056	.062	.040	.895	.371

a. Dependent Variable: 4. How would you response if you feel hot at this location? (multiple responses)

Tourist sub-group: coldness

Tourist sub-group: hotness

Coefficients ^a						Coefficients ^a							
Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta					B	Std. Error	Beta			
1 (Constant)	-6.100	4.189			-1.456	.147	1 (Constant)	-.656	4.844			-.135	.892
Month	.574	.280	.274	2.051	.042		Month	.184	.324	.079	.570	.570	
Day	.059	.018	.311	3.252	.001		Day	.025	.021	.116	1.178	.240	
Time	.004	.062	.005	.068	.946		Time	-.037	.072	-.039	.516	.606	
Holiday	-.469	.199	-.176	-2.354	.020		Holiday	-.363	.230	-.121	-1.574	.117	
External Temperature	.103	.071	.155	1.438	.152		External Temperature	.059	.082	.080	.720	.473	
Location	-.097	.085	-.116	-1.143	.255		Location	-.044	.099	-.047	.445	.657	
Interviewer	.004	.042	.008	.105	.916		Interviewer	-.059	.048	-.094	-1.225	.222	
NHK_M/F	.287	.191	.108	1.498	.136		NHK_M/F	.454	.221	.153	2.051	.042	
NHK_Age	.305	.175	.126	1.745	.083		NHK_Age	.258	.202	.095	1.275	.204	
NHK_Income	-.026	.162	-.012	-.163	.870		NHK_Income	-.003	.187	-.001	-.017	.986	
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.160	.079	.146	2.038	.043		Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	-.031	.091	-.025	-.336	.737	
Chinese_NonChinese	.337	.303	.081	1.111	.268		Chinese_NonChinese	.436	.351	.093	1.243	.216	

a. Dependent Variable: 3. How would you response if you feel cold at this location? (multiple responses)

a. Dependent Variable: 4. How would you response if you feel hot at this location? (multiple responses)

Table 42 Independent T-test for reactions toward coldness and hotness between local male and female

Weight = None

Group Statistics					
	HK_M/F	N	Mean	Std. Deviation	Std. Error Mean
3. How would you response if you feel cold at this location?	Male	308	2.7468	1.4282	.0814
	Female	347	2.3977	1.0967	.0589
4. How would you response if you feel hot at this location?	Male	308	3.1282	1.5596	.0889
	Female	347	2.9673	1.4461	.0776

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
3. How would you response if you feel cold at this location?	Equal variances assumed	89.131	.000	3.529	653	.000	.3491	.0989	.1548	.5433
	Equal variances not assumed			3.475	573.123	.001	.3491	.1004	.1517	.5463
4. How would you response if you feel hot at this location?	Equal variances assumed	6.191	.013	1.370	653	.171	.1609	.1175	-.0698	.3916
	Equal variances not assumed			1.364	629.225	.173	.1609	.1180	-.0708	.3926

Weight = W1

Group Statistics					
	HK_M/F	N	Mean	Std. Deviation	Std. Error Mean
3. How would you response if you feel cold at this location?	Male	288	2.7232	1.4254	.0840
	Female	368	2.3301	1.0788	.0562
4. How would you response if you feel hot at this location?	Male	288	3.0364	1.5580	.0919
	Female	368	2.9510	1.4540	.07579

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
3. How would you response if you feel cold at this location?	Equal variances assumed	100.570	.000	4.019	654	.000	.3931	.0978	.2010	.5851
	Equal variances not assumed			3.887	519.517	.000	.3931	.1011	.1944	.5917
4. How would you response if you feel hot at this location?	Equal variances assumed	6.351	.012	.723	654	.470	.0854	.1181	-.1465	.3173
	Equal variances not assumed			.717	594.600	.474	.0854	.1191	-.1485	.3193

Weight = W2

Group Statistics					
	HK_M/F	N	Mean	Std. Deviation	Std. Error Mean
3. How would you response if you feel cold at this location?	Male	255	2.8039	1.4298	.0895
	Female	269	2.4262	1.0590	.0646
4. How would you response if you feel hot at this location?	Male	255	3.1854	1.5630	.0979
	Female	269	2.9918	1.4429	.0881

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
3. How would you response if you feel cold at this location?	Equal variances assumed	81.238	.000	3.446	522	.001	.3777	.1096	.1624	.5930
	Equal variances not assumed			3.420	467.109	.001	.3777	.1104	.1607	.5947
4. How would you response if you feel hot at this location?	Equal variances assumed	5.839	.016	1.474	522	.141	.1936	.1314	-.0645	.4517
	Equal variances not assumed			1.470	512.629	.142	.1936	.1317	-.0651	.4523

Table 43 Independent sample T-test on responses toward coldness and hotness between male and female (categorised by local/ tourist and location)

Location				Levene's Test for Equality of Variances		t-test for Equality of Means					
				F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Up Town Plaza	Local	3. How would you response if you feel cold at this location?	Equal variances assumed	.915	.342	.683	71	.497	.2134	.3123	-.4093 .8362
			Equal variances not assumed			.688	70.560	.494	.2134	.3101	-.4050 .8319
		4. How would you response if you feel hot at this location?	Equal variances assumed	2.341	.130	2.345	71	.022	.8277	.3530	.1238 1.5316
			Equal variances not assumed			2.321	65.477	.023	.8277	.3566	.1156 1.5399
New Town Plaza	Tourist	3. How would you response if you feel cold at this location?	Equal variances assumed	10.652	.002	-.673	35	.505	-.2593	.3854	-1.0417 .5231
			Equal variances not assumed			-.585	17.331	.566	-.2593	.4434	-1.1934 .6748
		4. How would you response if you feel hot at this location?	Equal variances assumed	1.025	.318	-1.413	35	.167	-.6357	.4500	-1.5492 .2778
			Equal variances not assumed			-1.379	24.085	.181	-.63567	.4610	-1.5870 .3156
	Local	3. How would you response if you feel cold at this location?	Equal variances assumed	1.074	.302	-.262	120	.793	-.0573	.21841	-.4898 .3751
			Equal variances not assumed			-.255	85.982	.799	-.0573	.2247	-.5040 .3894
		4. How would you response if you feel hot at this location?	Equal variances assumed	.304	.582	-.048	120	.962	-.0132	.2756	-.5588 .5324
			Equal variances not assumed			-.047	90.306	.962	-.0132	.2792	-.5680 .5415
Wong Tai Sin Plaza	Local	3. How would you response if you feel cold at this location?	Equal variances assumed	.304	.582	-.542	92	.589	-.1562	.2881	-.7284 .4160
			Equal variances not assumed			-.556	75.145	.580	-.1562	.2809	-.7159 .4035
		4. How would you response if you feel hot at this location?	Equal variances assumed	6.121	.015	-1.346	92	.182	-.4251	.3159	-1.0526 .2023
			Equal variances not assumed			-1.429	82.472	.157	-.4251	.2976	-1.0171 .1668
Harbour City	Tourist	3. How would you response if you feel cold at this location?	Equal variances assumed	3.291	.072	-1.819	145	.071	-.4006	.2203	-.8360 .0347
			Equal variances not assumed			-1.857	120.179	.066	-.4006	.2157	-.8277 .0264
		4. How would you response if you feel hot at this location?	Equal variances assumed	.236	.628	-.443	145	.659	-.1114	.2517	-.6090 .3881
			Equal variances not assumed			-.442	112.223	.659	-.1114	.2521	-.6110 .3881
	Local	3. How would you response if you feel cold at this location?	Equal variances assumed	4.641	.033	.471	113	.638	.1290	.2737	-.4133 .6712
			Equal variances not assumed			.437	48.547	.664	.1290	.2952	-.4643 .7223
		4. How would you response if you feel hot at this location?	Equal variances assumed	3.250	.074	.328	113	.743	.1023	.3117	-.5152 .7198
			Equal variances not assumed			.306	48.989	.761	.1023	.3343	-.5696 .7742
New Jade Shopping Arcade	Local	3. How would you response if you feel cold at this location?	Equal variances assumed	3.357	.076	-1.344	35	.188	-.6516	.4849	-1.6365 .3333
			Equal variances not assumed			-1.397	21.790	.177	-.6516	.4665	-1.6196 .3164
		4. How would you response if you feel hot at this location?	Equal variances assumed	1.163	.288	1.414	35	.166	.8021	.5671	-.3497 1.9539
			Equal variances not assumed			1.419	20.005	.171	.8021	.5652	-.3769 1.9810
Pacific Place	Tourist	3. How would you response if you feel cold at this location?	Equal variances assumed	1.750	.209	.614	13	.550	.5492	.8940	-1.3844 2.4829
			Equal variances not assumed			.679	5.720	.524	.5492	.8087	-1.4533 2.5518
		4. How would you response if you feel hot at this location?	Equal variances assumed	.134	.720	-.015	13	.989	-.0144	.9829	-2.1404 2.1116
			Equal variances not assumed			-.013	4.080	.990	-.0144	1.0888	-3.0143 2.9855
	Local	3. How would you response if you feel cold at this location?	Equal variances assumed	5.662	.029	2.360	18	.030	1.5090	.6395	.1660 2.8521
			Equal variances not assumed			3.703	9.511	.004	1.5090	.4075	.5947 2.4234
		4. How would you response if you feel hot at this location?	Equal variances assumed	11.840	.003	-2.039	18	.056	-1.6577	.8131	-3.3653 .0499
			Equal variances not assumed			-3.530	13.164	.004	-1.6577	.4696	-2.6709 .6446
Festival Walk	Tourist	3. How would you response if you feel cold at this location?	Equal variances assumed	.899	.348	.695	43	.491	.3332	.4793	-.6333 1.2997
			Equal variances not assumed			.735	14.295	.474	.3332	.4530	-.6365 1.3029
		4. How would you response if you feel hot at this location?	Equal variances assumed	1.000	.323	.297	43	.768	.1668	.5608	-.9641 1.2977
			Equal variances not assumed			.302	13.489	.767	.1668	.5524	-1.0223 1.3559
	Local	3. How would you response if you feel cold at this location?	Equal variances assumed	.058	.811	1.260	60	.213	.5012	.3979	-.2946 1.2970
			Equal variances not assumed			1.153	10.833	.274	.5012	.4348	-.4575 1.4600
		4. How would you response if you feel hot at this location?	Equal variances assumed	3.760	.057	1.888	60	.064	.9362	.4959	-.0555 1.9280
			Equal variances not assumed			2.112	12.847	.055	.9362	.4434	-.0228 1.8953

a. No statistics are computed for one or more split files

Tourist origin

Given the factor of cultural difference, it is possible that tourists from different countries, regions could react differently toward unsatisfactory thermal conditions. Besides, tourists with a more distant origin could have different reactions from those with a closer origin since the cost of each visit to Hong Kong would be higher and it is expected that they would demand a better experience to maximise their utility of the visit.

Though the result is insignificant, as shown in Tables 41 and 44, due to the insufficient sample size, it is also worthwhile to note that tourists from non-China origins tends to react more strongly toward both coldness and hotness than tourists from mainland China.

Table 44 Independent sample T-test on reactions toward coldness and hotness between tourists from mainland China and other origins

Weight = None

Group Statistics					
	Chinese Non-Chinese	N	Mean	Std. Deviation	Std. Error Mean
3. How would you response if you feel cold at this location?	Chinese origin	218	2.6177	1.2677	.0859
	Non-Chinese origin	37	3.0405	1.4062	.2312
4. How would you response if you feel hot at this location?	Chinese origin	218	2.9641	1.4786	.1001
	Non-Chinese origin	37	3.5811	1.2666	.2082

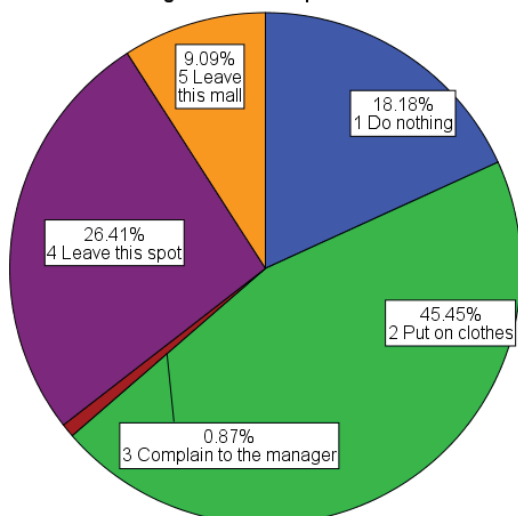
Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
				t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.						Lower	Upper
3. How would you response if you feel cold at this location?	Equal variances assumed	1.066	.303	-1.846	253	.066	-.4228	.2291	-.8739	.0283
	Equal variances not assumed			-1.714	46.470	.093	-.4228	.2466	-.9191	.0735
4. How would you response if you feel hot at this location?	Equal variances assumed	9.287	.003	-2.393	253	.017	-.6170	.2579	-1.1249	-.1092
	Equal variances not assumed			-2.670	54.098	.010	-.6170	.2311	-1.0802	-.1538

Weight = W3

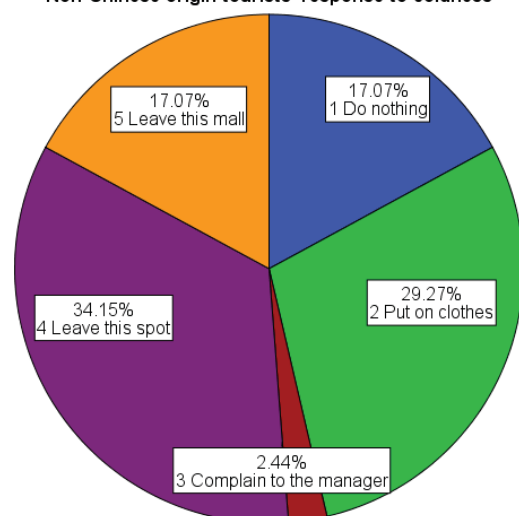
Group Statistics					
	Chinese Non-Chinese	N	Mean	Std. Deviation	Std. Error Mean
3. How would you response if you feel cold at this location?	Chinese origin	224	2.6244	1.2628	.0843
	Non-Chinese origin	26	3.1571	1.3614	.2661
4. How would you response if you feel hot at this location?	Chinese origin	224	2.9406	1.4733	.0984
	Non-Chinese origin	26	3.6857	1.2132	.2372

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
3. How would you response if you feel cold at this location?	Equal variances assumed	.240	.624	-2.026	248	.044	-.5328	.2630	-1.0508	-.0147
	Equal variances not assumed			-1.908	30.438	.066	-.5328	.2792	-1.1026	.0371
4. How would you response if you feel hot at this location?	Equal variances assumed	11.754	.001	-2.489	248	.013	-.7451	.2994	-1.3347	-.1555
	Equal variances not assumed			-2.902	34.458	.006	-.7451	.2568	-1.2667	-.2235

Chinese origin tourists' response to coldness



Non-Chinese origin tourists' response to coldness



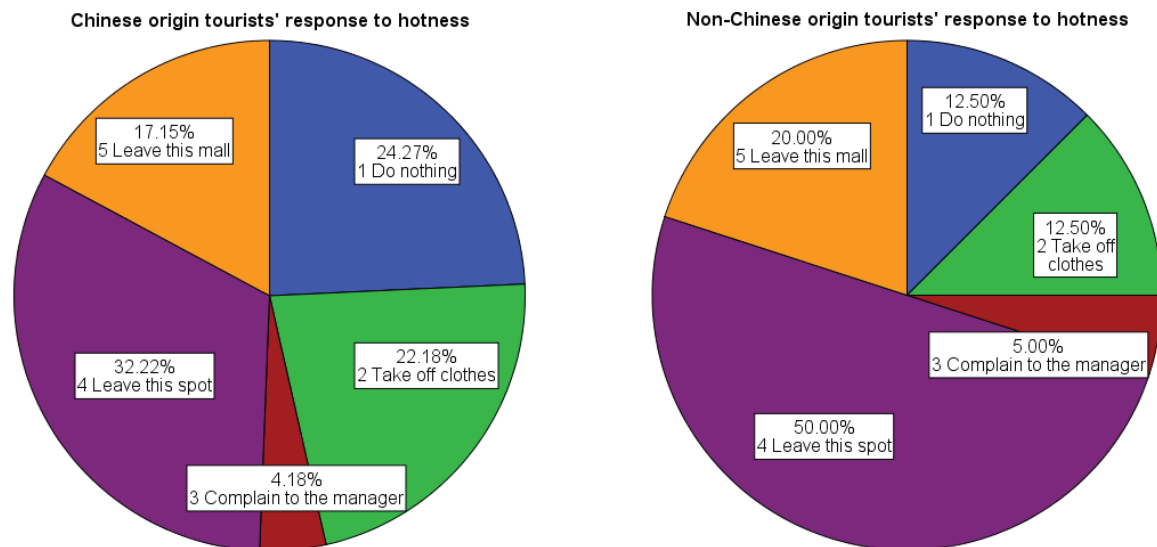


Figure 15 Responses to coldness and hotness of tourists from mainland China and other origins

Variation between weekends and weekdays

While local and tourist are two distinct groups in terms of shopping behaviour, it is also possible that visitors in weekdays and weekends could have a different response to unsatisfactory thermal and lighting conditions given different visiting schemes, for instance, shopping for daily needs versus shopping for leisure. However, there is no significant difference in the behavioural response between weekday and weekend visitors, regardless of the weighting condition, location and identity as a local or tourist. This suggests that visitors' reaction is rather static regardless of the date of visit and does not affect the reactions toward hotness and coldness (Table 41).

Chapter 6 Lighting

6.1. Behavioural responses to internal lighting

This section is intended to explore the sensibility and reaction of visitors to unacceptable lighting conditions, to examine the possible cost of compliance for malls to reduce the use of internal lighting in terms of the reduction on visitor flow and time of staying.

Same as the previous parts, visitors who have just entered the mall and those expected to spend are filtered. Again, two distinct groups, local people (n=655) and tourists (n=262), are identified to check the universality of reaction.

The reaction toward unacceptable lighting conditions is low, having more than half of the respondents with no action toward both brightness and darkness, while less than ten percent of the respondents would choose to leave the mall under such conditions. There is also a high unanimity between the reactions to brightness and darkness. The same results can be found in both tourist and local sub-groups, suggesting the universality of human reaction to unaccepted lighting conditions. For reactions toward both brightness and darkness, no single factor could be found to be significantly influencing the result. Weightings also do not play a significant role here in altering the result.

Table 45 Multiple regression on reaction to brightness and darkness of male/ female

Local sub-group: brightness

Local sub-group: darkness

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.148 ^a	.022	.005	1.061843313955214

a. Predictors: (Constant), HK_Income , HK_Age , Holiday, Time, HK_M/F , Interviewer, Location, Day, Month

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.953	9	1.439	1.276	.247 ^b
	Residual	579.541	514	1.128		
	Total	592.494	523			

a. Dependent Variable: 5. How would you response if you feel the lighting here is too bright? (multiple responses)

b. Predictors: (Constant), HK_Income , HK_Age , Holiday, Time, HK_M/F , Interviewer, Location, Day, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	3.988	1.428			2.793	.005
Month	-.278	.188	-.163		-1.478	.140
Day	-.011	.009	-.100		-1.346	.179
Time	-.025	.029	-.038		-.850	.396
Holiday	-.166	.106	-.078		-1.562	.119
Location	.099	.054	.169		1.823	.069
Interviewer	-.028	.020	-.063		-1.378	.169
HK_M/F	.027	.095	.013		.282	.778
HK_Age	.090	.055	.073		1.649	.100
HK_Income	.039	.066	.027		.594	.553

a. Dependent Variable: 5. How would you response if you feel the lighting here is too bright? (multiple responses)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.127 ^a	.016	-.001	1.0476

a. Predictors: (Constant), HK_Income , HK_Age , Holiday, Time, HK_M/F , Interviewer, Location, Day, Month

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.318	9	1.035	.943	.487 ^b
	Residual	564.068	514	1.097		
	Total	573.385	523			

a. Dependent Variable: 6. How would you response if you feel the lighting here is too dim? (multiple responses)

b. Predictors: (Constant), HK_Income , HK_Age , Holiday, Time, HK_M/F , Interviewer, Location, Day, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	1.778	1.409			1.262	.208
Month	.007	.186	.004		.036	.971
Day	-.004	.008	-.035		-.467	.641
Time	-.008	.029	-.012		-.277	.782
Holiday	.003	.105	.001		.025	.980
Location	.008	.053	.013		.140	.888
Interviewer	-.022	.020	-.050		-1.087	.277
HK_M/F	-.140	.094	-.067		-1.497	.135
HK_Age	.121	.054	.100		2.243	.025
HK_Income	.032	.066	.022		.485	.628

a. Dependent Variable: 6. How would you response if you feel the lighting here is too dim? (multiple responses)

Tourist sub-group: brightness

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.230 ^a	.053	.007	1.037064085381947

a. Predictors: (Constant), NHK_Income, Holiday, Day, Time, NHK_M/F, NHK_Age, Interviewer, Location, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	11.183	9	1.243	1.155	.326 ^b
Residual	201.119	187	1.076		
Total	212.302	196			

a. Dependent Variable: 5. How would you response if you feel the lighting here is too bright? (multiple responses)

b. Predictors: (Constant), NHK_Income, Holiday, Day, Time, NHK_M/F, NHK_Age, Interviewer, Location, Month

Tourist sub-group: darkness

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.195 ^a	.038	-.008	1.0403

a. Predictors: (Constant), NHK_Income, Holiday, Day, Time, NHK_M/F, NHK_Age, Interviewer, Location, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	7.973	9	.886	.819	.600 ^b
Residual	202.359	187	1.082		
Total	210.332	196			

a. Dependent Variable: 6. How would you response if you feel the lighting here is too dim? (multiple responses)

b. Predictors: (Constant), NHK_Income, Holiday, Day, Time, NHK_M/F, NHK_Age, Interviewer, Location, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.987	1.705		1.751	.082
Month	.123	.186	.075	.662	.508
Day	.015	.014	.099	1.056	.292
Time	-.090	.050	-.133	-1.817	.071
Holiday	-.138	.158	-.066	-.870	.385
Location	-.125	.067	-.188	-1.848	.066
Interviewer	-.039	.033	-.089	-1.189	.236
NHK_M/F	.012	.155	.006	.074	.941
NHK_Age	-.083	.141	-.044	-.590	.556
NHK_Income	.005	.129	.003	.037	.971

a. Dependent Variable: 5. How would you response if you feel the lighting here is too bright? (multiple responses)

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.014	1.711		1.762	.080
Month	-.050	.186	-.031	-.270	.787
Day	.002	.014	.016	.172	.864
Time	-.033	.050	-.049	-.664	.508
Holiday	.056	.159	.027	.354	.724
Location	-.061	.068	-.093	-.907	.365
Interviewer	.048	.033	.110	1.465	.145
NHK_M/F	-.099	.156	-.047	-.633	.528
NHK_Age	.041	.141	.022	.291	.771
NHK_Income	-.136	.130	-.082	-1.047	.296

a. Dependent Variable: 6. How would you response if you feel the lighting here is too dim? (multiple responses)

Table 46 Paired samples test for reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = None)

Q15.Are you a local resident or a tourist?		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Tourist	Pair 1 5.How would you response if you feel the lighting here is too bright? (multiple responses) - 6.How would you response if you feel the lighting here is too dim? (multiple responses)	-.009542	1.0572	.06532	-.1382	.1191	-.146	261	.884
Local	Pair 1 5.How would you response if you feel the lighting here is too bright? (multiple responses) - 6.How would you response if you feel the lighting here is too dim? (multiple responses)	.053435	1.0904	.04261	-.0302	.1371	1.254	654	.210

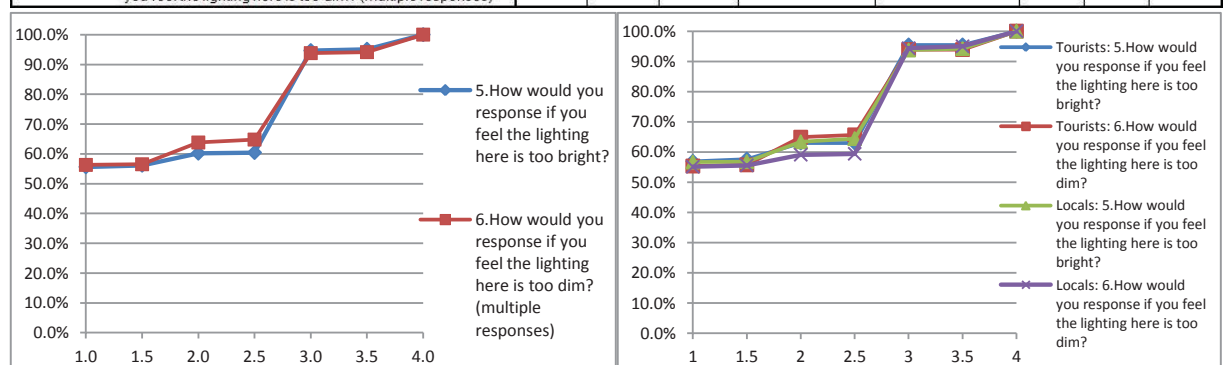


Figure 16 Reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = None)

Table 47 Paired samples test for reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = W1 & W3)

Paired Samples Test											
Q15.Are you a local resident or a tourist?					Paired Differences				t	df	Sig. (2-tailed)
					Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
					Lower	Upper					
Tourist	Pair 1	5. How would you response if you feel the lighting here is too bright? (multiple responses) - 6.How would you response if you feel the lighting here is too dim? (multiple responses)		.027356	1.085	.06809	-.1067	.1614	-.402	253	.688
Local	Pair 1	5. How would you response if you feel the lighting here is too bright? (multiple responses) - 6.How would you response if you feel the lighting here is too dim? (multiple responses)		.045878	1.067	.04166	-.0359	.1277	1.101	655	.271

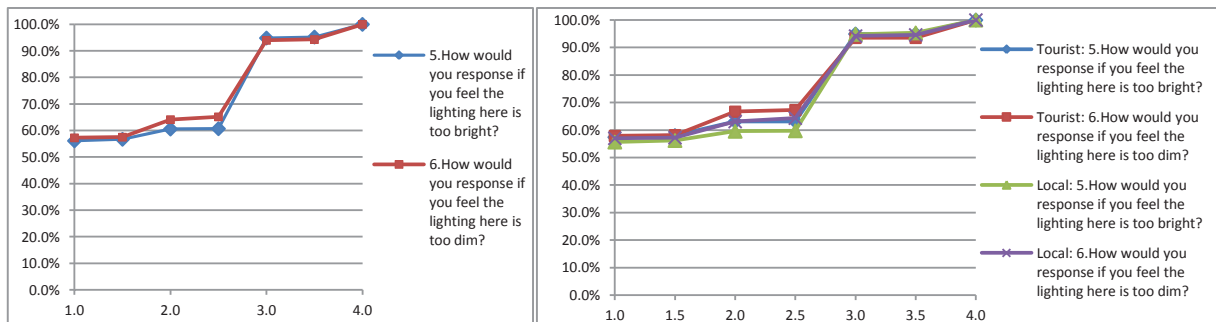


Figure 17 Reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = W1 & W3)

Table 48 Paired samples test for reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = W2 & W3)

Paired Samples Test										
Q15. Are you a local resident or a tourist?		Paired Differences					t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Tourist	Pair 1	5. How would you response if you feel the lighting here is too bright? (multiple responses) - 6. How would you response if you feel the lighting here is too dim? (multiple responses)	.02736	1.0850	.06809	-.1067	.1614	.402	253	.688
Local	Pair 1	5. How would you response if you feel the lighting here is too bright? (multiple responses) - 6. How would you response if you feel the lighting here is too dim? (multiple responses)	.05555	1.0935	.04779	-.03834	.1494	1.162	523	.246

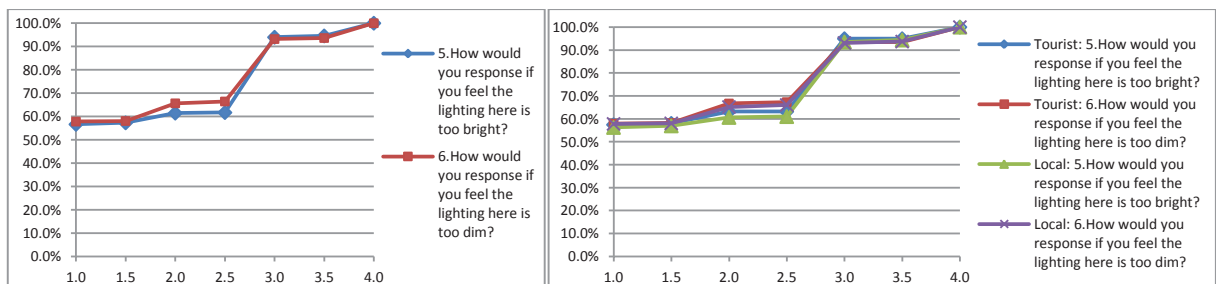


Figure 18 Reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = W2 & W3)

Table 49 Paired samples test for reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = W1 & W2 & W3)

Paired Samples Test									
Q15. Are you a local resident or a tourist?		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Tourist	Pair 1 5. How would you response if you feel the lighting here is too bright? (multiple responses) - 6. How would you response if you feel the lighting here is too dim? (multiple responses)	.02736	1.085	.0681	-.1067	.1614	.402	253	.688
Local	Pair 1 5. How would you response if you feel the lighting here is too bright? (multiple responses) - 6. How would you response if you feel the lighting here is too dim? (multiple responses)	.03693	1.067	.0463	-.0540	.1279	.798	531	.425

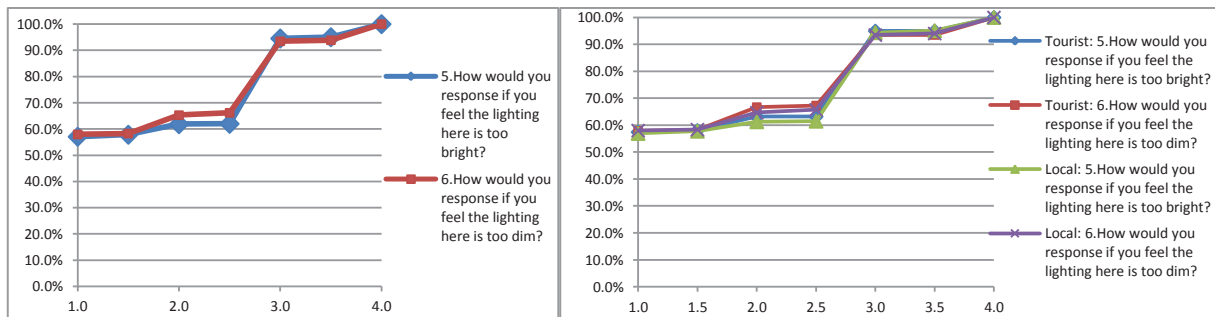


Figure 19 Reaction when feeling too bright and dim (categorised by local/ tourist) (Weight = W1 & W2 & W3)

Such a universality of reaction toward both brightness and darkness suggests that there is no difference for the malls to set the intensity of internal lighting toward either direction from optimal, and the potential penalty of dimming the mall would be limited, regardless of the nature and targeted group of customer of the mall.

This is in contrast to the result of an earlier research by Park and Farr (2007) which suggested that brighter lighting could attract more customers since it arouses people's attention.

6.2.External lighting

This section is intended to explore the effectiveness of external lighting on attracting the attention of visitors to the mall, to examine the strength of advertisement effect of the lighting and the possible cost of compliance for the malls to reduce the use of external lighting from the loss of advertisement effect and attractiveness to visitors, which could reduce the visitor flow.

All valid responses (n=1868) are utilised given that thermal history as well as the purpose of visit would not affect the respondents' awareness of the external lightings and there is no need to exclude those who have just arrived. Two distinct groups, local people (n=1514) and tourists (n=354), are identified based on their knowledge background about local attractions. Owing to the varied number of external lightings in different malls, the results are further sub-divided into seven groups according to the location of interview.

Table 50 Multiple regression on the awareness of external lighting

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.258 ^a	.067	.058	.4842

a. Predictors: (Constant), Q12. How long did you stay in this mall?, Holiday, Time, Interviewer, Location, Day, Q15. Are you a local resident or a tourist?, Month

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.219	8	1.902	8.114	.000 ^b
	Residual	212.879	908	.234		
	Total	228.098	916			

a. Dependent Variable: Q7.Is the external lighting (e.g. bill boards) of this mall able to make you aware of this place?

b. Predictors: (Constant), Q12. How long did you stay in this mall?, Holiday, Time, Interviewer, Location, Day, Q15. Are you a local resident or a tourist?, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.366	.426		-.860	.390
Month	.111	.054	.140	2.070	.039
Day	.003	.003	.061	1.249	.212
Time	.004	.010	.013	.403	.687
Holiday	-.024	.035	-.024	-.682	.496
Location	-.030	.016	-.109	-1.844	.065
Interviewer	.006	.006	.033	.992	.321
Q15. Are you a local resident or a tourist?	-.147	.040	-.133	-3.696	.000
Q12. How long did you stay in this mall?	.071	.016	.153	4.347	.000

a. Dependent Variable: Q7.Is the external lighting (e.g. bill boards) of this mall able to make you aware of this place?

Local sub-group

Tourist sub-group:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.182 ^a	.033	.014	.4963

a. Predictors: (Constant), Q12. How long did you stay in this mall?, Month, Time, HK_M/F, HK_Income, HK_Age, Interviewer, Holiday, Day, Location

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.322	10	.432	1.755	.066 ^b
Residual	126.356	513	.246		
Total	130.677	523			

a. Dependent Variable: Q7. Is the external lighting (e.g. bill boards) of this mall able to make you aware of this place?

b. Predictors: (Constant), Q12. How long did you stay in this mall?, Month, Time, HK_M/F, HK_Income, HK_Age, Interviewer, Holiday, Day, Location

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.236 ^a	.056	.005	.4580

a. Predictors: (Constant), Q12. How long did you stay in this mall?, NHH_Income, Day, Holiday, NHH_Age, NHH_M/F, Interviewer, Time, Location, Month

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2.308	10	.231	1.100	.364 ^b
Residual	39.022	186	.210		
Total	41.330	196			

a. Dependent Variable: Q7. Is the external lighting (e.g. bill boards) of this mall able to make you aware of this place?

b. Predictors: (Constant), Q12. How long did you stay in this mall?, NHH_Income, Day, Holiday, NHH_Age, NHH_M/F, Interviewer, Time, Location, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	-.200	.671			-.417	.677
Month	.090	.088			.112	1.018
Day	.003	.004	.063	.841	.400	
Time	.010	.014	.032	.725	.469	
Holiday	-.047	.050	-.047	.950	.343	
Location	-.014	.025	-.050	.537	.591	
Interviewer	.002	.010	.008	.178	.859	
NHH_M/F	-.009	.044	-.009	.196	.844	
NHH_Age	-.059	.026	-.101	2.276	.023	
NHH_Income	-.034	.031	-.049	1.089	.277	
Q12. How long did you stay in this mall?	.069	.023	.134	2.938	.003	

a. Dependent Variable: Q7. Is the external lighting (e.g. bill boards) of this mall able to make you aware of this place?

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	.606	.764			.792	.429
Month	.107	.083			.147	1.291
Day	.001	.006	.019	.198	.843	
Time	-.024	.022	-.082	1.089	.278	
Holiday	-.061	.070	-.066	.877	.382	
Location	-.083	.030	-.284	2.767	.006	
Interviewer	-.005	.015	-.028	.375	.708	
NHH_M/F	.010	.069	.011	.149	.882	
NHH_Age	-.038	.062	-.045	.606	.545	
NHH_Income	.017	.057	.023	.301	.764	
Q12. How long did you stay in this mall?	.028	.033	.065	.865	.388	

a. Dependent Variable: Q7. Is the external lighting (e.g. bill boards) of this mall able to make you aware of this place?

It is found that about half of the visitors are made aware of the mall by the external lighting in total (No Weight=50.5%, W1=50.4%, W2=51.5%, W1&W2=51.3%), and more tourists (No Weight=68.2%, With Weight=67.8%) are aware of it than locals (No Weight=46.4%, W1=46.4%, W2=46.9%, W1&W2=46.7%). When split into different locations, there appears to be a difference between different malls' external lighting effectiveness among the locals, in which respondents at the low-end malls tends to report the external lighting does not make them aware of the mall. Such a "class difference" among the malls is much less significant for the tourist sub-group since the low-end malls, where there are too few tourist responses for analysis, are excluded. Interestingly, when a weight of duration of staying in Hong Kong is added, the number of tourists made aware of Pacific Place by the external lighting becomes less than that of not made aware of.

6.2.1. Locational factor

While the class difference is insignificant, it is found that there is a locational influence on the ability of the external lighting in arousing the awareness of tourists on the mall, that visitors in different locations would be affected by the lighting to a different extent.

One possible explanation is the difference in amount of external lighting in different malls. For instance, there are more external lighting and advertisements in Harbour City than in Pacific Place. It could also be attributed to the way visitors enter the mall that the external lighting would not be able to attract visitors entering the mall from the MTR stations directly, which is

the case for Pacific Place. In contrast, the external lighting and advertisements are visible to visitors before they enter the mall in Harbour City.

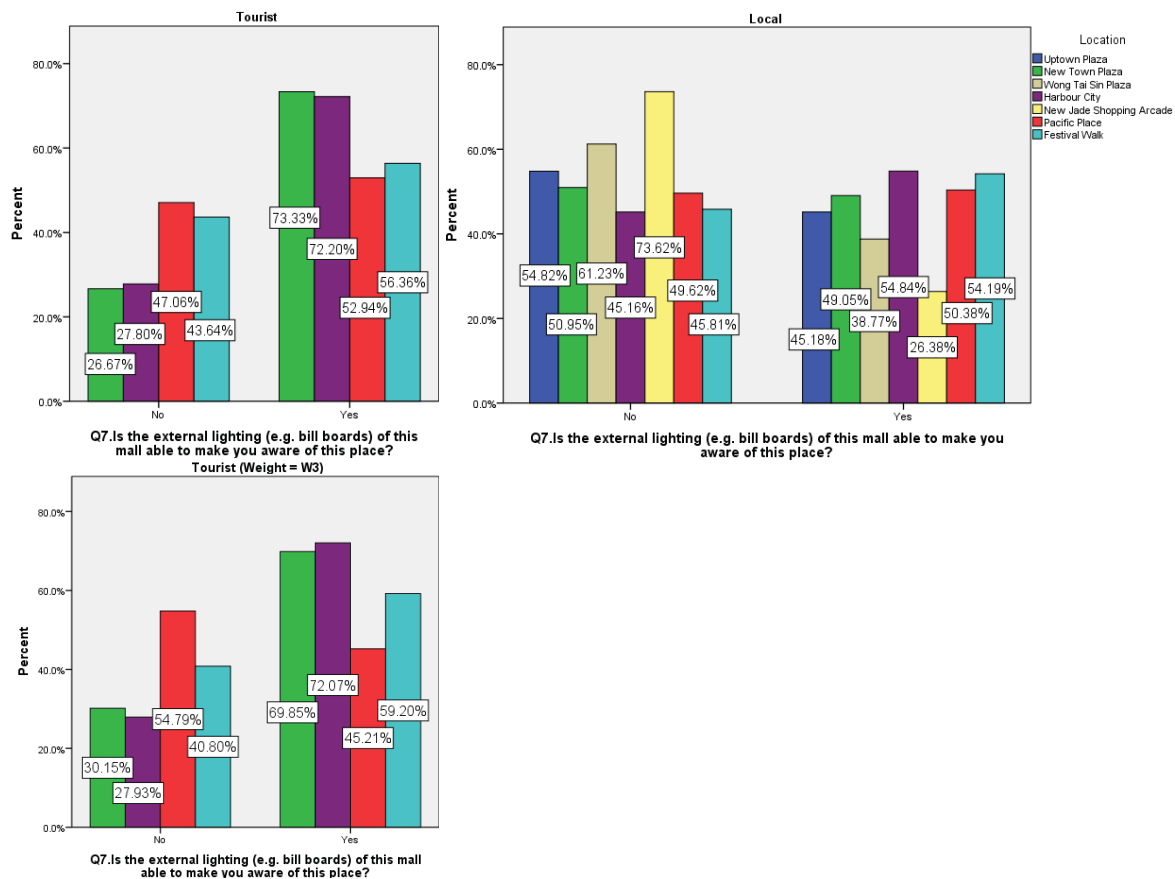


Figure 20 Awareness of the external lighting (categorised by local/ tourist) (Weight = None, W3)

6.2.2. Tourist/ local distinction

It is recognised that external lighting is more effective in arousing the awareness of tourists than locals to the presence of the mall. This could be a result of the difference in knowledge about the existence of the mall. While tourists are not aware of the existence of the mall on the first hand and external lighting could serve as an icon of the mall, the locals have been aware of, through other sources such as advertisements and social network, and external lighting is of limited effectiveness in attracting local visitors. This suggests that information from alternative channels and differences in knowledge background could affect the effectiveness of external lighting in arousing visitors' awareness toward the mall.

6.2.3. Duration of stay

An interesting finding is that local respondents who have stayed for a longer time are also more made aware of the mall by the external lighting. However, such an influence of duration of stay no longer exists when split into different locations, suggesting that this could be an illusion of the locational effect, in which people tends to stay longer in the higher-end malls, which also have more external lighting.

Cost of compliance of reducing the amount of external lighting

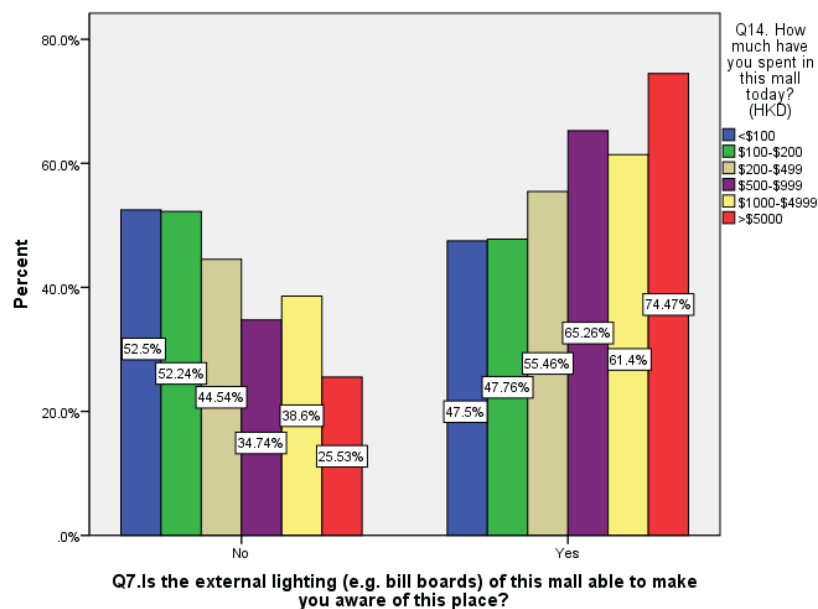


Figure 21 Visitors' awareness of external lighting categorised by expenditure

Consider the higher amount of spending by tourists than by locals the result suggests that a reduction in the utilisation of external lighting could lead to a more serious reduction in revenue for malls with a higher proportion of visitors being tourists since tourists are more attracted by the external lighting. Therefore, the cost of compliance would be higher for such malls which are, incidentally, high-end malls that the average expenditure by each visitor is higher.

This does not imply that the policy should focus on reducing the amount of external lighting in lower-end malls with a small proportion of tourists though since these malls are nevertheless malls with, incidentally, fewer external lighting, suggesting that any reduction would not contribute much to the energy bill. With the apparent positive correlation between the amount of external lighting and their ability in arousing the visitors' awareness of the mall, it seems that the

cost of compliance and potential benefits would be in positive correlation as well for the reduction of utilisation of external lighting.

Chapter 7 Implementation of voluntary agreements

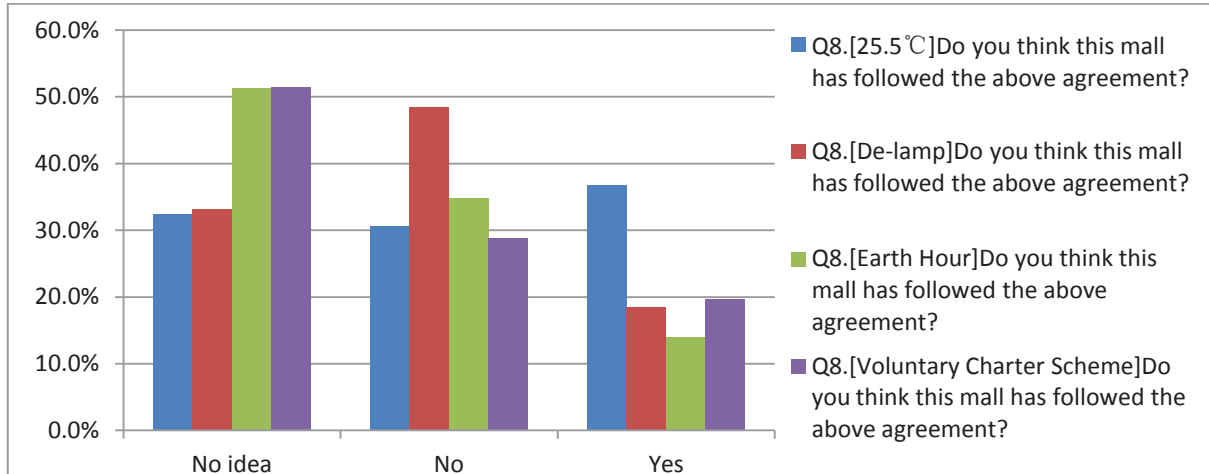
This section is intended to explore the perception of visitors on the easiness of information acquisition about participation of shopping malls in the voluntary agreements, as well as the potential penalty by the visitors should the shopping malls failed to adhere the agreements.

All valid responses (n=1868) are utilised given that such perception has no relation to the time and money spent in the shopping mall, as well as the purpose of visit. Two distinct groups, local people (n=1514) and tourists (n=354), are identified for further examination as in previous sections. Three weights are added to the two sub-groups respectively.

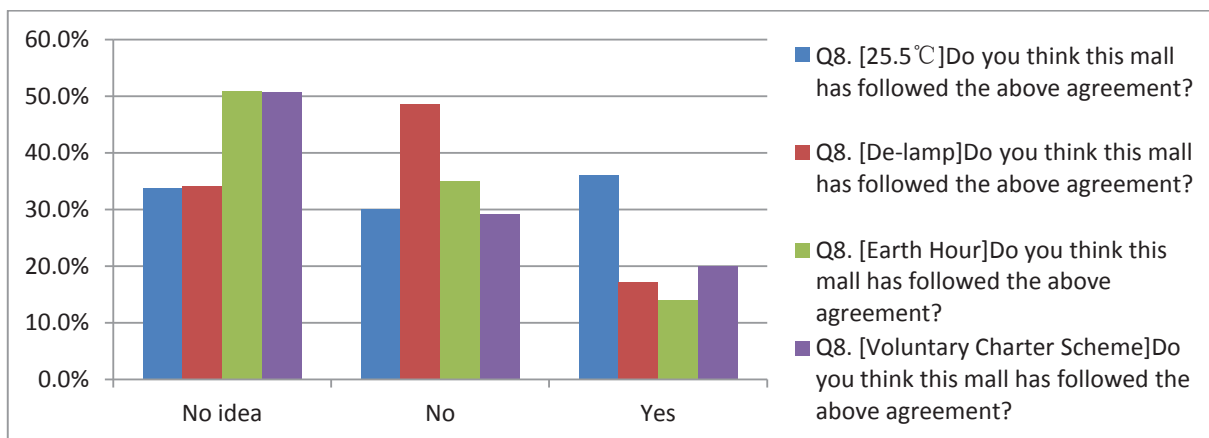
7.1.Perception to the participation of malls in the campaigns

An introductory question is set to introduce to the respondents about the four selected voluntary agreements to prepare them for the upcoming evaluation of the agreements, as well as to find out their perception on the participation of the malls in the agreements and examine the easiness of recognition through daily observation to the mall. It is found that the awareness on the campaigns of 25.5°C and De-lamp are significantly higher than that of Earth Hour and External lighting reduction. There is no significant difference between the two sub-groups, tourists and locals in general, though. However, there are more locals perceiving that the malls did not join the campaigns of De-lamp and Earth Hour. There is no significant difference in the results when weights are added. Other than a correlation with the interviewer in questions about the 25.5°C and Voluntary Charter Scheme and a correlation between the perceived air temperature and perception on the mall's participation in the campaign of 25.5°C within the local subgroup, no single factor is able to predict the responses. The influence of the perceived air temperature suggests that the correlation with interviewer for the campaign of 25.5°C could be a result of the spot of deployment that respondents at warmer spots would tend to perceive the mall has participated in the campaign.

Weight = None



Weight = W1 & W3



Weight = W2 & W3

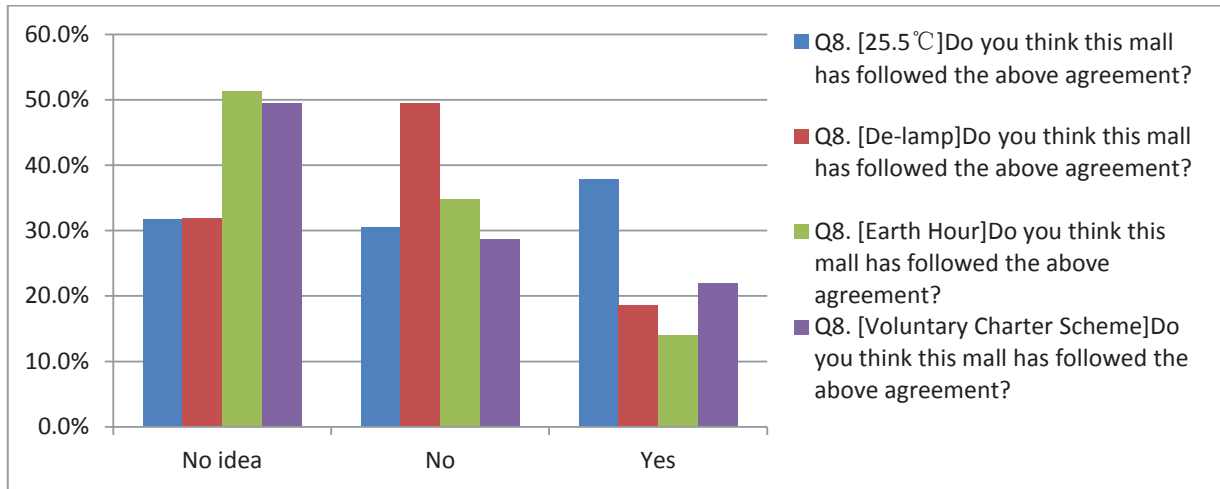
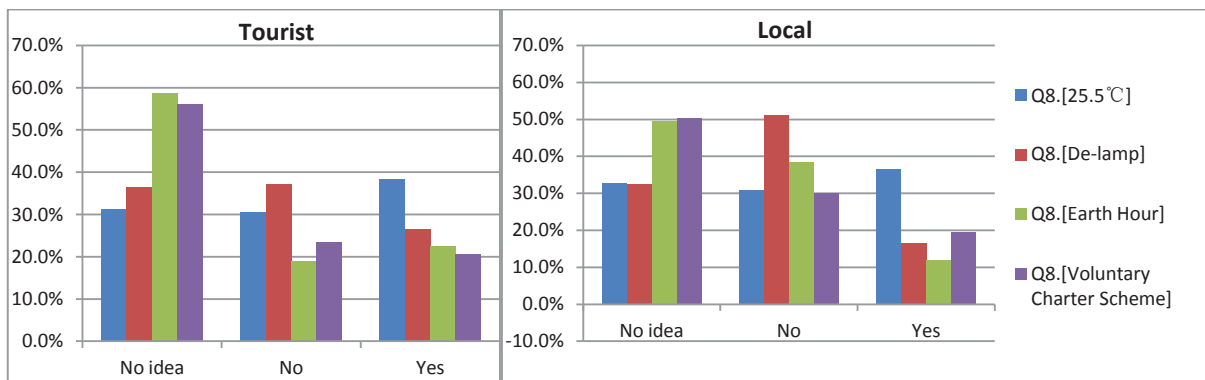
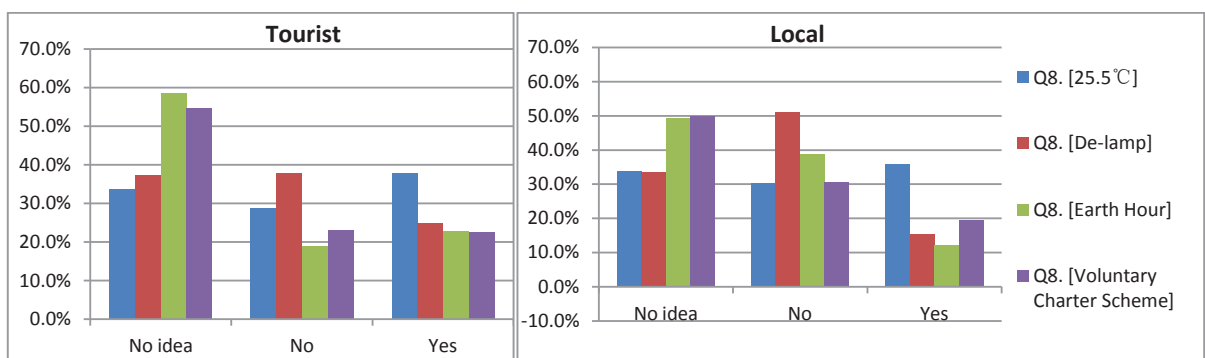


Figure 22 Perception on the mall's participation in the four voluntary agreements

Weight = None



Weight = W1 & W3



Weight = W2 & W3

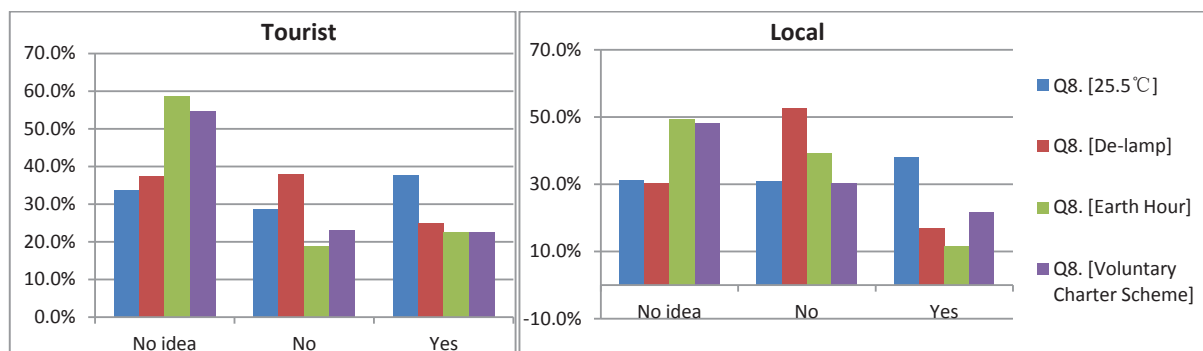


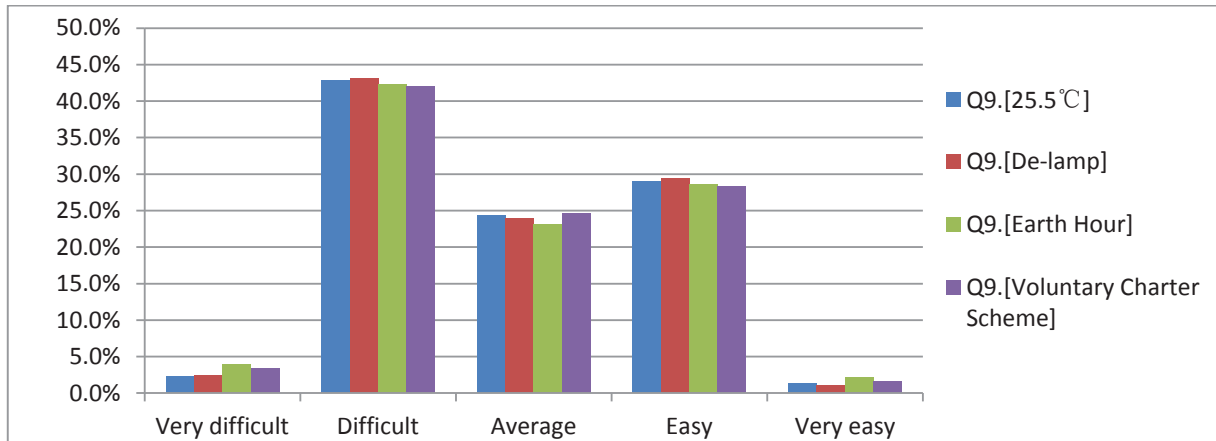
Figure 23 Perception on the mall's participation in the four voluntary agreements sorted by local/ tourist

This suggests that people could be more sensitive to events with direct exposure, including air temperature and internal brightness, while they may be less sensitive to those not directly exposed to. The survey was conducted during summer, while the Earth Hour campaign was held in March; whereas not all respondents were able to see the external lightings since some of the malls are directly linked to MTR stations. In addition, the respondents may be unaware of the Voluntary Charter Scheme on external lighting reduction since the campaign has yet started. Besides, there may be a difference in the perception to lightings between tourists and locals since more locals believed that the mall did not join the lighting programmes and reduce their use of lighting.

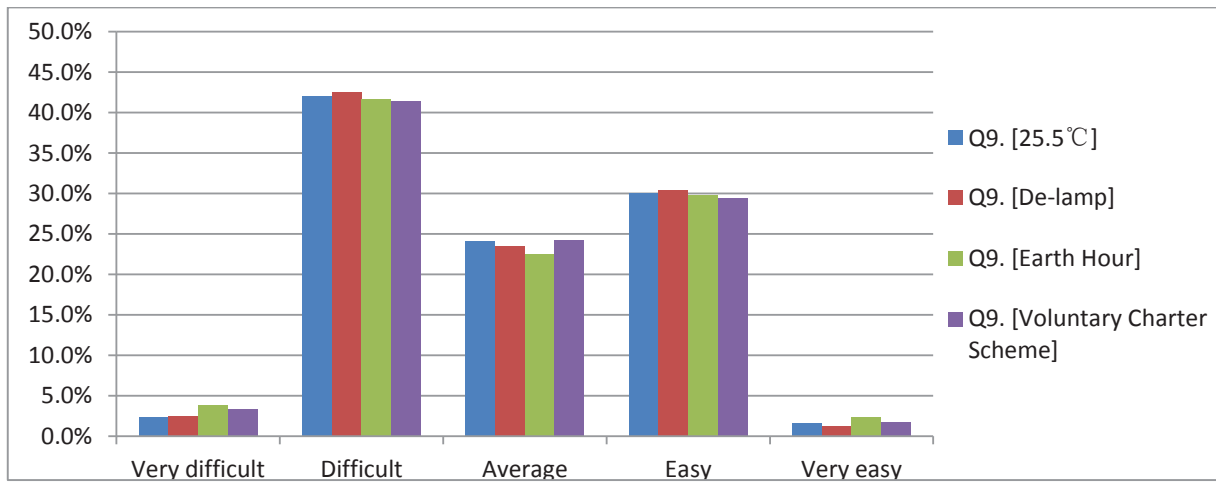
7.2.Easiness of information acquisition

Contrary to the hypothesis, there is a high homogeneity on the perception of visitors on the easiness of knowing about the mall's participation on all four voluntary agreements. There is a tendency that respondents believe it is difficult to acquire the information (means=2.844, 2.839, 2.829, 2.826, under a scale of 1-5, with 1 denoting very difficult and 5 very easy)

Weight = None



Weight = W1 & W3



Weight = W2 & W3

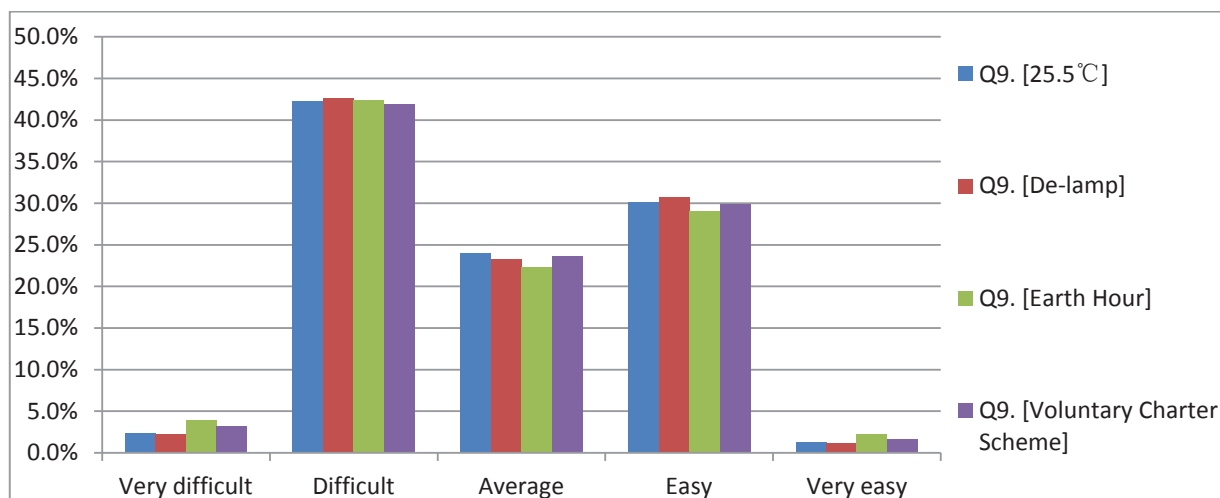
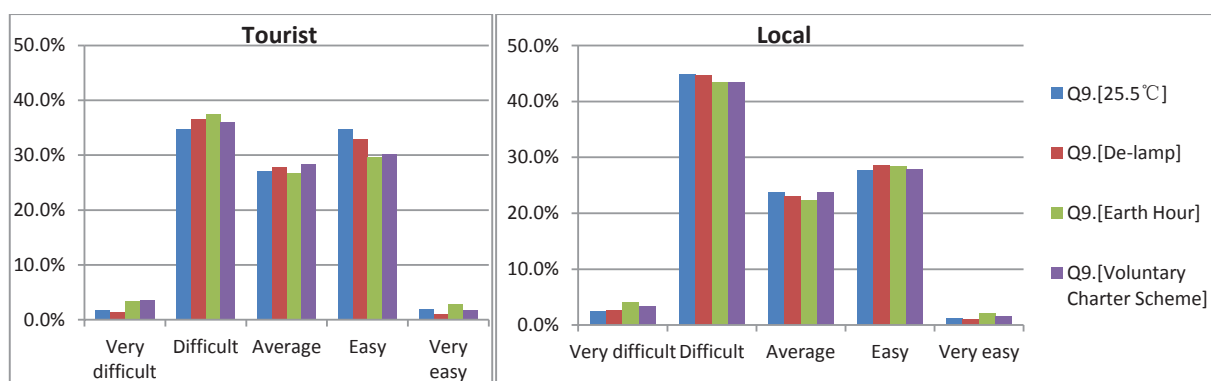


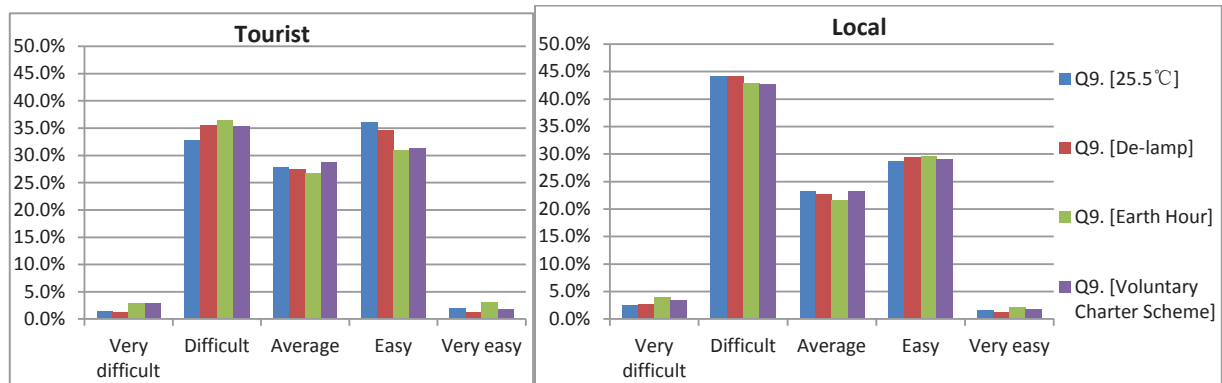
Figure 24 Perception on the easiness of acquiring information about the mall's participation in the agreements

Such a high homogeneity can be found in both groups: tourists and locals, while the easiness perceived vary among the two groups. More tourists perceive it is easy to acquire the information compare to locals, and there is a significant difference between the perception of the two groups over the campaigns of 25.5°C and De-lamp (two-tailed sig. = 0.000, 0.005), and the result is the same after weightings are added (two-tailed sig. = 0.000, 0.002).

Weight = None



Weight = W1 & W3



Weight = W2 & W3

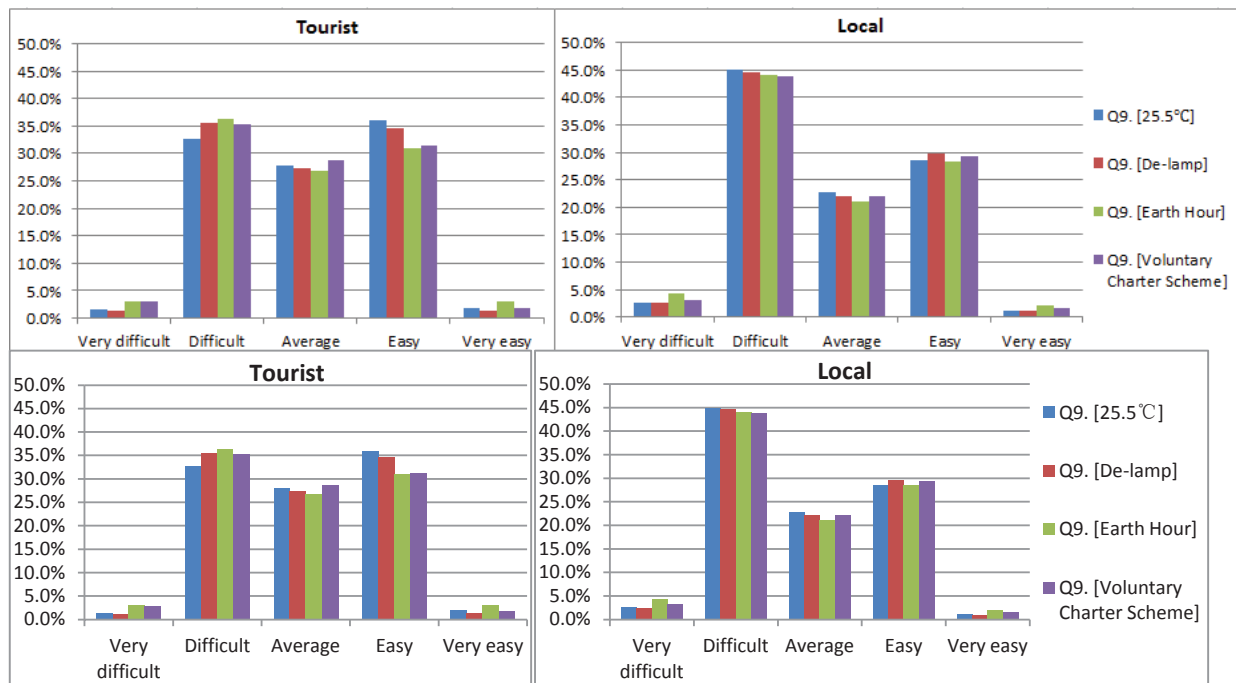


Figure 25 Easiness of acquiring information sorted by local/ tourist

Table 51 Statistics of the perceived easiness of acquiring information sorted by local/tourist

Weight = None

		N	Mean	Std. Deviation	Std. Error Mean
Q9.[25.5°C]	Local	1514	2.805	.9146	.0235
	Tourist	354	3.008	.9172	.0487
Q9.[De-lamp]	Local	1514	2.806	.9185	.0236
	Tourist	354	2.960	.8929	.0475
Q9.[Earth Hour]	Local	1514	2.810	.9617	.0247
	Tourist	354	2.912	.9555	.0508
Q9.[Voluntary Charter Scheme]	Local	1514	2.808	.9351	.0240
	Tourist	354	2.904	.9322	.0495

Weight = W1 & W3

		N	Mean	Std. Deviation	Std. Error Mean
Q9. [25.5°C]	Local	1513	2.828	.9275	.0238
	Tourist	345	3.042	.9073	.0489
Q9. [De-lamp]	Local	1513	2.823	.9270	.0238
	Tourist	345	2.991	.8976	.0483
Q9. [Earth Hour]	Local	1513	2.830	.9704	.0249
	Tourist	345	2.947	.9542	.0514
Q9. [Voluntary Charter Scheme]	Local	1513	2.828	.9440	.0243
	Tourist	345	2.935	.9219	.0496

Weight = W2 & W3

		N	Mean	Std. Deviation	Std. Error Mean
Q9. [25.5°C]	Local	1219	2.806	.9204	.0264
	Tourist	345	3.042	.9073	.0489
Q9. [De-lamp]	Local	1219	2.821	.9241	.0265
	Tourist	345	2.991	.8976	.0483
Q9. [Earth Hour]	Local	1219	2.799	.9697	.0278
	Tourist	345	2.947	.9542	.0514
Q9. [Voluntary Charter Scheme]	Local	1219	2.823	.9437	.0270
	Tourist	345	2.935	.9219	.0496

Contrary to direct sensation, more effort is needed to observe the participation of the mall in search for the related information. Information disclosure of the shopping malls and the campaign organisers also affect the easiness of information acquisition. Therefore, the relative ease of detecting the temperature and brightness changes become irrelevant here and the difference between the campaigns become insignificant. However, temporal difference could remain a significant factor here with the perceived easiness for acquiring information about the participation in the campaign of Earth Hour being less than expected. Besides, it can be attributed to the human nature that a person's perception on the easiness of observation would be the same for events of similar nature.

The result also suggests that there is no significant difference among the voluntary campaigns on the perceived easiness of information acquisition for the public. Instead, it would be affected by other factors, such as the perception to the mall operator and knowledge about access to information.

A multiple regression is conducted for each agreement to examine whether there are any significant factors influencing the response and find out the main predictor. The perceived temperature is added particularly to the campaign of 25.5°C to examine any possible relationship between them.

Table 52 Multiple regression on the perceived easiness of information acquisition about the mall participation in the VAs

Campaign: 25.5°C

Campaign: De-lamp

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.111 ^a	.012	.005	.9145

a. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3). Holiday, Interviewer, Time, Q15. Are you a local resident or a tourist?, Location, Day, Month

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	19.326	8	2.416	2.888	.003 ^a
Residual	1555.030	1859	.836		
Total	1574.355	1867			

a. Dependent Variable: Q9. [25.5°C]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3). Holiday, Interviewer, Time, Q15. Are you a local resident or a tourist?, Location, Day, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	3.327	.593			5.610	.000
Month	-.036	.078	-.025		-.467	.640
Day	-.005	.004	-.047		-1.216	.224
Time	.003	.013	.005		.235	.814
Holiday	.065	.048	.036		1.376	.169
Location	-.012	.022	-.025		-.554	.580
Interviewer	.001	.008	.002		.089	.929
Q15. Are you a local resident or a tourist?	.233	.057	.100		4.091	.000
Q1. Please indicate your perceived air temperature in this shopping mall from cold (-3) to hot (3).	.018	.018	.023		.993	.321

a. Dependent Variable: Q9. [25.5°C]How difficult/ easy is it to know whether the mall has joined the above agreement?

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.086 ^a	.008	.004	.9136

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	12.035	7	1.719	2.060	.045 ^b
Residual	1552.511	1860	.835		
Total	1564.546	1867			

a. Dependent Variable: Q9. [De-lamp]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	2.850	.592			4.811	.000
Month	.044	.078	.030		.570	.569
Day	-.003	.004	-.032		-.814	.416
Time	-.006	.013	-.010		-.415	.678
Holiday	.056	.047	.030		1.172	.241
Location	-.021	.022	-.042		-.938	.348
Interviewer	-.006	.008	-.017		-.709	.478
Q15. Are you a local resident or a tourist?	-.150	.056	-.064		-2.673	.008

a. Dependent Variable: Q9. [De-lamp]How difficult/ easy is it to know whether the mall has joined the above agreement?

Campaign: Earth Hour

Campaign: Voluntary Charter Scheme on external

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.092 ^a	.008	.005	9588

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	14.584	7	2.083	2.266	.027 ^b
Residual	1709.940	1860	.919		
Total	1724.524	1867			

a. Dependent Variable: Q9. [Earth Hour]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	3.033	.622		4.879	.000
Month	-.022	.081	-.014	-.268	.789
Day	-.008	.004	-.076	-1.957	.051
Time	.011	.014	.018	.784	.433
Holiday	.096	.050	.050	1.936	.053
Location	-.006	.024	-.012	-.266	.790
Interviewer	-.008	.008	-.022	-.926	.354
Q15. Are you a local resident or a tourist?	-.118	.059	-.048	-2.012	.044

a. Dependent Variable: Q9. [Earth Hour]How difficult/ easy is it to know whether the mall has joined the above agreement?

lighting reduction

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.063 ^a	.007	.003	9336

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	11.183	7	1.596	1.833	.077 ^b
Residual	1621.273	1860	.872		
Total	1632.456	1867			

a. Dependent Variable: Q9. [Voluntary Charter Scheme]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	2.292	.605		3.787	.000
Month	.079	.079	.053	.997	.319
Day	.002	.004	.025	.653	.514
Time	.013	.014	.022	.939	.348
Holiday	.037	.048	.020	.767	.443
Location	-.045	.023	-.089	-1.973	.049
Interviewer	-.008	.008	-.024	-1.008	.314
Q15. Are you a local resident or a tourist?	-.105	.057	-.044	-1.848	.065

a. Dependent Variable: Q9. [Voluntary Charter Scheme]How difficult/ easy is it to know whether the mall has joined the above agreement?

It was revealed that there is no single significant external factor that could be a predictor on the result except the tourist/local distinction. The different perception by tourists and locals, in which tourists tend to perceive it to be easier as aforementioned, could be attributed to the varied perception and understanding about local management companies. While the locals would have better knowledge about the ownership of the shopping mall and channels to access the information, the perception on the easiness of information acquisition may be affected by the past experience and perception on the management team's behaviour. Besides, since tourists could bring more revenue to the malls, it is possible that the mall managers would have an intention to serve the tourists better which give them a better position for information acquisition.

Table 53 Multiple regression on the perceived easiness of information acquisition about the mall participation in the VAs

Campaign: 25.5°C

Campaign: De-lamp

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.130 ^a	.017	.009	.9120

a. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.144	9	1.905	2.290	.015 ^b
	Residual	1004.666	1208	.832		
	Total	1021.810	1217			

a. Dependent Variable: Q9. [25.5°C]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.124 ^a	.015	.008	.9190

a. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.982	9	1.776	2.103	.027 ^b
	Residual	1020.190	1208	.845		
	Total	1036.172	1217			

a. Dependent Variable: Q9. [De-lamp]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.880	.821		3.509	.000
Month	-.052	.111	-.035	-.465	.642
Day	-.001	.005	-.006	-.104	.917
Time	.000	.016	.000	.017	.987
Holiday	.027	.062	.015	.436	.663
Location	-.015	.031	-.031	-.490	.624
Interviewer	.011	.011	.030	1.038	.300
HK_M/F	-.040	.053	-.022	-.758	.449
HK_Age	.083	.031	.078	2.708	.007
HK_Income	.089	.038	.068	2.342	.019

a. Dependent Variable: Q9. [25.5°C]How difficult/ easy is it to know whether the mall has joined the above agreement?

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.065	.827		2.497	.013
Month	.083	.112	.056	.739	.460
Day	.002	.005	.019	.347	.728
Time	-.007	.016	-.012	-.406	.685
Holiday	.037	.062	.020	.599	.549
Location	-.040	.031	-.079	-1.263	.207
Interviewer	.009	.011	.024	.828	.408
HK_M/F	-.010	.054	-.005	-.189	.850
HK_Age	.071	.031	.066	2.308	.021
HK_Income	.116	.038	.088	3.028	.003

a. Dependent Variable: Q9. [De-lamp]How difficult/ easy is it to know whether the mall has joined the above agreement?

Campaign: Earth Hour
lighting reduction

Campaign: Voluntary Charter Scheme on external

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.091 ^a	.008	.001	.9627

a. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.339	9	1.038	1.120	.345 ^b
	Residual	1119.571	1208	.927		
	Total	1128.911	1217			

a. Dependent Variable: Q9. [Earth Hour]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	3.214	.866		3.710	.000
Month	-.079	.117	-.051	-.669	.503
Day	-.007	.005	-.072	-1.335	.182
Time	.002	.017	.003	.097	.923
Holiday	.067	.065	.035	1.029	.304
Location	.001	.033	.002	.033	.973
Interviewer	.003	.012	.008	.264	.792
HK_M/F	.007	.056	.003	.118	.906
HK_Age	.008	.032	.007	.243	.808
HK_Income	.092	.040	.067	2.308	.021

a. Dependent Variable: Q9. [Earth Hour]How difficult/ easy is it to know whether the mall has joined the above agreement?

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.110 ^a	.012	.005	.9395

a. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.010	9	1.446	1.638	.100 ^b
	Residual	1066.310	1208	.883		
	Total	1079.320	1217			

a. Dependent Variable: Q9. [Voluntary Charter Scheme]How difficult/ easy is it to know whether the mall has joined the above agreement?

b. Predictors: (Constant), HK_Income , Time, Day, HK_Age , HK_M/F , Location, Interviewer, Holiday, Month

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	2.331	.845		2.757	.006
Month	.038	.115	.025	.332	.740
Day	.004	.005	.042	.777	.437
Time	.007	.017	.012	.413	.680
Holiday	-.008	.064	-.004	-.125	.901
Location	-.050	.032	-.097	-1.549	.122
Interviewer	.003	.011	.007	.246	.806
HK_M/F	.056	.055	.030	1.020	.308
HK_Age	.013	.032	.012	.424	.671
HK_Income	.096	.039	.071	2.457	.014

a. Dependent Variable: Q9. [Voluntary Charter Scheme]How difficult/ easy is it to know whether the mall has joined the above agreement?

In addition, within the local sub-group, there is a significant difference in the perceived level of easiness between respondents with different income levels, particularly for the two campaigns of De-lamp and Voluntary Charter Scheme, and income level becomes a predictor of the result. The high income group perceived the information acquisition to be easier than the low and middle income groups. There is also a trend that the higher the income, the more easy it is to acquire information about the mall's participation in the campaign as perceived by the local people (Table 54). This may be attributed to the better access to different information channels by the higher income group, and possibly the greater awareness of the environment related programmes.

Age could also be a predictor in affecting the perceived easiness in the campaigns of 25.5°C and De-lamp, that older people tend to perceive it to be easier to acquire the information than the younger generation. However, gender does not play a significant role on influencing the perception of the respondents for all campaigns.

Table 54 Mean values of perceived easiness of information acquisition categorised by income group

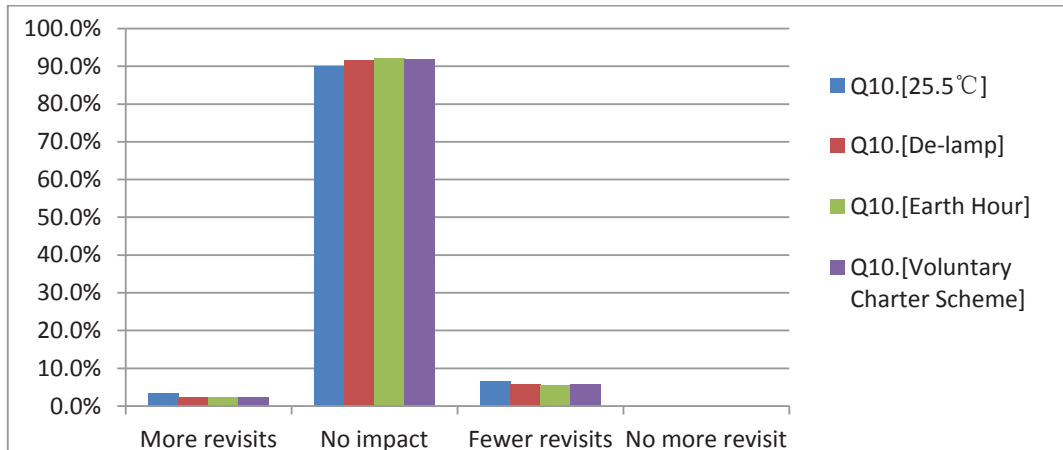
Weight = W2

	HK Income	N	Mean	Std. Deviation	Std. Error
Q9. [25.5°C]	<\$30000	704	2.754	.9213	.0347
	\$30000-\$60000	321	2.845	.8937	.0499
	>\$60000	194	2.929	.9498	.0681
Q9. [De-lamp]	<\$30000	704	2.763	.9137	.0344
	\$30000-\$60000	321	2.816	.9193	.0513
	>\$60000	194	3.039	.9414	.0675
Q9. [Earth Hour]	<\$30000	704	2.754	.9792	.0369
	\$30000-\$60000	321	2.800	.9246	.0516
	>\$60000	194	2.961	.9953	.0714
Q9. [Voluntary Charter Scheme]	<\$30000	704	2.785	.9333	.0352
	\$30000-\$60000	321	2.769	.9342	.0522
	>\$60000	194	3.052	.9681	.0694

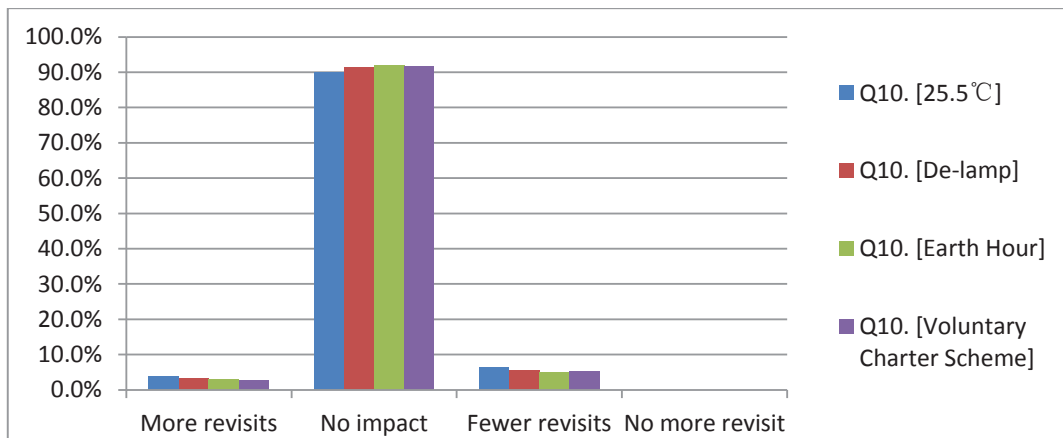
7.3.Potential penalty of non-compliance

There is an even higher homogeneity on the potential penalty by the visitors to the malls when failed to adhere the agreements, referring to the propensity of resurrection of the visitors. Such potential penalty is negligible (means=0.036, 0.040, 0.034, 0.039, under a scale of -1-2, with -1 denoting more revisits, 0 no impact, 1 fewer revisits and 2 no revisit) with most of the respondents claiming that there is no impact on their resurrection decision should the mall failed to adhere the agreement. The result has no significant difference after adding weights to the data.

Weight = None



Weight = W1 & W3



Weight = W2 & W3

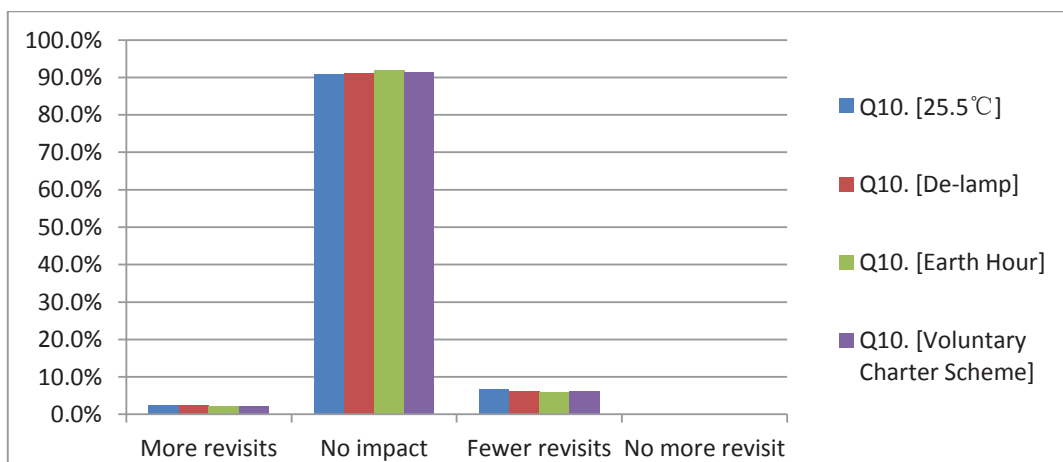


Figure 26 Voluntary penalty to the mall for failing to adhere the agreements

Similarly, such a high homogeneity can be found in both groups: tourists and locals, while the level of potential penalty varies. With the potential penalty by tourists being higher than that of locals, there is a significant difference among the two groups on the potential penalty of failing to adhere the campaigns of 25.5°C, De-lamp and Earth Hour, in which the reduction of resurrection by the tourist group would give more potential penalty to the shopping mall when no weighting or W1 & W3 are added. However, when W2 & W3 are added, the differences for 25.5°C and De-lamp become insignificant. Still, the penalty for not joining the campaign of Earth Hour by tourists is significantly higher than by locals.

Table 55 Statistics of voluntary penalty to the mall sorted by local/ tourist

Weight = None

		N	Mean	Std. Deviation	Std. Error
Q10.[25.5°C]	Local	1514	.022	.3055	.0079
	Tourist	354	.093	.3685	.0196
Q10. [De-lamp]	Local	1514	.028	.2860	.0074
	Tourist	354	.088	.3461	.0184
Q10.[Earth Hour]	Local	1514	.021	.2688	.0069
	Tourist	354	.090	.3495	.0186
Q10.[Voluntary Charter Scheme]	Local	1514	.032	.2775	.0071
	Tourist	354	.071	.3418	.0182

Weight = W1 & W3

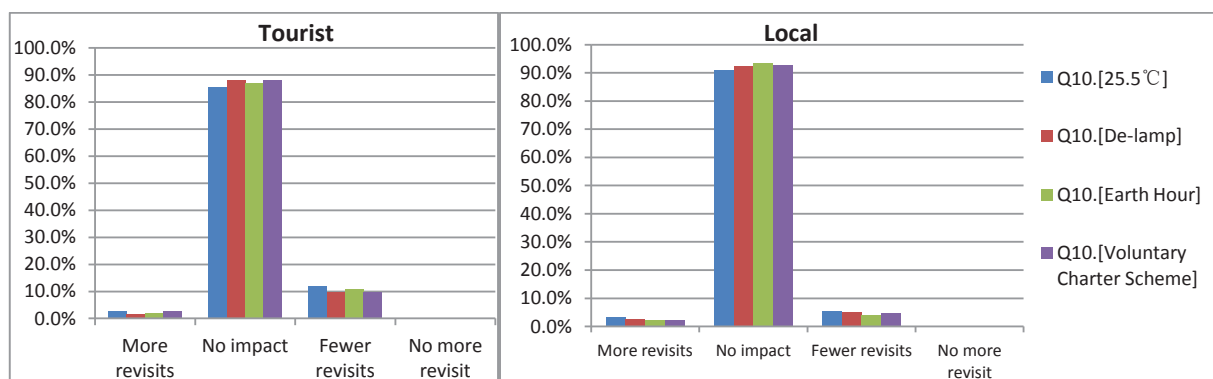
		N	Mean	Std. Deviation	Std. Error
Q10. [25.5°C]	Local	1513	.015	.3174	.0082
	Tourist	345	.087	.3423	.0184
Q10. [De-lamp]	Local	1513	.016	.3010	.0077
	Tourist	345	.083	.3382	.0182
Q10. [Earth Hour]	Local	1513	.010	.2850	.0073

	Tourist	345	.085	.3275	.0176
Q10. [Voluntary Charter Scheme]	Local	1513	.021	.2889	.0074
	Tourist	345	.068	.3251	.0175

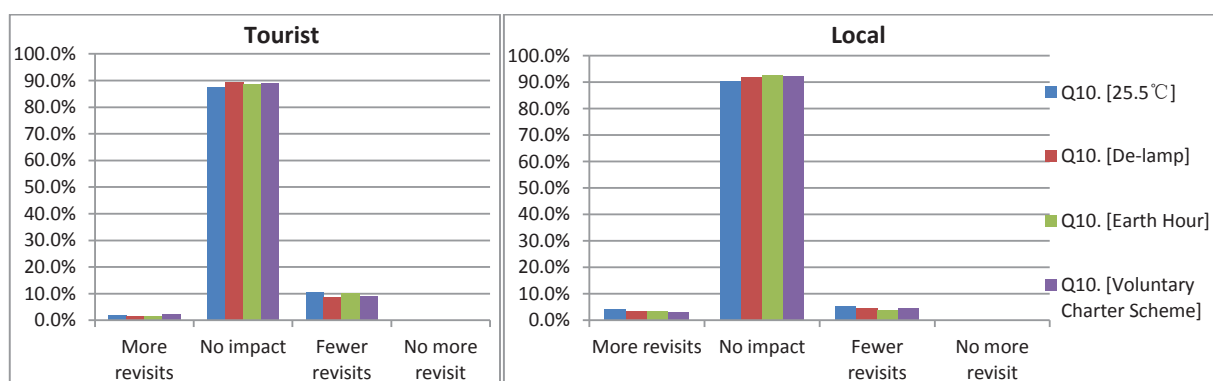
Weight = W2 & W3

		N	Mean	Std. Deviation	Std. Error
Q10. [25.5°C]	Local	1219	.031	.2929	.0084
	Tourist	345	.087	.3423	.0184
Q10. [De-lamp]	Local	1219	.034	.3009	.0086
	Tourist	345	.083	.3382	.0182
Q10. [Earth Hour]	Local	1219	.027	.2842	.0081
	Tourist	345	.085	.3275	.0176
Q10. [Voluntary Charter Scheme]	Local	1219	.038	.2963	.0085
	Tourist	345	.068	.3251	.0175

Weight = None



Weight = W1 & W3



Weight = W2 & W3

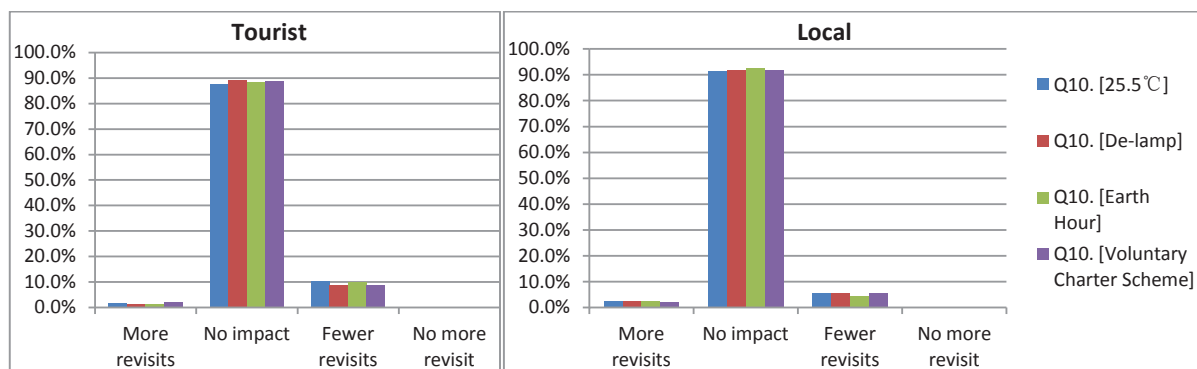


Figure 27 Voluntary penalty to the mall for failing to adhere the agreements sorted by local/ tourist

Table 56 Multiple regression on the potential voluntary penalty to the mall on non-compliance

Campaign: 25.5°C

Campaign: De-lamp

Model Summary						Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.119 ^a	.014	.011	.3178		1	.136 ^a	.018	.015	.2969	
a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month						a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month					
ANOVA ^a						ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.	Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2.711	7	.387	3.834	.000 ^a	1 Regression	3.084	7	.441	4.998	.000 ^a
Residual	187.886	1860	.101			Residual	163.984	1860	.088		
Total	190.597	1867				Total	167.068	1867			
a. Dependent Variable: Q10. [25.5°C]Would your plan of revisit be affected if the mall did not join the above agreement?						a. Dependent Variable: Q10. [De-lamp]Would your plan of revisit be affected if the mall did not join the above agreement?					
b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month						b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month					
Coefficients ^a						Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients			Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.		B	Std. Error	Beta	t	Sig.
1 (Constant)	-.031	.206		-.151	.880	1 (Constant)	-.102	.193		-.529	.597
Month	.025	.027		.049	.921	Month	.033	.025		.069	1.308
Day	-.002	.001		-.046	1.180	Day	-.001	.001		-.040	1.033
Time	-.002	.005		-.012	.510	Time	-.004	.004		-.020	.841
Holiday	-.001	.017		-.002	.072	Holiday	-.004	.015		-.006	.250
Location	-.001	.008		-.008	.168	Location	.003	.007		.018	.413
Interviewer	.001	.003		.010	.425	Interviewer	.002	.003		.017	.731
Q15. Are you a local resident or a tourist?	-.061	.020		-.075	3.143	Q15. Are you a local resident or a tourist?	-.043	.018		-.057	2.386
a. Dependent Variable: Q10. [25.5°C]Would your plan of revisit be affected if the mall did not join the above agreement?						a. Dependent Variable: Q10. [De-lamp]Would your plan of revisit be affected if the mall did not join the above agreement?					

Campaign: Earth Hour
lighting reduction

Campaign: Voluntary Charter Scheme on external

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.152 ^a	.023		.019

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	3.538	7	.505	6.257	.000 ^b
Residual	150.269	1860	.081		
Total	153.807	1867			

a. Dependent Variable: Q10. [Earth Hour]Would your plan of revisit be affected if the mall did not join the above agreement?

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.128 ^a	.016		.013

a. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2.602	7	.372	4.446	.000 ^b
Residual	155.545	1860	.084		
Total	158.147	1867			

a. Dependent Variable: Q10. [Voluntary Charter Scheme]Would your plan of revisit be affected if the mall did not join the above agreement?

b. Predictors: (Constant), Q15. Are you a local resident or a tourist?, Day, Interviewer, Time, Location, Holiday, Month

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	-.268	.184			-1.452	.147
Month	.061	.024	.132		2.515	.012
Day	.000	.001	.010		.256	.798
Time	-.005	.004	-.026		-1.118	.264
Holiday	-.014	.015	-.024		-.923	.356
Location	-.005	.007	-.035		-.775	.438
Interviewer	.001	.002	.008		.324	.746
Q15. Are you a local resident or a tourist?	-.050	.017	-.068		-2.852	.004

a. Dependent Variable: Q10. [Earth Hour]Would your plan of revisit be affected if the mall did not join the above agreement?

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	.076	.187			.406	.685
Month	.013	.025	.027		.514	.607
Day	-.001	.001	-.046		-1.188	.235
Time	-.008	.004	-.043		-1.864	.062
Holiday	-.011	.015	-.019		-.744	.457
Location	.009	.007	.058		1.287	.198
Interviewer	.002	.002	.019		.834	.404
Q15. Are you a local resident or a tourist?	-.024	.018	-.032		-1.341	.180

a. Dependent Variable: Q10. [Voluntary Charter Scheme]Would your plan of revisit be affected if the mall did not join the above agreement?

Again, the tourist/local distinction is the main predictor of the potential voluntary penalty to the mall upon non-compliance to the voluntary agreements, whereas income, age and gender no longer play a role here as predictors.

While the availability of information about alternative shopping location and limitations from the planned itinerary could influence the decision on resurrection of the visitors as explained in section I, the result also suggests that the force of inertia could be in effect as well in influencing the resurrection decision of locals. The necessity of the shopping trip may also force the local people to resurrect despite the mall's unsatisfactory environmental performance. Since local shopping trips are intended to fulfil more basic needs, it would be more difficult to switch to alternatives compare to tourists who shop for non-basic needs. One more possible reason is the longer time of planning for a tourist's itinerary allows him/ her to collect more information and think more carefully than the planning of a local's shopping trip, which could be done in very limited time.

Chapter 8 Discussion of Findings

Based on the findings, this section first addresses the issue of thermal comfort, which a significant difference between different groups and a deviation from the results suggested by previous studies exist. The two main components in the crime and punishment model: cost of compliance and potential penalty for non-compliance, of the four selected voluntary agreements would be examined afterwards. It is followed by an insight to the enterprises' decision on complying with certain agreements but not the others, answering the research hypotheses and revealing the major operation principles influencing the implementation of voluntary agreements.

8.1. Thermal comfort

8.1.1. Thermal adaptation

The present findings suggest that the existing perception that local shopping malls are too cold having the thermostat set way below the range of comfort could be illusory since visitors, particularly locals, do not really perceive the indoor temperature of shopping malls to be cold. Instead, it is commonly reported as neutral, satisfactory and within the comfort zone of a majority of visitors. Nevertheless, the temperature is still too low for quite a proportion of tourists. These suggest the work of the process of thermal adaptation.

The temperature sensation of human is not static, rather, a process of adaptation takes place when the external temperature changes. According to Humphreys et al, (1998; 2013), a positive correlation exists between the indoor temperature and the neutral temperature, which individuals feel comfortable. As the air temperature drops, one would try to adapt to the new temperature and still report as comfortable. While this is supposed to be a universal phenomenon that people should have the same adaptation practice regardless of their origin, in the current study, it seems that local people and tourists in Hong Kong are having different adaptability to the indoor temperature of the shopping malls, in which more local people would perceive the temperature as satisfactory. It also appears that the range of thermal comfort of local people is lower, that local people prefer cooler temperatures instead of warmer temperatures since, under the same setting, local people would perceive the temperature as satisfactory while tourists would consider as too cold.

This is not unexpected considering the thermal comfort of an individual depends on his/her thermal history, personal perception to the environment and adaptation to it (Baker, 1996). While this adaptation process could take little time (Brager & de Dear, 1998), the adaptability would be influenced by the psychological preparation as well as the opportunity to adapt (Baker, 1996). While both groups have little opportunities to adjust the internal temperature to suit their own needs with the utilisation of centralised air conditioning systems, with the high rate of utilisation

of air conditioning, more precisely air cooling, in Hong Kong, local people are more adapted to a chilled internal environment, perceiving shopping malls to be cold and adapt by bringing extra clothing out for shopping trips; whereas tourists, particularly those coming from temperate regions where air cooling is rarely seen, have less experience with the massive utilisation of air cooling in shopping malls and are less prepared to it. With such a difference in perception to the thermal condition of shopping malls, a difference in perceived indoor temperature would result since local people would be more mentally prepared for the cold condition than tourists.

Such an adaptation process is not adapting to the nature but the manipulated environment, consider Hong Kong as a sub-tropical city that the higher temperature should induce people to perceive a higher temperature than a lower temperature. In addition, consider that visitors coming from Guangdong, China, which has basically the same climate as Hong Kong, also perceive the local malls to be cold, this suggests there exists a cultural difference on the thermal comfort and temperature perception among people with different origins, and such difference could be caused by the cultural difference on the utilisation of air conditioning in shopping malls.

It thus implies the result of the “abuse of air conditioning” with over manipulation of the internal thermal condition: with an increase in utilisation of air cooling, one would perceive the environment to be cold and eventually adapt to the coldness. Such coldness would then be considered as “normal” temperature and the thermostat setting is set well below the normal range of comfort of human being, which is around 25.5°C.

8.1.2. Thermal comfort and shopping behaviour

Previous studies on individual shopping behaviour have suggested that temperature generally has an insignificant yet negative impact on shoppers’ stimulus (Wakefield & Baker, 1998). The results from the present study also show the impact of temperature on the shopping decision of visitors in local shopping malls is insignificant, that the expenditure and duration of staying in mall are not correlated with the temperature sensation. This suggests that thermal comfort is not really a serious issue for actual shopping activities. A cultural difference could possibly exist here as well since the correlation between the thermal comfort and expenditure is particularly lower for local than tourists.

8.1.3. Tolerance, thermal comfort and shopping behaviour

Based on the reactions toward unsatisfactory temperatures, it seems that people are less tolerant to hotness than coldness, with no significant difference between people from different origins which could be attributed to a universality of reaction for human. This difference in tolerance could explain why a heavier weighting would be given to dissatisfaction with hotness in public space thermostat settings as well.

Combining the current results and findings from previous studies, the gender issue could also explain the preference to lower thermostat setting by the managers. Previous studies have suggested that male tends to perceive a higher temperature than female, whereas in the current study, it is also revealed that the tolerance toward coldness for female would be higher. Setting a lower temperature would therefore help retain male visitors without chasing away female visitors since they are more tolerable to the coldness.

While the tolerance to unsatisfactory thermal conditions is universal for people from different origins, a variation in the range of thermal comfort among the different groups suggests that shopping behaviour could be altered by varied thermostat settings. Given such “non-universality” on the range of thermal comfort, when a higher temperature is applied, while tourists would perceive it as comfortable, it would be too hot for locals and the locals would be driven away. In contrast, while locals are satisfied with the ambient environment when a lower temperature is set, tourists would perceive it as too cold. However, owing to the difference in tolerance toward coldness and hotness, the tourists would not necessarily be driven away.

Therefore, a new variable of the visitor profile of the mall, which is the share of tourists and locals, could be introduced in analysing the thermostat settings of shopping malls. Since tourists tend to perceive a higher temperature to be comfortable, it could be expected there would be different thermostat settings in malls targeting different groups of visitors when the managers take this into account.

Interestingly, there is yet another variation caused by the cultural difference between mainland Chinese and other tourists, that coldness gives a perception of high class to mainland Chinese and they would be willing to visit and shop despite the less than satisfactory temperature. This could further justify the managers’ decision of tuning down the thermostat setting for malls serving more mainland tourists than overseas tourists. This would be particularly applicable to the high-end malls since they would like to maintain an image of being high class and should they tune up the thermostat setting, they would fail to attract such mainland visitors who would like to shop for high-class products.

8.2. Cost of compliance

In the following section the cost of compliance of the four voluntary agreements are analysed one by one with a short summary on the factors potentially influencing the cost of compliance.

8.2.1. 25.5°C Thermostat setting

The perceived indoor temperature and behavioural responses of visitors toward coldness and hotness suggest that the cost of compliance for the malls to the 25.5°C Thermostat setting would be high.

Contrary to the hypothesis, currently visitors, particularly local, perceive the indoor temperature of the shopping malls as neutral or within the range of thermal comfort. As the thermostat setting is raised to 25.5°C, a larger proportion of visitors would perceive the mall to be too hot. As the distribution of perceived temperatures is not exactly symmetrical, that more visitors tend to perceive the malls to be cold than to be hot, the temperature adjustment would apparently result in an optimal that the proportions of people feeling cold and hot are the same. This however is not the optimal for shopping malls consider the different behavioural responses to coldness and hotness. Given that people tend to react more strongly to hotness, tuning up the thermostat setting implies that more people would leave the mall out of hotness. In contrast, while more visitors would find it too cold when the setting remains unchanged, the proportion of visitors leaving would be lower given the higher tolerance to coldness.

Besides, studies have provided that people in an air-controlled environment tends to expect a more static, cool thermal condition and would be more sensitive to any temperature changes (Brager & de Dear, 1998). This suggests that the impact could be amplified should the temperature be raised from the currently low level to 25.5°C and, in particular, local people would be more discontented with the adjustment since they would perceive the adjustment to be more significant.

Therefore, the cost of compliance for the malls to participate in the 25.5°C Thermostat setting would be high in the sense that more visitors would leave the mall.

Nevertheless, the intensity for different malls is subjected to adjustments depending on their visitor profiles, given that local and tourists with different origins have varied ranges of thermal. Since the temperature is perceived to be cooler by tourists than by locals, the margin for temperature adjustment would be larger for shopping malls which visitor profiles are made up of a larger proportion of tourists. The cost of compliance for these malls would be lower than malls serving primarily locals. However, if the adjustment be too strong that it also goes beyond the range of comfort of the tourists the result would be no different with that of local malls since tourist also has a stronger reaction toward hotness.

8.2.2. De-lamp programme

The behavioural responses of visitors toward unsatisfactory lighting conditions suggest that the cost of compliance for the malls to the De-lamp programme would be low, regardless of the visitor profile of the malls. There is a high unanimity on the responses toward brightness and

darkness, equally low, for different genders, tourists and locals. Since the visitors would not have strong reactions when the mall interior is either too bright or too dim, it makes no difference for the mall to adjust the intensity of internal lighting to either side. Therefore, the cost of reducing the intensity of lighting would not be great.

One main concern here would be the technical costs, such as the redesigning of internal lighting and interior, removal of extra lighting and installation of control valves and energy saving apparatus. Should the cost be minimal for the mall management team, it would have little impact on the decision of the management teams in joining the campaign or not.

8.2.3. Earth Hour

Given the short duration of the event, the cost of compliance would not be great for the mall to switch from the normal practise for an hour. It can also be expected that switching off part of the internal lighting would not have serious impact on the visitor flow given the weak reaction of the visitors toward darkness. The technical costs would be limited since the switching off of lighting is a once off action for the managers and no mechanical issues have to be resolved.

The positive relation between the intensity of external lighting and its ability in arousing the awareness of visitors to the mall, as well as its varied ability in achieving this between different groups of visitors add complexity to the issue. On the one hand, for malls with a higher intensity of external lighting, the cost of compliance would be higher since the relative loss of attractiveness would be higher than those with few external lighting. On the other hand, malls which have a visitor profile with a larger proportion of tourists would bear a higher cost of compliance than malls primarily serving local people. The cost would then be highest for malls which have both a high intensity of external lighting and high percentage of tourist in the visitor profile. Compare the data of the different malls selected in the present study it seems that the cost of compliance for the high-end malls would be higher than the low-end malls, since there are generally more external lighting in and more tourists visiting the high-end malls. In contrast, low-end malls generally have fewer external lighting as well as a visitor profile dominated by local people, thus would bear a smaller cost of compliance for joining the campaign. The resultant cost of compliance then depends on the positioning of the mall as a high-end or local mall serving tourists or locals.

8.2.4. Voluntary Charter Scheme on external lighting reduction

Like Earth Hour the cost of compliance for the mall to voluntarily reduce the use of external lighting would similarly depends on the positioning of the mall. One major difference between the two schemes would be the duration that while Earth Hour is a short term once off event the Voluntary Charter Scheme would be long lasting. Such a difference in duration would lead to a

difference in the cost of compliance since engaging in the Voluntary Charter Scheme implies the permanent loss of the attractive force of the external lighting and the mall shall incur a significantly higher cost. With the reduction of external lighting forever, the mall would have to seek for alternatives to attract new visitors whereas the impact of engaging in the Earth Hour would only last for an hour. Consider the advertising effect from the popularity of the event the cost would even be less significant since visitors could learn about the mall through the event. Given the initial difference in cost, the difference between malls with more external lighting targeted to serve tourists and malls with few external lighting primarily serving locals would be amplified and the cost could vary from insignificant to high.

Nevertheless, consider the difference in amount of lighting, the margin of benefits would also be positively correlated with the cost of compliance, that higher class malls would also have a larger margin of benefits upon engaging. Such a benefit would be more significant in the Scheme than in Earth Hour given its longer duration, and could help alleviate the high cost incurred by the high-end malls.

8.2.5. Factors influencing the cost of compliance

After going through the four agreements, several items that could affect the cost of compliance are identified. Above all would be the technical cost of taking actions to comply with the agreement, such as the installation of new apparatus, upgrading of current facilities and additional surveillance work by the personnel. While this constitutes a proportion of the cost, its control would be less complicated as it involves no human influence, but technical improvement would suffice.

Another factor would be the degree of reaction. Should the reaction of the user be higher, the cost of compliance would also increase since a more serious consequence could result. A third factor would be the human sensitivity, which refers to whether a change in the existing condition could be easily sensed by the user of the place. The cost of compliance of a programme involving a change in condition which would be highly sensible to human could increase since this would be the pre-requisite for the person to respond to the change. If the change is difficult to be sensed, the degree of response would have no importance on affecting the cost of compliance.

These two factors are, in nature, similar to the factors determining the public monitoring efficiency of the voluntary agreement, the rate of detection and voluntary penalty. The difference lies on their extent and direction of work. For the factor of sensitivity, while that on the “cost” side basically refers to the physical sensation of the person, that on the “efficiency” side also refers to the degree of easiness of information acquisition besides the direct sensation of the person. For the factor of response to change, the direction of the response is exactly the opposite:

the person chooses to give a penalty for complying and not complying with the agreement respectively in the “cost” side and the “efficiency” side.

While the above factors are the basic elements to be considered, in operation, the composition of the visitor, or user of the place, should also be taken into account consider the difference between different groups of people, which could have different cultural background, physical needs which could lead to varied degree of sensitivity and reaction.

8.3.Expected penalty for non-compliance

The expected penalty is, according to the crime and punishment theory, composed of two parts: the rate of detection and voluntary penalty. Since there is no significant difference between different voluntary agreements, the four agreements will be combined for discussion.

Concerning the voluntary agreements, it seems that people tend to be more sensitive to issue that are directly sensible or observable, such as temperature and internal lighting, not the less imitative ones in both temporal and spatial aspects, such as Earth Hour and external lighting. The result also reveals the perceived easiness of information acquisition about the malls’ participation is highly unanimous across different campaigns, though a difference exists between tourists and locals. It also suggests that it is positively related to the visitor’s income level, that higher income people may be more aware of the issues and may have better access to the information channels. This implies that people of different income groups may need to be separated when preparing the policies. The same unanimity and difference between tourists and locals are also revealed for the potential voluntary penalty to the mall in case of non-compliance to the agreements, while the tourists would give more penalties to the mall by not revisiting again.

8.3.1. Detection rate

Having more visitors perceiving it to be difficult than easy to acquire information about the participation of the shopping malls in the voluntary agreements, the rate of detection for the malls’ compliance would be ranged from limited to average. This suggests that the public surveillance would be effective to a certain extent only.

However, consider the difference in perception between tourists and locals it suggests that malls with different positioning would encounter varied effectiveness of public surveillance. Since it is perceived to be easier to acquire the related information by the tourists, high-end malls with a visitor profile having more tourists would face a higher rate of detection from the public than the low-end malls.

Consider the tourist-local distinction the high-end malls would face a particularly high rate of detection for the scheme of 25.5°C thermostat setting in which it is perceived particularly by the tourists to be easy to detect. On the other hand, the rate of detection for the participation in Earth Hour would be rather low for these malls, particularly after the event period, since it is perceived by tourists that they cannot obtain the related information easily. Since the rate of detection for locals is rather unanimous, such a different effectiveness of public surveillance is not applicable to the low-end, local malls.

8.3.2. Voluntary penalty

Similar to the rate of detection, the voluntary penalty given by the visitors, in terms of the reduction of resurrection, is very much the same for different voluntary agreements, and the intensity of penalty is unanimously low for all the agreements. Since the tourist-local distinction exists, like for the rate of detection, the voluntary penalty faced by the high-end malls serving tourists would be higher than the low-end malls.

Consider the slightly higher penalty given by the tourists to the mall for the non-compliance to the scheme of 25.5°C thermostat setting, it is also expected that the high-end malls would face a higher penalty than local malls as well as engaging in other schemes, though such a difference would not be very significant.

8.3.3. Total expected penalty

The limited rate of detection together with the low intensity of voluntary penalty implies that the expected penalty rate, which equals the product of detection rate and voluntary penalty level, would be low to limited. This implies that the monitoring effectiveness of public to the shopping mall would not be very effective.

However, with a higher rate of detection and higher voluntary penalty among tourists, it is possible that the expected penalty for non-compliance would be higher for the high-end malls targeting on serving tourists than low-end malls serving locals. In particular, high-end malls would face a particularly high monitoring effectiveness should they engage in the 25.5°C thermostat setting which comes from the tourists.

Nevertheless, consider the limited rate of detection and little voluntary penalty it implies that the public surveillance would be weak in forcing the shopping mall management teams to engage in the voluntary agreements in general.

8.4. Participation in the voluntary agreements

8.4.1. Condition of participation

As a rational being, the management team of the shopping mall would choose the least cost option, or one that generates most net benefit. Based on the cost and benefit analysis of the crime and punishment framework, the following condition should be attained for a rational being to participate in a voluntary agreement:

Cost of compliance (C) < Rate of detection (r) * voluntary penalty for non-compliance (P),

In which $r * P$ = Monitoring effectiveness (M)

The cost of complying with the agreement should be lower than the penalty given by the visitors, which is the cost of not complying with the agreement, such that a net gain for the shopping mall can be obtained by participating in the agreement.

Based on the current findings, it can be concluded that the tourists and locals are two distinct visitor groups and their influences on the mall should be considered as two separate variables (t and l). For locals, the cost of compliance (Cl), rate of detection (Dl) and voluntary penalty (Pl) would be low, medium and very low respectively, while those of tourists (Ct, Dt and Pt) would be medium, medium and low respectively.

Therefore, for the shopping mall to be willing to participate in the voluntary agreements, the following condition would have to be met:

$$[C_t(1-l) + C_l(l)] < \{ [D_t(1-l) + D_l(l)] * [P_t(1-l) + P_l(l)] \}$$

Given the similar rates of detection and voluntary penalties for non-compliance, the four voluntary agreements should have similar degree of monitoring effectiveness within the respective local/ tourist groups, except that of 25.5°C thermostat setting for tourist group since both its rate of detection and voluntary penalty are slightly higher. The decision then mainly depends on the relative strength of tourist and locals, that is, the visitor profile of the shopping mall.

8.4.2. Puzzles resolution

The question then comes back to the first puzzle of this study:

Why the Earth Hour event showed much higher participation and compliance rates than the 25.5 degree C thermostat setting guideline?

There are three hypothetical answers to the issue:

1. Much lower cost of compliance
2. Much higher rate of observation
3. Higher potential penalty for non-compliance

The first hypothesis can be kept since the cost of complying with the Earth Hour campaign is lower than that of complying with the 25.5°C thermostat setting. While the loss of advertising effect would be minimal for low-end malls with limited lighting, that of the high-end malls with a higher intensity of lighting could be compensated by the advertising effect from the popularity of the event. The negative impact of chasing visitors away for the Earth Hour campaign is less significant than that of the 25.5°C thermostat setting. The varied ranges of thermal comfort and cultural differences also raised the cost of complying with the 25°C thermostat setting much more significant as aforementioned.

The second hypothesis however is much doubted based on the current findings since there is no significant difference between the two and it is even the otherwise for tourists: they perceive it to be easier to observe the change in thermostat setting than engagement in the Earth Hour. The temporal difference between the events and the study period could cause such ambiguity but currently this hypothesis is not supported.

The third hypothesis is also doubted since the potential penalty for not complying with the Earth Hour campaign is not higher than that of 25°C thermostat setting, and even slightly lower among the tourist group.

As a result, it seems that the cost of compliance would be of significant influence on the manager's decision in participating in the voluntary agreement, given the unanimity of the expected penalty. This suggests that the public's ability to pursue the shopping mall management teams to engage in the voluntary agreements in Hong Kong would be limited given their limited monitoring effectiveness.

For the hypothesis on the three factors affecting the participation rates in the four voluntary agreements, while that on the detection rates is not supported since the detection rate is similarly low for all agreements, the hypotheses on the cost of compliance and voluntary penalty are supported.

Why a lot more people think that the indoor air temperature is too cold than too hot?

Under an “optimal situation” with a normal distribution of perceptions to the indoor air temperature, the numbers of people feeling too hot and too cold should be similar. The result of the perceived air temperature suggests that the current thermostat setting is yet below this point, proving that there is more people feeling cold than feeling hot.

One major hypothesis here is that people tend to react more strongly to hotness than to coldness, and the result is supportive to this hypothesis that people are less tolerant to hotness regardless of their origin.

Consider the assumption that the internal goal of the mall managers is to maximise the number of actual users, the hypothetical answer can be accepted. With the varied tolerance to coldness and hotness, should the temperature be set at a higher level, more visitors would leave the mall which gives a penalty to the mall manager. In contrast, even when the temperature is set lower that there is more people feeling cold than hot, given their higher tolerance, they shall not leave the mall and the penalty given to the mall manager would be lower. Therefore, the manager would choose to maintain a “lower than optimal” temperature for the general public. The current setting would have been optimal for the mall operation since should the temperature be set higher, the number of people leaving due to hotness would be higher than the number of people leaving due to coldness should the temperature be maintained.

For the hypothetical reasoning for the difference in tolerance toward coldness and hotness, the result is supportive to the explanation that the varied methods of adaptation and ability to adapt would cause the difference in tolerance levels. Under a cold situation, an individual could adapt to it by adding extra clothing, and there is no need to leave the mall, thus giving fewer penalties to the mall for setting too low a temperature. Under a hot situation, however, since one is unable to take off too many clothes, particularly during summer when light dress code dominates, the ability to adapt to it within the mall would be limited and the remaining solution would be either withstand it or leave the place.

However, the hypothetical explanation that the manager sets a lower temperature to create a greater thermal gap to retain visitors does not stand. The result suggests that the duration of staying in mall has no relationship with the external temperature. Given a static indoor air temperature, the thermal gap should be greater during hotter days than during cooler days. However, there is no significant difference between the durations of staying in different days, suggesting that the thermal gap would not really influence the cost for the visitor to leave the mall.

Chapter 9 policy implications and recommendation

The current findings about the visitors' shopping behaviour, behavioural responses and perceptions on voluntary programmes give several implications on the course of adjustments on the ambient environment management in local shopping malls, the current conditions and areas of deficiency in the pursue of voluntary programmes. These provide an insight to the roles of civil society and non-governmental organisations in such pursuance, in particular, the work that could be done to improve the performance of the voluntary agreements as an alternative policy tool.

9.1.Potential impacts of tourists on energy management

Given that the primary aim of the shopping mall management teams is to maximise the visitor flow, so as to boost the rental value and sales performance of the mall, the management should be conscious about the demands of the visitors and create an atmosphere that could best attract and retain visitors within the mall. More accurately, the managers would adjust the ambient environment of the mall to attract and retain the particular types of visitors that they intent to serve. This would depend on the positioning and the visitor profile of the mall, i.e. the mall would be adjusted to suit the needs of tourists should it be targeted to serve tourists.

It is evident that local people and tourists have varied ranges of thermal comfort and perceptions to shopping mall external lighting and advertisements. These varied characteristics imply that the ambient environment of shopping malls could be adjusted intentionally to cater different visitors across different malls and over time with variations in the visitor profile of the mall.

In the past fifteen years, the number of tourist visiting Hong Kong has increased more than four times from 13,000,000 to 60,000,000 (Figure 28), and has led to significant changes in the retail sector of Hong Kong. Tourist eventually accounts for a larger proportion in the visitor profile of shopping malls with increasing importance to shopping mall owners. This implies that their needs would be more taken care of by the management teams given their increase in absolute number and their relatively higher purchasing power than locals which influences the revenue of the shops and thus the rental value of the mall.

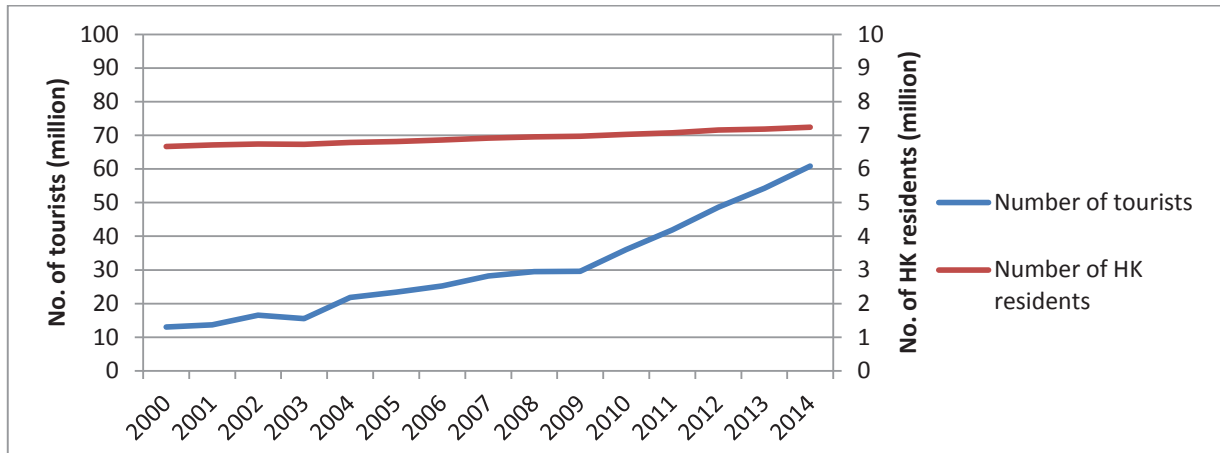


Figure 28 Number of tourists visiting Hong Kong versus number of local residents since 2000

Source: Census and Statistics Department: Hong Kong Monthly Digest of Statistics, various editions.

When a mall is serving primarily local people, the ambient environment would be set in favour of them. Since the range of thermal comfort of locals is lower, that they prefer cooler environments, the indoor temperature would be adjusted to a lower point. As the number of tourist increases and the mall started to target for serving more tourists, the demands of the tourists would be taken into consideration. Since tourist has a higher range of thermal comfort, the manager of the mall would tend to set a higher thermostat setting to cater their needs. However, it is impossible to set two distinct temperatures within the same location to cater for the needs of the two groups: locals and tourist. In order to balance their needs, the manager would then adjust the temperature to a point between the ranges of comfort of the two groups. Given the changing number of tourist and the proportion of tourists in shopping mall, it could be expected that the indoor temperature of shopping malls would be increased over time given the continuous development of tourism in Hong Kong.

However, this is only applicable to malls which do not experience upgrading or changing in positioning. While locals demand a lower indoor temperature, it is not necessarily the case for low end shopping malls to maintain a low temperature given the limited profit margin of providing a better environment with a relatively high expenditure on air-conditioning. However, as the mall is upgraded, more high-end shops would be introduced and high-end products would be sold, which increase the profit margin and make energy consumption a relatively less important part of operation cost. The manager would then be more willing to tune down the thermostat setting for the visitors.

If the shopping mall is upgraded to serve more tourists, it is possible that the manager would still tune down the thermostat setting. While tourist has a higher range of thermal comfort, it is

reported that there is a perception that being cooler, the mall would look more high-class to mainland Chinese tourists. Therefore, if the upgraded mall is to serve more tourists, particularly tourists from China, it is possible that the manager would tune down the thermostat setting instead.

9.2. Selection of voluntary agreements to promote

In this section, the two currently available programmes in Hong Kong, the 25.5°C thermostat setting and the Earth Hour, are compared on the basis of cost and benefit analysis, and there are significant differences between them in nature, which somehow lead to the difference in rate of compliance and effectiveness of the campaigns. To follow up, the preference of the four campaigns are highlighted based on the cost and benefit analysis, and a most preferable programme to be promoted in Hong Kong is selected.

9.2.1. Cost of compliance

While the rate of public surveillance and penalty are similar for both programmes, their costs of compliance are significantly different which could attribute to their differed compliance rates. Such a difference can be distinguished in both visitor reactions and temporal difference.

The current results have illustrated a difference in the degree of reaction by visitors toward thermal and lighting changes in either direction in shopping malls. As aforementioned, people tend to react more strongly toward hotness, while people react the same way toward both brightness and darkness. The degree of reaction toward thermal changes is also stronger than that toward brightness changes. This implies that any regulations intended to regulate the thermal conditions in indoor environment would invite stronger concern from the enterprises and potentially stronger opposition from the public as people are more sensitive to the internal thermal changes. In contrast, the reactions from the public for regulations on lightings, particularly internal lighting could be less significant since people are less sensitive about lighting conditions.

The comparison between the two current programmes and the Voluntary Charter Scheme on External Lighting Reduction illustrates how the difference in time and duration of compliance influence the action of the shopping mall managers. While the immediate effect of the reduction of external lighting could be great, for the mall would lose the channel of attracting visitors, particularly tourists, consider the limited duration of the event, participating in the Earth Hour would not incur the mall a serious cost. In addition, the list of participating parties is updated on an annual base and each year's support is on a once-off basis, which means the enterprise could consider their own condition in the particular year before participating. In contrast, the

compliance with the 25.5°C thermostat setting is a year-round engagement and it would be a permanent commitment without revision which would give a long-lasting impact to the mall. While the consideration for the compliance with the 25.5°C thermostat setting could involve the consideration of the varied public reaction toward thermal changes, the participation in the Voluntary Charter Scheme could well reflect the difference induced by the temporal consideration when compared with the participation in the Earth Hour.

9.2.2. Risk taking behaviour of managers

Having positive costs of compliance in general and uncertainty about the actual behaviour of the visitors, there involves a risk for the malls to participate in the voluntary agreements. A loss would occur should the reactions from the visitors is greater than expected and there is a subsequent drop in visitor flow upon joining the campaign, while a gain would occur should the opposite scenario happens. Given the difference in the costs of compliance, the level of risk could also differ for different programmes which could influence the participating decision of the mall management teams.

While it is known that people are sensitive toward thermal changes and would leave the mall should the indoor temperature be raised, it is unclear at which level would people start to leave the mall and whether 25.5°C is too high for the visitors remain uncertain for the shopping mall manager. The manager is therefore at risk to decide to comply with the guideline. The long-lasting commitment to the guideline also amplifies the risk for complying with it since the enterprise cannot switch back to the original settings even if there is a subsequent loss of visitors.

In contrast, the less significant impact on the visitor flow of switching off the external lighting for an hour makes the risk of joining the Earth Hour lower. The risk is further reduced given the short duration of the event and it is up to the enterprise to decide whether they would continue to support the event next year which gives it much flexibility in action except the event hour. Should there be a subsequent reduction in visitor flow the enterprise can simply choose not to join the event next year to avoid the loss and the risk would be minimal. In addition, the popularity of the Earth Hour event could act as an alternative channel of promotion and provide a positive corporate image for the enterprise which could substitute the loss of external lighting, thus further reducing the risk of participation.

The difference in levels of risk implies that the rate of compliance with the two voluntary programmes would be different since the malls would incur a significantly higher risk for complying with the 25.5°C thermostat setting which prevents them from joining. The difference in levels of risk further implies that enterprises with different risk taking ability would have different decisions on participating in the voluntary agreements.

By projecting the potential risk it is possible to estimate the possible rate of compliance of the other voluntary agreements. Consider the four agreements presented in this study, the risk for the De-lamp programme and Voluntary Charter Scheme would not be lower than that of Earth Hour given their need of a long-lasting commitment. However, consider the relatively less significant reaction toward brightness changes, the De-lamp programme would have a risk lower than that of the 25.5°C thermostat setting. Consider the varied ability of the external lighting in attracting visitors' attention to the mall, the risk of participating in the Voluntary Charter Scheme could vary between that of the 25.5°C thermostat setting and the Earth Hour.

9.2.3. Preference of programme for energy conservation

25.5°C thermostat setting

The existing low rate of compliance combined with the results from the current study suggests that it may not be effective to put extra emphasis on this programme with no change to the current situation and guidelines. The cost for the shopping malls to comply with it would be too high while the little favour and interest to the campaign among the public suggests that public surveillance would be too weak to press the enterprises to comply with the guideline. However, having air conditioning as one of the major end-use of energy in Hong Kong, it is still commendable to continue the programme to promote the reduction of air-condition utilisation. Compare with lighting, which is the target of other programmes, air conditioning remains a significant consumer of electricity in the retail and restaurant sectors, two major sectors in a shopping mall. There remains a large room for improvement in the electricity consumption of air conditioning compare with lighting, in which the amount of electricity consumption has significantly reduced in the previous years (see Figure 28). The programme could also be effective in modifying public's perception toward the utilisation of air-conditioning in the malls given the adaptation process and expectation toward air temperature which would eventually changes the demand of the local people on the ambient environment of the mall, thus reducing the cost of compliance for the malls. Nevertheless, this would be a lengthy process which the effect would not be visible in the short run.

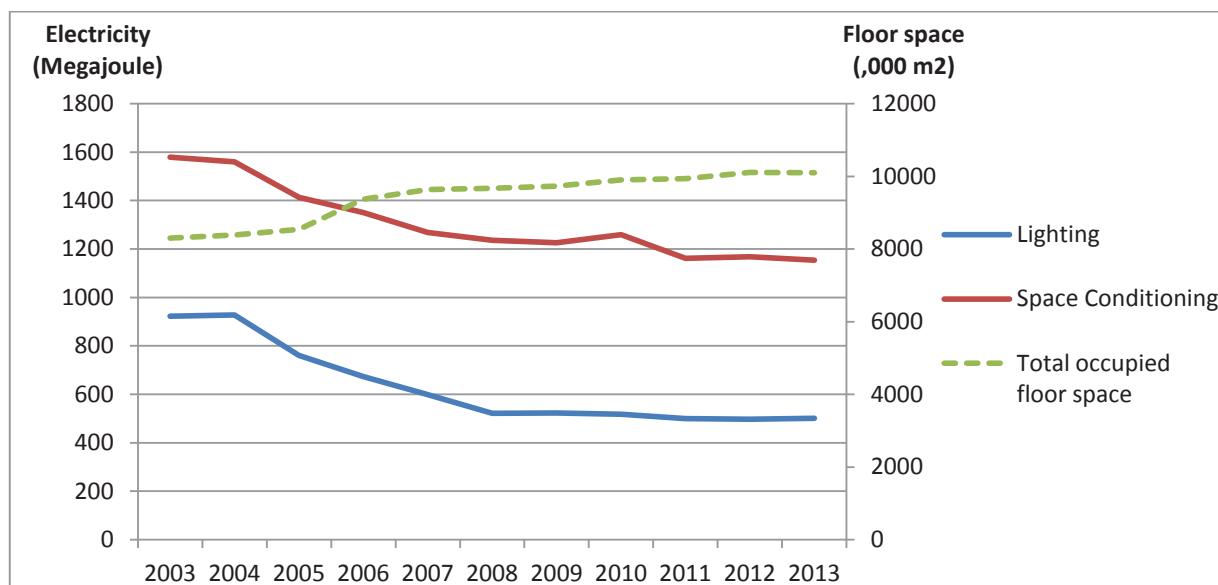


Figure 29 Average electricity usage per square meter of retail/restaurant floor space

Source: Rate and Valuation Department: Property market statistics: Completions and related statistics, 2015, Electrical & Mechanical Services Department: Hong Kong energy end-use data 2014

De-lamp

Having a low cost of compliance for the mall, it seems that De-lamp would be a feasible campaign in Hong Kong. Since visitors are not having strong reaction even when the mall becomes dimmer, it is possible for the management teams to reduce the degree of lumen in mall without compromising the visitor flow.

The effectiveness of the campaign could be hindered by the current limited effectiveness of public surveillance for voluntary agreement since little penalty would be given to the mall should it failed to comply with the agreement. Therefore, more work could be done on arousing the awareness of the public on the issue of over-brightness in shopping malls to increase the rate of detection. Another method to enhance the incentive for the mall to participate in the agreement would be by emphasising the reduction in energy cost of the mall, instead of the public reaction to maintaining an excessively bright environment.

Since the programme is new to Hong Kong, some technical guidelines would have to be set up first to reduce the ambiguity. This includes the way of brightness measurement: whether the intensity of lighting or the energy consumption is considered, the distribution of lighting, and the interaction between lighting and interior design.

Voluntary Charter Scheme

The promotion of the scheme would be complicated consider the varied impact of joining the campaign among different types of shopping malls. While the cost for malls which are posited to be serving tourists would suffer a greater potential loss for compliance since tourists are more made more aware of the mall by the external lighting, lower-end malls would suffer little for reducing external lighting. However, to enhance the effectiveness of the scheme in reducing energy consumption, malls with a large amount of external lighting, which are typically higher-end malls serving more tourists, should be the targeted group. While the lower-end malls would be more willing to comply with the agreement, their effort in reducing the total energy consumption would be limited.

Consider such correlation between the cost and effectiveness of compliance, this scheme should be promoted with multiple aims, such as the reduction of light pollution, rather than solely emphasising the energy conservation issue since the economic incentive would be rather limited, particularly when compared with the De-lamp programme. This however would be beyond the scope of the current study.

Earth Hour

The remarkable success of the Earth Hour, with its increasing rate of compliance and popularity, suggests that it would be worthwhile to continue promoting it. The cost of compliance is minimal for the shopping malls with the short duration while the potential gain, with a better corporate image, is positive. With its popularity and icon as an environmental conservation campaign, it would be a sound instrument to promote the idea of energy conservation and facilitate the demand-side energy conservation policies. Consider the short duration, however, it would give little impact on the total energy consumption of the city.

Consider the different sensitivity of people toward thermal and brightness changes in indoor area, it would be preferable for the action groups to pursue on lighting controls rather than continuing their focus on thermal controls should a better result be achieved for energy conservation by utilising voluntary agreements with less resistance from both the public and the enterprises. Among the lighting control programmes, De-lamp would be a preferable agreement consider its relatively low cost of compliance for the enterprises, while the promotion of the Voluntary Charter Scheme on external lighting reduction could suffer from strong resistance from the enterprises, particularly those operating the shopping malls at tourist regions.

9.2.4. Adjustment of current programme

Currently the compliance rate to the 25.5°C thermostat setting is rather low among the retail sector and the major shopping malls in Hong Kong. The lack of public surveillance, which is common for different voluntary agreements, as well as the relatively high cost of compliance for the shopping mall could attribute to such a low rate of compliance. Since it remains a commendable programme as aforementioned with the large gap of improvement in the amount of energy consumption, some adjustments would be preferred to raise its effectiveness.

From the cost perspective, studies have provided that people in an air-controlled environment tend to expect a more static, cool thermal condition and would be more sensitive to any temperature changes (Brager & de Dear, 1998). The local people are also more adapted to a cold environment and have a stronger reaction to hotness, of leaving the location should the temperature be raised. These together raise the cost of compliance for the mall since, given such an adaptation, even temptation to maintain, a cooler internal temperature among local people, the current guideline of setting the indoor temperature at 25.5°C would be a bit too ambitious since the thermal change would be too significant for local people, which make it less acceptable among the public and the visitors shall “vote with their legs” by leaving the mall should the malls engage in the agreement.

While there is an increase in proportion of tourist in local malls, consider the duration of staying in Hong Kong their absolute number remains insignificant compare to the local population, and it is unlikely their temperature perception would give a strong influence on the thermostat setting of the local malls. In addition, consider their perception of “coldness means high-class-ness”, a change in visitor profile would not necessarily alter the “optimal” operating temperature of the malls to a large extent that could lower their cost of compliance to follow the 25.5°C guideline.

To improve the rate of compliance for the public, a slightly lower recommended temperature setting would be preferable, such as 24°C. This would be more close to the perception of the public and less severe reaction would exist. This lower operating temperature is still within the suggested range of thermal comfort by the ISO 7730 and ASHRAE Standard 55, and is thermal neutrality temperature at 50% of relative humidity. By setting the thermostat at this level it avoids having too many reports of hotness and leaving of visitors, thus lowering the cost of compliance for the enterprises. According to previous study, this is also the level above which people within an air-controlled environment would report a much higher PMV, that is, report feeling hotter (Brager & de Dear, 1998).

9.3.Areas of deficiency

While it is possible to promote the programme of De-lamp and the 25.5°C thermostat setting, after adjustment in reduction level, to reduce energy consumption, the current environment of Hong Kong remains unfavourable for the effective implementation of voluntary agreements and many works have to be done to improve the effectiveness of both the current programmes and future proposals.

9.3.1. Excessive cost of compliance

As proposed in the previous section, cost of compliance would be a major predictor of the rate of compliance of the agreement in Hong Kong. However, it is evident the cost of compliance is too high for the enterprises to commit to the voluntary agreements, particularly for thermal changes. The reason why De-lamp could stand out from the other programmes in the current study is basically its relatively low cost of compliance. This low cost of compliance has also contributed to the success of the Earth Hour while the relatively high cost has prevented enterprises from complying with the 25.5°C thermostat setting. A reduction in cost relative to its benefit would be needed should a programme be run more successfully.

This high cost of compliance for the 25.5°C thermostat setting is caused by the high sensitivity and strong reactions toward hotness in indoor area, which could be a result of the “over-use” of air-conditioning in Hong Kong that altered the thermal expectation of local people on indoor area. This also suggests the daily practices of local people could hinder the effectiveness of the voluntary agreement, in influencing the cost faced by the enterprises in committing to the programmes.

9.3.2. Lack of public support

Based on the current data, the effectiveness of public surveillance on the enterprise compliance to the voluntary agreements would be limited given both a low rate of detection and voluntary penalty. These suggest that public pressure would be too weak to pursue any changes to the existing practice of the shopping mall. The minimal voluntary penalty given by the visitors for non-compliance with the agreement to the shopping mall also suggests the public has little interest on the issue and ranked ambient environment as an unimportant factor influencing their shopping decision. Practical needs would be more important than environmental concern as perceived by the local people.

Therefore, one major area of deficiency the action groups currently face would be this indifference of the public to the current energy wasting practices of shopping malls that they have no interest of taking action to alter the condition. While a majority of the visitors would either take no action or make personal adaptation by adding more clothes when they feel cold in mall instead of complaining to the mall manager, most of the visitors would not give any penalty

to the mall by visiting less for not complying with the 25.5°C thermostat setting. Worse still, there are visitors arguing that alteration on the current condition, particularly temperature setting, would reduce their interest of visit which raises the cost for the shopping mall managers to engage in the voluntary agreements.

9.3.3. Information inadequacy

Another area of deficiency would be the inadequate promotion of the programmes, as well as the lack of information about the performance of the engaged parties, which make the public unaware of what are currently done and what can be done to help alter the situation. It is perceived by the visitors that the acquisition of information about the engagement of the mall in the agreement is difficult, which results in a low rate of detection. There is a lack of channel for information distribution and promotion of the participating parties of the agreement. There also lacks the channels for the public to report for any suspected cases of non-compliance which reduced the incentive for active public participation and surveillance on the performance of the participating shopping malls. This also attributes to the lack of support from the public for this is one way of empowerment to the public to encourage their participation in the programme.

9.3.4. Model of pro-environmental behaviour

The areas of deficiency of the current programmes could be evaluated under the framework of pro-environmental behaviour, which helps examine the reasons of the public not taking action to change the condition even when they are unsatisfied with it. This could also give some insight to the directions of work to improve the situation. According to Kollmuss and Agyeman (2002), pro-environmental actions are influenced by both internal and external factors and there are several barriers to such actions in both contexts. On the internal side, human behaviour is affected by their existing knowledge, and a lack of knowledge to or contradicting knowledge about the environmental issue would hinder the development of environmental consciousness, thus reducing the incentive of carrying out pro-environmental behaviour. On the external side, the availability of opportunities and incentives would affect the individual's decision on taking the pro-environmental action. In addition, the impact of taking the pro-environmental action would consequentially influence the individual's decision of taking it.

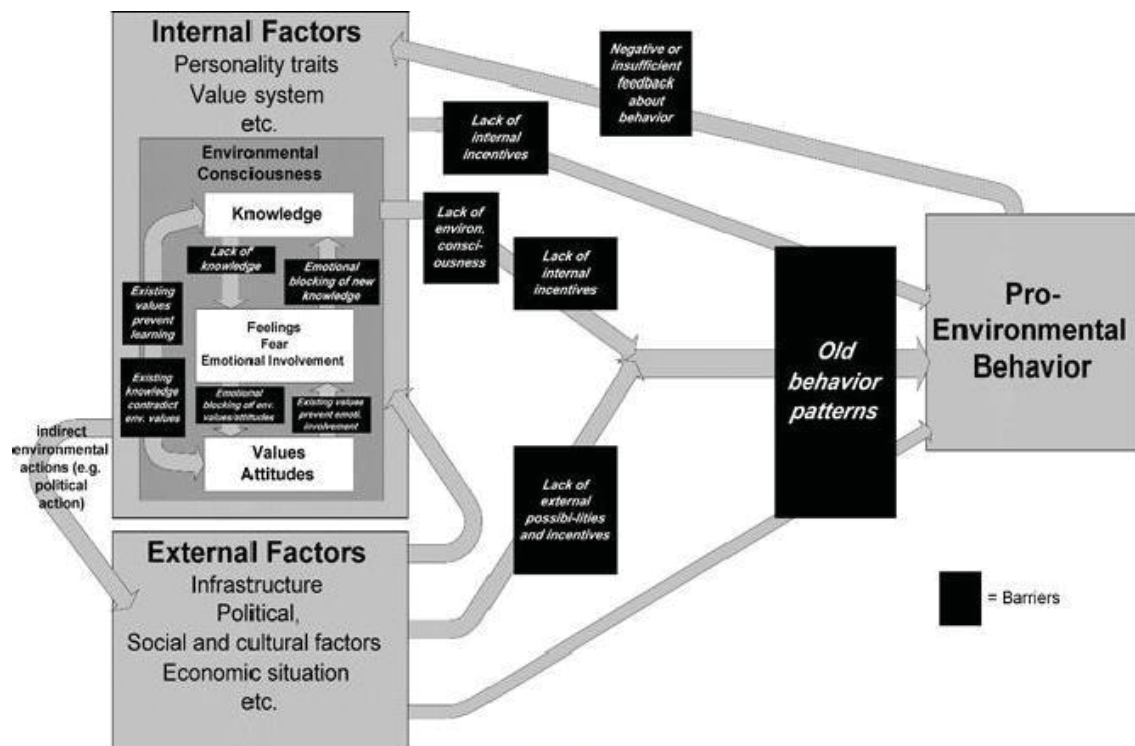


Figure 30 Model of pro-environmental behaviour (Kollmuss & Agyeman, 2002)

In the current study, the pro-environmental action among the public refers to the detection of and voluntary penalty to the non-compliance with the voluntary agreements of the shopping malls, and a lack of action could be influenced by three components in the model. The unawareness of the issue and a lack of knowledge on the programmes among the public could cause the lack of internal incentive to take action. The inadequate channels for reporting the performance of the malls prevents the public from taking an active role in the programme and reduces the external incentive for taking action. The feedback system could influence the decision of the public for action taking in three ways. The reduction in comfort in mall, due to the increase in indoor temperature, upon complying with the voluntary agreement discourages some visitors, particular those prefer a lower temperature, from taking action to urge the mall to tune up the thermostat setting. The cost of paying fewer visits to the mall, such as the cost in searching for alternative shopping venues and the inability to purchase certain products, hinders the visitors' incentive of giving voluntary penalty to the mall for non-compliance with the voluntary agreement. Finally, the reluctance of the mall to change the present energy consumption pattern and the uncertainty for the reaction of the mall to the urge for the change discourages the public from taking actions to pursue the shopping malls to comply with the voluntary agreements.

In order to improve the effectiveness of the voluntary agreements, the internal forces pushing the individual to engage in the action should be cultivated. More platforms and channels for action should also be provided as external incentives to drive the individual to take part in the public surveillance. Penalties to the non-complying enterprises should also be made visible to the individuals to further encourage their participation, thus giving pressure to the enterprises. These are exactly what the non-governmental organisations could work on and details of the operation will be discussed in the next section with further reference to a social marketing framework.

9.4.The role of NGOs

The non-governmental organisations play an important part in pushing forward the environmental issue in the society and a change in the current practices, especially when the government and private institutions are not working on it. The work could range from arousing public interest on the issue to advocating new policies and programmes aiming at tackling the problems. In the context of the current study, the work of the non-governmental organisations would be the initiation and promotion of the voluntary programmes. Given the inherited weaknesses of voluntary agreements, the NGOs would also need to work on the related issues and government policies, as well as to improve the effectiveness of the voluntary agreements.

9.4.1. Limitations of voluntary agreements

While voluntary agreements possess strengths such as high flexibility and more prompt than legislation (Khanna, 2001); the current study also shows some of the limitations of voluntary agreements: the voluntary nature which limits their power in pushing the enterprises for a change and its reliance on the public surveillance for effective enforcement on the enterprises.

Since it is voluntary to comply with the agreement, its effectiveness in reducing the energy wastage could be largely compromised by the reluctance of the enterprises to comply with it, particularly in case that a significant cost of compliance is foreseen by the enterprises, which is the case of the current agreements in Hong Kong. Besides, there is no guarantee that the enterprise would fully comply with the agreement, since the lack of legal binding power of the agreements on the participating enterprises renders it impossible for the public and the hosting organisation to impose any concrete punishment on the non-complying enterprises.

Apart from these, without institutional recognition and supervision, public surveillance would be the only effective way of monitoring the performance of the enterprises. Two factors, the availability of the information for surveillance and the public awareness on the issue therefore influence the effectiveness of the surveillance. In case that information is up to the enterprises to publicise, the effectiveness could be hindered since the information provided could be

manipulated and there is no way for the public to clarify. In addition, should the public be unaware of the issue, the force of public surveillance would be much reduced since the non-governmental organisations would be unable to monitor all the enterprises. There would also lack the public pressure on the enterprises.

Without legitimate punishment, it would also rely on the public to impose voluntary penalty on the non-complying enterprises, such as boycotting the enterprise's products, services and refusing to visit its premises. However, the willingness and ability of the public in doing so pose a major weakness to the utilisation of voluntary agreement since such willingness depends on the awareness and degree of concern of the public and such ability would vary across different individuals. Should the enterprise controls a large proportion of the individual's life, it would be impossible for the individual to impose penalty on the enterprise effectively since personal life would be greatly affected while the degree of penalty would also be largely reduced should the public is unwilling to do so. The effectiveness of the agreement is therefore subjected to the control of the degree of public concern and the domination of the involved enterprises in the life of the people.

Simply put, the binding force of a voluntary agreement would be loose and the effectiveness is largely dependent on the enterprises' self-discipline and public awareness, giving no guarantee that the situation could be improved effectively.

9.4.2. Mandatory regulations

Studies have shown that a threat of legislation could be an incentive for the enterprises to engage in the voluntary agreement as the enterprises would try to pre-empt the potential stringent control from the law (Khanna, 2001; Southworth, 2009). According to Southworth (2009), on the issue of carbon emission, without a mandatory control, the enterprises are reducing their carbon emission only to an extent smaller than that they would do under a mandatory emission reduction regulation. A policy mix of mandatory regulation and voluntary agreement would be able to improve the effectiveness, in which a mandatory regulation is formed to establish a base line for the performance improvement while a voluntary commitment is provided for enterprises which would like to do more (Lee and Yik, 2004). In doing so, the mandatory regulations and voluntary agreements can be regarded as complimentary to each other. Consider the lack of incentive for the shopping mall management teams to reduce their energy consumption through making adjustments to the air conditioning and lighting, it seems that the introduction of a legislation threat would be preferable.

Nevertheless, such a threat from legislation would be unlikely under the current political situation of Hong Kong which the government faces many difficulties in passing a bill, and would not be concerned by the enterprises. This suggests that in the short run the only way to improve the effectiveness of the voluntary agreements in urging the enterprises to reduce their

energy consumption rests on the agreements themselves, through the fine tuning of the programmes, and on strengthening the surveillance power of the civil society.

However, it would still be commendable for the non-governmental organisations to push for a legislation of the mandatory regulations given that such a legal threat could effectively increase the level of compliance by the enterprises. Preaching of the importance of the issue to the public would also be useful for an increase in public awareness could help gain the public support in lobbying for the legislation of the mandatory regulations.

Therefore, the non-governmental organisations shall work bi-directionally: promoting the voluntary agreements and arousing public concern, as well as pressing the government to legislate the mandatory regulations on business energy usage.

9.4.3. Enforcement of voluntary agreements

While there is a mature civil society in Hong Kong considering the size, number and efforts made by the non-governmental organisations; public awareness about and engagement in the environmental and energy issues remain limited. The insignificant influence from public surveillance due to the limited rate of detection and voluntary penalty for non-compliance is a main hindrance to the effectiveness of the voluntary agreements and success in urging the business sector to reduce their energy consumption. Therefore, efforts should be made to enhance the rate of detection among public as well as the voluntary penalty public are willing to project to the enterprises.

9.4.3.1. Action framework

According to previous studies, there are several areas of work that non-governmental organisations could focus on to enhance the effectiveness of the projects. Based on the framework of social marketing, there are five factors which determine the effectiveness of the programme:

The Force: the intensity of the personal motivation toward the goal,

The Direction: the knowledge of how to consummate the motivation,

The Mechanism: the existence of an agency that enables the person to translate his motivation into action,

Adequacy and Compatibility: the ability and effectiveness of the agency in performing its task,

Distance: the audience member's estimate of the energy and cost required to consummate the motivation in relation to the reward.

(Kotler & Zaltman, 1971)

For an ideal situation which a programme would be effective there should be a strong force among the public to take action, a clear direction on how to achieve the goal, a sound mechanism for implementation, a compatible agency to operate the mechanism and facilitate the implementation, and a short distance and cost for the public to take action. There are several variables that could influence these five factors, thus affecting the effectiveness of the programme.

Public awareness

The public awareness of the issue is influential to the intensity of the personal motivation as well as the personal knowledge about it. By arousing public awareness, it could increase one's knowledge about the issue and it is possible to motivate him/her to support the issue and pursue toward the goal, thus facilitating the success of the programme.

One way to increase public awareness would be through peer influence, which would provide an external source of initiation to the individual to engage in the issue. In a previous study, it is suggested that societal factors such as the attitude of parents and friends are influential toward one's pro-environmental action, and is revealed that peer influence is a major factor affecting the local adolescences' decision on green purchasing (Lee, 2010). In Kotler and Zaltman's study, it is also suggested that face-to-face interaction and promotion in neighbourhood level would be effective for the promotion of the programme. Borrowing from these ideas, it suggests that peer influence and more intimate contact would play a role in the supportiveness of the public to the voluntary agreements, in which the "consumption choice" here refers to the selection of shopping mall.

This implies that the power of the social network could be utilised to raise the public attention toward the programme. The information about the programmes could be first spread to activists who are more actively supporting the environmental programmes. These activists could then act as key players spreading the information and persuading others to support and participate in the campaign within their own social network. As a result, the motivation of the public to engage in the programme would be strengthened, thus raising the Force of the programme.

Empowerment

For the public to be willing to take action, it is important to give them a sense of empowerment, that they are given the power to change the existing condition (Kong et al., 2002). In promoting the voluntary agreements, the public should be given a sense that their positive attitude toward the voluntary agreements and voluntary penalty given to enterprises not complying with the

agreements would be able to force the enterprises to change their existing policies and ambient environment settings.

In this empowerment process, the “direction” of work and “mechanism” for work should be readily available to the public, so that they could exert their influence through concrete action. In the context of sustainable consumption, focuses like green purchasing and socially responsible investment are common as means of empowerment, by giving the consumer and investors power to choose green products and urging the enterprises to change (Kong et al., 2002). Consider the difference in nature between voluntary agreement and green products in which no commodity exchange is involved in the voluntary agreement it would be difficult to empower the public simply through consumption choices. Instead, an information system would be more preferred as an instrument of empowerment to the public. The information system shall serve three functions: information provision and public awareness arousing, encouragement of public engagement and pressure exertion on the enterprises. The public shall voice out their opinion to the current practices of the enterprises and pledge for supporting the agreement through not visiting malls that failed to comply with it. This could urge the enterprises to comply with the agreements by exerting public pressure on them.

Public Recognition

Apart from the work on the public side, efforts could also be given on the enterprise side, by increasing their incentive to participate in the voluntary agreements to raise the effectiveness of the agreements. Besides raising the monitoring effectiveness, the reduction of the cost of compliance would also be effective. One way would be the increase in public recognition on the efforts the enterprise made to reduce its environmental impact. With an increase in the public recognition, the enterprise would be benefitted with a more positive enterprise image (Delmas & Terlaak, 2001). This could add to its business goodwill and potentially generating more revenue for the public would prefer that enterprise to others. As a result, this would balance the cost of compliance to the voluntary agreement, in terms of the loss of visitors.

To achieve this, the commitment of the enterprise to the voluntary agreement as well as its performance afterwards would have to be made public for the public to recognise its efforts. An information system would be needed to deliver the information, such as through digital platforms, monthly publications, advertisements, labelling and so on.

9.4.3.2.Action plans

Promotion and advertisement

The current result reveals that the availability of information about the voluntary agreements remain insufficient to the public as quite a proportion of mall visitors have no idea about the malls' participation. Besides, according to Lee (2010), the mass media in Hong Kong has surprisingly loss its importance in influencing public environmental behaviour, which is contrary to studies in other cultures. The lack of access to the information and the lack of public support would largely hinder the effectiveness of the agreements. This suggests that there is yet much room for improvement in the promotion strategy of local environmental groups.

On the traditional mass media, more attractive propagandas could be designed, such as having a more emotional appeal, to attract more attention. Consider the rising influence of the internet, it would also be preferable to utilise it as a major platform of propagation. In addition, the power of the social capital and social network could be better utilised through promotions on social media. As pointed out by Good (2001) the internet could be a potential social capital enhancer and help reinforce the real life, face-to-face communities. Given the influence of peer on one's pro-environmental actions, activities involving an active use of social capital could be initiated to arouse public awareness of the issues and boost the public participation in the programmes, thus raising the rate of monitoring effectiveness.

Online platforms

One method of promotion and public empowerment would be the establishment of an online platform which provide a one-stop service of information provision, public reporting and social networking. The platform could provide information for the participation of the enterprises in the campaigns, which is similar to the action currently taken by Green Peace, in which an online information portal has been set up to report the energy utilisation index of different building.

The Hong Kong SAR government has enforced the Buildings Energy Efficiency Ordinance (Cap 610) on 21 September 2012 which made energy auditing and report on energy efficiency of buildings compulsory. After that, Green Peace has launched an online platform providing information about the energy utilisation index of the reported buildings (Green Peace, 2015). The organisation also encouraged public reporting of the latest indexes, thus encouraging public participation on and surveillance over the issue.

For the new platform, the lighting and temperature conditions of the building are given in the report and are updated on a regular basis to see whether improvements have been made and whether the enterprise has complied with the agreements.

Public reporting is also encouraged to raise the rate of detection and arouse public awareness of the issue. A reporting system, as a function embedded in the online portal, can be established for the public to report the discrepancies of ambient environment, temperature and lightings in the buildings to the NGOs to raise the public interest in reporting, as well as raising the potential penalty to the buildings since the negative result could hinder the interest of visitors to visit the mall.

Commentary columns could be provided for the public to rate the performance of the malls in terms of temperature, internal and external lighting conditions, to increase the participation of the public. A recommendation function could also be introduced for the public to indicate whether they would recommend others to visit the mall in terms of the environmental performance, to serve as a quick indicator of the mall's performance.

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Public Dissemination

Date and time: 4:30pm, 25/12/2015

Venue: Room 233, Chen Kuo Bun Building, The Chinese University of Hong Kong

Name of Activity: Seminar series, Department of Geography and Resource Management, The Chinese University of Hong Kong

Type of Activity: Public Lecture

Information Disseminated: The public lecture gave a comprehensive introduction of the research project and findings.

Format and Methods of Dissemination: The public lecture was given by Prof. XU Yuan, the Principal Investigator of the research project. Lecture slides were carefully prepared in advance. The public lecture was followed by interactive and Q&A session.

Users/Audience: The public lecture was open to the public. Everyone can freely attend without prior registration. The information about the lecture was distributed through the network of the Department of Geography and Resource Management.

Expected Outcomes of Public Dissemination: The research findings were reviewed and examined by the audience.

*The Chinese University of Hong Kong
Department of Geography and Resource Management*

will present a seminar

by

Prof. Xu Yuan

*Assistant Professor
Department of Geography & Resource Management, CUHK*

*Enforcing and complying with voluntary agreements as an
alternative energy conservation policy instrument*

Abstract:

This research explores the feasibility of an alternative, complementary policy instrument, particularly voluntary agreements, for energy conservation and environmental protection. They require the voluntary collaboration of stakeholders, while mandatory regulations inherently put the polluters in confrontational positions against the government. However, the effectiveness of voluntary approaches could be seriously compromised because polluters are not obliged to participate and for those who do, the compliance rate may still be low. We choose to study shopping malls that are generally large in size and consume substantial amounts of energy. The focused voluntary agreements are the 25.5 degree C thermostat setting for air conditioning, Earth Hour, De-Lamp, and turning off external lighting. The study explains the variance of compliance rates on these voluntary energy conservation agreements.

About the Speaker:

Prof. Xu is an assistant professor in the Department of Geography and Resource Management and the leader of the Environmental Policy and Governance Programme in the Institute of Environment, Energy and Sustainability, The Chinese University of Hong Kong. His major research focus is on the enforcement of and compliance with energy and environmental policies. Before joining CUHK in August 2010, he received a Ph.D. degree in public policy in February 2010 from Princeton University and conducted postdoctoral training in between at Massachusetts Institute of Technology. He got M.S. in climatology (2004), B.S. in atmospheric sciences (2001) and a bachelor's degree in economics (2001) from Peking University.

Acknowledgement: Funding for this research is provided by the Central Policy Unit through the Public Policy Research Funding Scheme 2015-16 (2014.A4.004.15A).

Language: English

Date: 23 November 2015 (Monday)

Time: 4:30~6:30pm

Venue: Room 233

Chen Kou Bun Building

Chung Chi College, CUHK

~All are Welcome~

For any enquiry, please contact Prof. Steve Yim (Tel. 3943 6534 or Email: steveyim@cuhk.edu.hk).

