



Sustainability Indicators through the Lenses of Tourism Sector
in Phuket

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ABSTRACT

Phuket faces challenges in monitoring the state of the development due to the lack of practical and integrated sustainability indicators and reporting system. Tourism impacts include littering, solid waste, wastewater as well as threats to safety and wellbeing, traditional values and culture. This study aims to identify the sustainability indicators from the perspective of the tourism sector in Phuket and suggest the practical ways to implement the monitoring. Mixed methods including desktop research, observation, in-depth interview, survey and data triangulation. Preliminary interviews were conducted with 68 informants in tourism and related businesses, 400 tourism operators were surveyed and 17 public officers were interviewed. Both qualitative and quantitative data analyses were utilized. The findings reflect the low level of awareness and practice of sustainability indicators in tourism sector. Issues in Phuket tourism development was categorized into 14 topics of economy, nature, governance, data management, infrastructure, transport, Phuket brand positioning, public health, population, tourism, culture, satisfaction evaluation, social inclusion and education. These concerns were interpreted into 43 indicators that reflected five themes of environment, economy, people and living, tourism, and governance. Upon further investigation, 18 indicators were considered practical based on their specificity, availability, timeliness, accessibility and importance. The thesis concludes that the lack of a centralized organization for sustainability reporting is a barrier for indicator monitoring. This can be addressed using information and communication technology to collect and share data electronically. Digitalization of data should be incorporated to resolve these issues. The recent national policy on “Smart Thailand 2020” can be used to ensure that Phuket tourism is sustainable.

Keywords: Sustainable Development, Sustainability Indicators, Tourism Sector, Phuket

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List of Abbreviations and Symbols

EU	European Union
EU SDI	European Union Sustainable Development Indicators
EU SDS	European Union Sustainable Development Strategy
GDP	Gross Domestic Product
GNB	Gross National Well-being
GNH	Gross National Happiness
IUCN	International Union for Conservation of Nature
KM	Knowledge Management
LDC	Least Developed Countries
MDGs	Millennium Development Goals
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
PTA	Phuket Tourism Association
SD	Sustainable Development
SDI	Sustainable Development Indicators
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environmental Program
WCED	World Commission on Environment and Development
WWF	World Wide Fund for Nature

Chapter 1

Introduction

Sustainability is an important concept of the modern time. However, effective implementation of this in reality is a challenge. The term sustainability as popularly cited in The Brundtland Report defined it as “Meeting the needs of the current generation without compromising the ability of the future generations to meet theirs” (Brundtland, 1987).

Stakeholder’s participation in the evaluation of the development is imperative for sustainability. A common platform for data that can act as sustainability indicators becomes an essential building block for monitoring the state of the development in a region. This requires all organizations, including private, public and civil society sectors to work collaboratively in exchanging knowledge and information in order to achieve a desired future that is sustainable.

1.1 Sustainability and tourism development in Phuket

Phuket is an island in the Andaman Sea in the west coast of southern Thailand which is currently facing sustainability issues. The commencement of Phuket airport in 1976 has accelerated the growth of tourism as the major industry for Phuket (Nam, 2015). Phuket is considered one of the world’s top tourist destinations with an estimate of over 10 million tourists a year (Morison, 2013; Barnett, 2014). According to Tourism Authority of Thailand (2013), tourist number was

aimed to increase by eight percent in international arrivals and three percent in domestic tourists.

The island has undergone several phases of development from extensive tin mining to rubber plantations and most recently tourism. Initially, Phuket tourism was based on terrestrial and aquatic ecosystems which provided the aesthetic value that attracted visitors. The beautiful beaches in and around Phuket provided opportunities for water activities such as snorkeling and diving. However these natural habitats are being rapidly replaced by man-made attractions such as shopping malls, night clubs and tourist infrastructures. Changes in landscape for tourism put great pressure on the environmental and social systems of the area and threaten its sustainability (Zhang, *et al.*, 2011). It is imperative that the concept of sustainability is implemented to manage tourism development while minimizing environmental deterioration (Kytzia, *et al.*, 2011).

While tourism increases the national Gross Domestic Product (GDP) and provincial income, it puts great pressure on the island's resources. Some of these problems have been apparent such as the traffic congestions, solid waste accumulation and flooding (Layne, 2014; Mitrarat, 2014). At the same time, the long term damage of accumulative problems such as public health concerns, illegal waste dumping and air pollution are degrading the wellbeing of tourists and residents. Phuket is also affected by unpredictable rainfall caused by climate change (The Phuket News, 2015). Undoubtedly, monitoring and managing tourism impacts are critical for Phuket sustainability.

1.2 Definition of tourism sector

In this study, tourism sector is defined as tourism business operations that deliver tourism products, such as goods, services and hospitality to the visitors (Department of Trade and Investment NSW, 2012). The tourism sector is considered as the community of parties that are involved in satisfying consumption and service needs of the tourists (United Nations World Tourism Organization, 2008).

It is generally the economic nature employed by visitors on arriving, staying and traveling in the destinations they are visiting for leisure, business and other purposes (Esen and Uyar, 2010).

Based on Chon and Maier's (2010) hospitality and tourism network framework, tourism sector has three major units, the mobile tourism service enterprise, the immobile tourism service enterprise, and the interfusion of mobile and immobile tourism service enterprise. The immobile service enterprise is directed towards hospitality service or "accommodation" that provides lodging services (World Trade Organization, 1998). Hotels, resorts and hostels are some examples of the accommodation. "Food and beverage" represents services that provide dining, catering and drinking facilities such as restaurants, cafés, fast food kiosk, and clubs. The mobile service enterprise is guided by travel services such as "tour operators and travel agencies" that provide package tours, day trips, airline and hotel booking, car rentals, and cruises. "Transportation" is also a mobile service which may include airline companies, marina, and land transports. The combinations of both types of service enterprise are exemplified by sporting, entertainment adventure, and special activities that can be referred to as "others."

Tourism involves a wide range of multidisciplinary sectors (Echtner and Jamal, 1997). Tourism cannot exist as a single entity because of its complex nature of being bound by many disciplines (Jovicic, 1988). Tourism is greatly supported by the development of air transport that has boosted the number of

international tourists (Air Transport Action Group, 2008) and is central to the economy, especially for many developing countries as well as Organization for Economic Co-operation and Development (OECD) countries (Suder, 2004).

The concept of triple bottom line should be considered as a fundamental concept of sustainability and incorporated in tourism development. It is summarized in Figure 1.1.

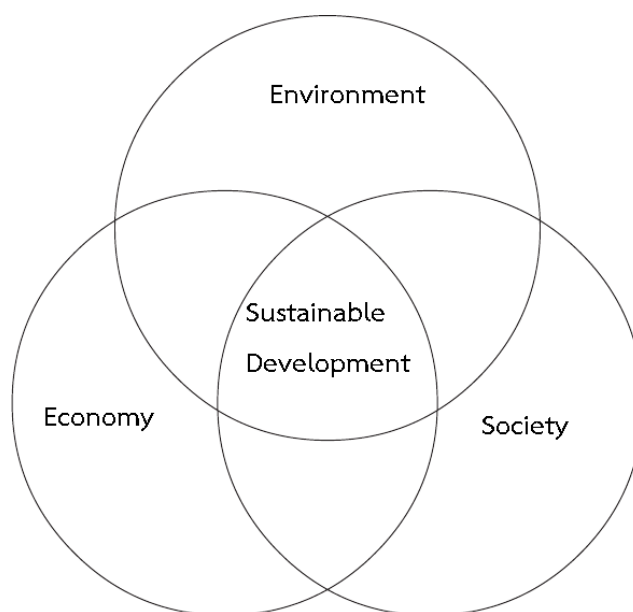


Figure 1.1 The concept of triple bottom line of sustainability as the core of tourism development (Elkington, 2004).

Incorporating the three dimensions of economy, environment and society as the triple bottom line can help determine policies and regulations for sustainable tourism development.

1.3 Statement of problem

Currently Phuket lacks an efficient system for reporting sustainability indicators that can holistically present the conditions and trends of the development on the island. Without a monitoring system to measure the development impacts and emerging problems due to the growth of the tourism sector, the quality of environment and social wellbeing in Phuket may decline beyond recovery. Implementing tourism policies that will help determine guidelines for holistic tourism development is vital in Phuket (Sakolnakorn, *et al.*, 2013) and necessary for raising awareness and understanding of the problems (Boonchai, 2012) and mobilizing actions towards sustainable development with transparency (Blengini and Shields, 2010).

1.4 Objectives:

- 1) To study the awareness and practice of sustainability indicators from Phuket tourism sector's perspective.
- 2) To identify the important sustainability indicators from Phuket tourism sector's perspective.
- 3) To locate the data source for the sustainability indicators identified by the tourism businesses at public sector offices in Phuket.
- 4) To evaluate and identify practical sustainability indicators that are realistic and achievable in Phuket.

1.5 Scope:

- 1) This study focuses on the response from tourism business operators on sustainability indicators, their perceived importance and responsible organizations which are related to obtaining data for sustainability indicators in Phuket.
- 2) The tourism sector in this study is defined as the tourism business operators who are involved in both mobile and immobile tourism enterprises.

1.4 Expected outcomes:

- 1) The list of appropriate and practical sustainability indicators in Phuket.
- 2) The inventories of data sources for Phuket sustainability indicators.
- 3) The recommendations for effective implementation of the indicators in Phuket.

Chapter 2

Literature Review

2.1 Introduction

This chapter explores the concepts of sustainability, sustainable development and sustainability indicators. It summarizes the concepts of the sustainability practices and their implementations. This chapter further discusses the distinctive frameworks and guidelines that promote the sustainability concept across different regions at a supra-national level, national level and local level.

2.2 Sustainable development and sustainability

Sustainable Development (SD) became a popular term after the Brundtland report was published in 1987 (Brundtland, 1987). Since then a large amount of literature on SD has emerged and shaped the discussions around the concept (Robinson, 2004; Boonchai, 2012). It has become a common terminology in the modern world as an integrated path for both environment and economic development. SD does not have a fixed definition both politically and scientifically (Holland, 1995). SD approach reconciles two sets of ideas. It aims to achieve economic development of a nation or a community while protecting the natural environment and maintaining the interest on social wellbeing (United Nations, 2008).

SD evolution has been significant in terms of how it has been perceived in different disciplines such as business management, sustainable tourism and policy making. SD concept received criticism in the 1980's for being a fancy phrase or a cliché which would not survive in the modern development system

(Holmberg, 1992; Trzyna and Osborn, 1995). Nevertheless, sustainability remains a priority concept in the development paradigm within and across nations. SD concept was acknowledged and supported by many international organizations such as The United Nations Conference on Environment and Development (UNCED) known as the Earth Summit. Council for Sustainable Development was also introduced to promote eco-efficiency concept for SD. This was followed by the adoption of the Johannesburg Declaration on Sustainable Development (United Nations, 2002).

Achieving SD is however a great challenge (United Nations, 2008). One of the challenges is the high cost of implementation (Pires, *et al.*, 2014). Hezri and Nordin (2006) explained this problem as the high requirement in human resource with expertise and technical resources which leads to the non-compliances of policies. This was demonstrated in the implementation of the conservation strategies formulated by the World Wide Fund For Nature (WWF) and United Nation Environmental Program (UNEP) which required an import of human resource and technology which was not the best approach as many problems were best solved with local knowledge in Malaysia (Hezri and Nordin, 2006). This is partly due to the fact that investing in foreign human resource to study the local situation is expensive and time consuming (Bockstaller and Girardin, 2003; Reed, *et al.*, 2006).

2.3 Indicators identification: roles and challenges

SD indicators are widely used to guide SD implementation and can be identified in various ways. McCool and Stanky (2004) identified the roles of indicators at three levels. Firstly, indicators help determine the current state of the system. Secondly, they help monitor the progress of development. Thirdly, also stated by Church and Rogers (2006) and The United Nations (2007), indicators alert the people on a forthcoming future for societal, economic and environmental situations, caused by their own actions.

An indicator is ought to give base line information on the current situation of a region (Augenbroe, *et al.*, 1998; Agol, *et al.*, 2014). Any issues can be brought to immediate attention by identifying indicators that will monitor the issues so all localities or countries should have variation in the choices of their indicators to measure SD (Hák, *et al.*, 2012). Indicators are also chosen for measuring the effectiveness of any actions and policies in all dimensions to reach a desired sustainable state (Harris, 2000). Indicators can serve as a vigilant tool to predict and prevent future problems on the nature, culture, society and wellbeing (Shields, *et al.*, 2006).

According to Bell and Morse (2001), indicators can be developed into two archetypes; traditional and unconventional. The traditional method refers to a top-down approach (Fraser, *et al.*, 2006) that is formulated by authorities or individuals from different fields with different expertise. The second approach is an unconventional bottom up method which decentralizes decision making power to the common people. The community-based bottom up method involves social participation of the community and social actors. The latter approach incorporates all aspects such as values, culture, as well as environmental problems and acknowledges local involvement in policy development (Fromhold-Eisebith and Eisebith, 2005).

Both approaches for developing indicators have their own pros and cons. The top-down approach can be of implicit and explicit manners (Wolfe, *et al.*, 2003). This means policies become compulsory regulations for people and organizations. The policies in top-down approach can be influenced by the politics or the internal and external pressures from the government parties or international forces (Donnelly, 2010; Persson, *et al.*, 2016).

The bottom up process is a collective decision making by the locals for their locality which has high possibility of success because the participants are willing to commit to what they have agreed upon (Koplowitz, 2008). On the other hand the downfall may be disagreement between opinions and ideas of the different stakeholders because of their diverse backgrounds and indicators that are hard to implement (Sébastien and Bauler, 2013).

A balance should be maintained between these two approaches to develop sustainability indicators without overly emphasizing on the upper level decision makers or the lower level managers or the community (Reed, *et al.*, 2006). In order to produce meaningful and appropriate indicators, the stakeholders in the process need to include the private sector, civil society, NGOs and the government organizations who share a common goal for the society (Bell and Morse, 2004).

Indicators are also determined according to their quality and values (Hai, *et al.*, 2014). Indicator priorities should be identified, sorted and weighed. It is a sophisticated process to choose indicators that can appropriately reflect a balance between the social, ecological and economic components of SD (Michalos, 1997; Cornescu and Adam, 2013; Liu and Zhang, 2013). Not all countries and cultures have the same expectation for wellbeing or happiness. The need for culturally appropriate indicators for the region is more meaningful than replicating indicators based on international models or frameworks (Moreno Pires, 2011).

Indicators play an important role in monitoring sustainability (Rice and Rochet, 2005). The process of achieving the full functionality of an indicator can be marked by successful data keeping (Hai, *et al.*, 2013). However, data keeping simply does not ensure the implementation of the indicators (Adelle and Pallemmaerts,

2009). Each of these indicators needs to be properly interpreted, analyzed and informed to the key actors in order to become meaningful (IASC CAP, 2007).

Indicators should be designed at the level where data collection is effective and accurate. The probability of database accuracy, efficient monitoring and better analysis of these data is also higher in a smaller region (Moreno Pires, 2011). The right indicators will best serve as a tool for achieving SD if properly implemented at a spatial and temporal scale (Nader, *et al.*, 2008).

2.4 Practicing Sustainability

In 1992, The United Nations established the Commission on Sustainable Development (CSD)¹ after the United Nations Conference on Environment and Development (United Nations, 1992). CSD was directed towards developing frameworks for SD to ensure implementation of Agenda 21 and Rio declaration at regional, national and local levels by offering guidance and methodologies. This led to publication of three editions of indicators of Sustainable Development: Guidelines and Methodologies (United Nations, 2007).² The first two were called the Blue Book One and the Blue Book Two published in 1996 and 2001, respectively with another CSD publication in 2007. The latest edition published was in 2015. It compiled ideologies of sustainability from Agenda 21 and Millennium Development Goals.

The first edition of Blue Book One comprised of 134 indicators classified into four pillars namely social, economic, environmental and institutional

¹For more information on United Nation Commission on Sustainable Development visit the official UNCSD at : <https://sustainabledevelopment.un.org/intergovernmental/csd/about>

²Document available at <https://sustainabledevelopment.un.org/content/documents/guidelines.pdf>

aspects.³ The indicators were developed through the participation of member states. A pilot test was conducted with 22 countries around the world on voluntary basis. Countries from Asia Pacific regions such as China, Pakistan and Philippines also received monetary assistance to conduct the test. The evaluation and assessment of the results led to publication of Blue Book Two which presented 58 indicators instead of 134 in the first edition. The later edition of CSD publication in 2007 however presented 50 core indicators under 14 themes which were further explained in 44 sub-themes. The themes were broadened in the third edition due to the multidisciplinary nature of the term sustainable development and changing environmental conditions.

Since then many countries have incorporated SD and its expansion in their development plans such as Gross National Well-being (GNB). Frameworks of sustainability practices are identified in the following section such as Millennium Development Goals, European Union Sustainable Development Indicators, Gross National Happiness and Sufficiency Economy Theory. Some well-known frameworks are presented in this section.

2.4.1 Millennium Development Goals (MDGs)

The UN adopted eight goals to guide global SD for the global citizen (United Nations, 2003). The United Nations member countries signed a Millennium Declaration in 2000 with the aim and agreement to improve the quality of life of the people in their countries and regions (Adelle and Pallemmaerts, 2009).

³ List of indicators available at

<http://www.unece.org/fileadmin/DAM/stats/documents/2001/10/env/wp.27.e.pdf>

The eight MDGs include: (United Nations, 2003)

- 1) to eradicate extreme poverty and hunger,
- 2) to achieve universal primary education,
- 3) to promote gender equality and empower women,
- 4) to reduce child mortality,
- 5) to improve maternal health,
- 6) to combat HIV/AIDS, malaria and other diseases,
- 7) to ensure environmental sustainability and
- 8) to develop a global partnership for development.

The UN released a collective report on global achievement of these goals which were presented in the United Nations Assembly annually to keep track on their progress. Although the member states were to release their country report every three years, they need not use the same strategy to achieve these goals due to the individual country's requirement (Sathaye, *et al.*, 2007). The UN member states pledged to achieve their targets by 2015 (United Nations, 2010). The goals were positively achieved through all regions of the world. However, Oceania countries such as Australia, New Zealand and Fiji, and western Asian countries such as Lebanon, Syria, and Iraq showed slow progress on the first and seventh goals. The eighth goal was fully achieved through out all regions of the world. Overall, the MDGs were reported to be successfully achieved globally in the UN report "The Millennium Development Goals Report 2015."⁴

⁴The MDG report chart is available at:

http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20PC%20final.pdf

2.4.2 European Union Sustainable Development Indicators (EU SDI)

European countries set their indicators according to those identified by European Union (EU) in the treaty of European Union (European Union, 2008) which stated the commitment of the union to achieve SD and monitor sustainable growth in the member countries. Many European countries have adopted standardized SD indicators but implementations of these indicators were still not a priority (Moreno Pires, 2011).

European Union developed European Union Sustainable Development Indicators (EU SDI) that classified the issues and concerns of the member states in 10 different themes (Table 2.1).

Table 2.1 Themes of European Union Sustainable Development Indicators

Themes	
1	Socio-economic development
2	Sustainable consumption and production
3	Social inclusion
4	Demographic changes
5	Public health
6	Climate change and energy
7	Sustainable transport
8	Natural resources
9	Global partnership
10	Good governance

Eurostats⁵ has been set up to maintain a systematic electronic record keeping. It publishes a report to monitor the progress in The European nations. The EU keeps the member countries informed about their status and also provides the comparison on the level of development amongst the member countries. The members can base their result on SD that is statistically presented in a report by the Eurostats.

2.4.3 Gross National Happiness (GNH)

Gross National Happiness (GNH) is the concept used as the primary objective of development in Bhutan. The notion of ‘happiness’ can be defined in the general context that applies to the feeling of contentment or the emotion (McKean, 2005). Bhutan applied the meaning of happiness which focused on emotion into the country’s development concept (Veenhoven, 2007; Ura, 2009). His Majesty Jigme Singye Wangchuk first coined the term “Gross National Happiness” in 1972 establishing a unique development tool to measure the progress of the nation. The happiness concept in Bhutan roots in the 1729’s legal code by Zhabdrung Ngawang Namgyal⁶. It stated that “If government cannot create happiness for its people, there is no purpose for the government to exist” (Ura, *et al.*, 2012). Thus great leadership must acknowledge the pursuit of happiness along with liberty, equity and justice (Burns, 2003). Such concept nurtures the Bhutanese citizens to be grounded in humanitarian values.

Despite being amongst least developing country (LDC) (Chung, 2013), Bhutan’s decision to adopt the tool that aims for the holistic development of intellectual, social and spiritual aspect (Musikanski, 2014) following GNH concept has

⁵ Eurostats is a statistical organization based in Luxembourg that carries out statistical procedure and maintains a data base for the European Union. Details on Eurostat’s are available on the website (<http://ec.europa.eu/eurostat/web/sdi/indicators>)

⁶ Zhabdrung Ngawang Namgyal was Buddhist scholar from Tibet who holds a significant importance in Bhutan history as he unified the country. He introduced the dual system of government by separating spiritual and administrative heads that brought an end to the civil war in Bhutan.

gained the international recognition and acknowledgment for its non-materialists goals (Thinley, 2013).

GNH concept is based on four pillars namely good governance, cultural conservation, natural preservation and equitable and sustainable socio-economic development (Rinzin, *et al.*, 2007; Ahonen, 2014). This forms the basis of the development concept which is further divided into 9 domains of living standard, health, education, time use, good governance, ecological diversity and resilience, psychological well-being, community vitality and culture diversity and resilience. These domains classify indicators by specific objectives to measure the progress of the country over time.

GNH is rooted in Buddhist teachings (Wangmo and Valk, 2012) which include respecting the nature, self-respect and self-contentment. These values run through generations in Bhutanese society and are reflected in the GNH indicators such as ‘Driglam Namzha’⁷ (Etiquettes) which help preserve the cultural identity. Other indicators highlight the importance of education, good health, conservation of culture and community development.

The constitution of Bhutan under article 5, section 3 states that “The government shall ensure that, in order to conserve the country’s natural resources and to prevent degradation of the ecosystem, a minimum of sixty percent of Bhutan’s total land shall be maintained under forest cover for all time” (Royal Government of Bhutan, 2005). Bhutan has been able to exceed the expectation of the constitution by achieving seventy two percent forest cover (Tobgay, 2016). Similarly Article 5, section 5 states that “The parliament may, by law, declare any part of the country to be a national park, wildlife reserve, nature reserve, protected forest, biosphere reserve, critical watershed and such other categories meriting protection.” This resulted in ten zones that were declared as protected areas (Royal Government of Bhutan, 2005).

⁷ Driglam Namzha is the Bhutanese code of conduct of how one should behave in a formal setting regarding the dress code and one’s actions.

Despite global praise for GNH concept (Helliwell, *et al.*, 2013), its criticism for being a utopian fantasy remains (Stehlik, 1999). In 2012, there was a discussion on the disfunctionality of the concept and an urge for Bhutan to put more emphasis on economic development (The Bhutanese, 2012).

2.4.4 Sufficiency Economy Theory

Thailand's "Sufficiency Economy" was first introduced by His Majesty the King Bhumibol Adulyadej⁸ on 4th December 1997 to address the economic crisis faced by the nation (Mongsawad, 2010). The term quickly gained popularity and was acknowledged by policy makers in Thailand. The meaning of sufficiency is defined as the idea of differentiating needs and wants to prevent unnecessary spending (Thaiways, 2002). Sufficiency Economy theory roots its foundation on the middle path and finding happiness in what is available to oneself.

While SD emphasizes on 3 Ps (People, Planet and Profit), Sufficiency Economy focuses on 3E's (Equity, Ecology and Efficiency) (Laukaikul, 2014). Sufficiency Economy is an important development concept because of its ability to connect and transcend through all sizes of communities starting from self-sufficient families, sustainable communities and finally self-reliance society (The Chaipattana Foundation, 2007).

Initially, Sufficiency Economy was applied to agriculture and rural development but has now been adopted to apply to other issues including poverty, water supply, public health, public welfare and consumption (Piboolsravut, 2004). In addition, implementation following Sufficiency Economy concept can be seen in several royal projects which are categorized into eight sectors of agriculture, environment, public health, occupational promotion, water resources, communication, public welfare and others. These themes were implemented in the

⁸ His Majesty the King Bhumibol Adulyadej was honored by awarding the first-ever Human Development Lifetime Achievement Award In recognition of his contribution towards the betterment of his citizens through his Royal Projects by Kofi Annan on May 26, 2006. (UN, 2006; Thaiways, 2002)

projects such as soil improvement, wastewater improvement, forest rehabilitation and local self-reliance (The Chaipattana Foundation, 2016).

2.5 Comparison of SD frameworks

This section compares and contrasts different SD frameworks discussed above (MDGs and EU SDI, GNH and Sufficiency Economy). Table 2.2 summarizes the goals and the implementation mechanisms of each framework.

Table 2.2 Comparative study of the sustainable development frameworks at international, regional and national level

Level	International Framework	Regional Framework	National Framework	National Framework
	MDG	EU SDI	GNH	Sufficiency Theory
Development goals	<p>Eight goals on</p> <ul style="list-style-type: none"> Eradicating poverty Achieving universal primary education Reducing child mortality Promoting gender equality Improving maternal health Combating HIV/AIDS, malaria and other diseases, Ensuring environmental sustainability Developing a global partnership for development 	<p>Nine domains on</p> <ul style="list-style-type: none"> Socio-economic development Sustainable consumption and production Social inclusion Demographic changes Public health Climate change and energy Sustainable transport Natural resources Global partnership Good governance 	<p>Nine domain on</p> <ul style="list-style-type: none"> Living standard Health Education Time use Good governance Ecological diversity & resilience Psychological well-being Community vitality Culture diversity & resilience 	<p>Moderation</p> <ul style="list-style-type: none"> Self-immunity Reasonableness
Establishment	Following the Millennium Summit, MDG were identified.	Founded under Directorate-General of the European Commission	King's declaration to adopt GNH index	Proposed by King Bhumibol Adulyadej

Table 2.2 Comparative study of the sustainable development frameworks at international, regional and national level
(continued)

Level	International Framework	Regional Framework	National Framework	National Framework
	MDG	EU SDI	GNH	Sufficiency Theory
Started in	2000	2001	1987	1997
Administered by	United Nation Development Fund	Eurostat	Royal Government of Bhutan (Gross National Happiness commission)	Thai government
Guiding principle	Fundamental rights / welfare or people and environment	EU Sustainable Development Strategy	Happiness/buddhism/spiritualism	Middle path
Reporting method	Survey	Each theme has specific methodology available at http://ec.europa.eu/eurostat/statistics-explained/index.php/Main_Page	Survey	There is no official database
Database	Database available on http://mdgs.un.org/unsd/mdg/data.aspx Published Millennium Development Goals Report 2014	Report published by Eurostat every two years Data available at http://ec.europa.eu/eurostat/data/database	Publish survey interpretation (statistically)	None

MDGs and EU SDI represent the international and regional standards while GNH and Sufficiency Economy symbolize national frameworks. All of them were established using a top-down approach. While all aim for SD, there are differences in the evaluation and implementation. The MDGs and EU SDI are monitored by the publication of reports and collection of data. The data for MDGs and EU SDI are organized, accessible and the figures have complementary interpretation to aid understanding. Sufficiency Economy does not have a central organization or an entity for implementation or data collection. In GNH, happiness is measured based on Alkire-Foster method⁹ where indicators are scored from the survey questions that are both subjective and objective. Each indicator is assigned with targets for instance the indicator “household income” under the domain “living standards” that targets a monthly income level of 23.127 Ngultrum (USD\$ 0.344). Depending on the number of indicators an individual is satisfied with, the weight of these indicators is calculated. For example, 77%-100% is considered deeply happy, 66%-76% is extensively happy, 50%-65% is narrowly happy and 0%-49% is unhappy or ‘not-yet-happy’ (Ura, *et al.*, 2012).

The frameworks for SD that are adopted at different levels tend to focus on different issues and hold temporal and spatial importance of each context. On the international front issues like poverty, education, gender, equality take priority whereas economic issues such as national income (GDP), employment, production and consumption patterns are of high importance in Europe, and spirituality dominates Bhutan and Thailand.

This study aims to identify the indicators for sustainability in Phuket at a local level by undertaking a bottom up approach from the perspective of the key

⁹ For detailed methodology of GNH indicators visit the webpage http://www.grossnationalhappiness.com/docs/GNH/PDFs/Sabina_Alkire_method.pdf

stakeholders from the tourism sector. The literature review is used for analyzing results and suggestions for successfully implementing sustainability.

2.6 Conclusion

Indicators are vital for development strategies. Appropriate indicators should be identified to monitor the development progress at local level. This research aims to identify sustainability indicators from the perspectives of the tourism sector in Phuket and evaluate their practicality using a bottom-up approach. This allows the indicators for SD in Phuket to be developed from the understanding of the local environment, desires and monitoring capacity of the practitioners in reality.

Methodology

3.1 Introduction

This chapter describes the methodology used in this study. The chapter is presented in five parts namely the introduction, research procedure, desktop research, field data collection, and analysis. A mixed method was used to determine and address the research questions. This framework combines both quantitative and qualitative research paradigms (Leech and Onwuegbuzie, 2007). This is seen to be appropriate for the research that has several research questions.

3.2 Research questions

The research questions are formulated to help guide the research activities. There are four main research questions (RQs) which have been further divided into sub-questions in order to better identify the methods appropriate for each step of the research (Table 3.1).

RQ 1. “What sustainability indicators are used in Phuket?”

This question explores the history, existing indicators in Phuket and their practicality, and stakeholders who participated in their formulation.

RQ 2. “What sustainability indicators are important for tourism sector in Phuket?”

The question aims to evaluate Phuket’s sustainability indicators from the opinions of the tourism community in Phuket.

RQ 3. “Where is data for sustainability indicators?”

The question attempts to identify the sources and locations of the data for sustainability indicators.

RQ 4. “What are practical sustainability indicators for Phuket?”

This question brings together the information gained from the previous stages to identify data that can realistically be used to report sustainability in Phuket.

Table 3.1 The research questions and research activities

Research question	Sub-question	Method	Source	Output
1. What sustainability indicators are used in Phuket?	1.1 What are the existing indicators that have been developed and used in Phuket?	-Desktop research	-Phuket Sustainability Indicator Report -Local authorities	-Chapter 4
	1.2 What indicators are identified by tourism sector?	-In-depth Interview	-Phuket Sustainability Indicator report -Local authorities	-Chapter 4
2. What sustainability indicators are important for tourism sector in Phuket?	How are indicators evaluated by the tourism sector?	-In-depth Interview	-Literature	-Chapter 2
		-Survey	-Informants	-Chapter 4
3. Where is data for sustainability indicators?	3.1 Where should data be stored and who should be responsible?	-In-depth interview	-Local authorities -Informants	-Chapter 4
	3.2 What data is available and how is it stored?	-Interview	-Websites of data source	-Data repository -Appendix 3
4. What are practical sustainability indicators for Phuket?	How to report sustainability indicators for Phuket?	-Interview -Survey	-Local authorities -Informants	-Chapter 5

3.3 Research procedure

This research followed an exploratory approach (Robson, 2011) that enabled the gathering of facts, ongoing and forthcoming events. Several methods were used in this research. Figure 3.1 illustrates the overview of the methodology in resolving the research questions.

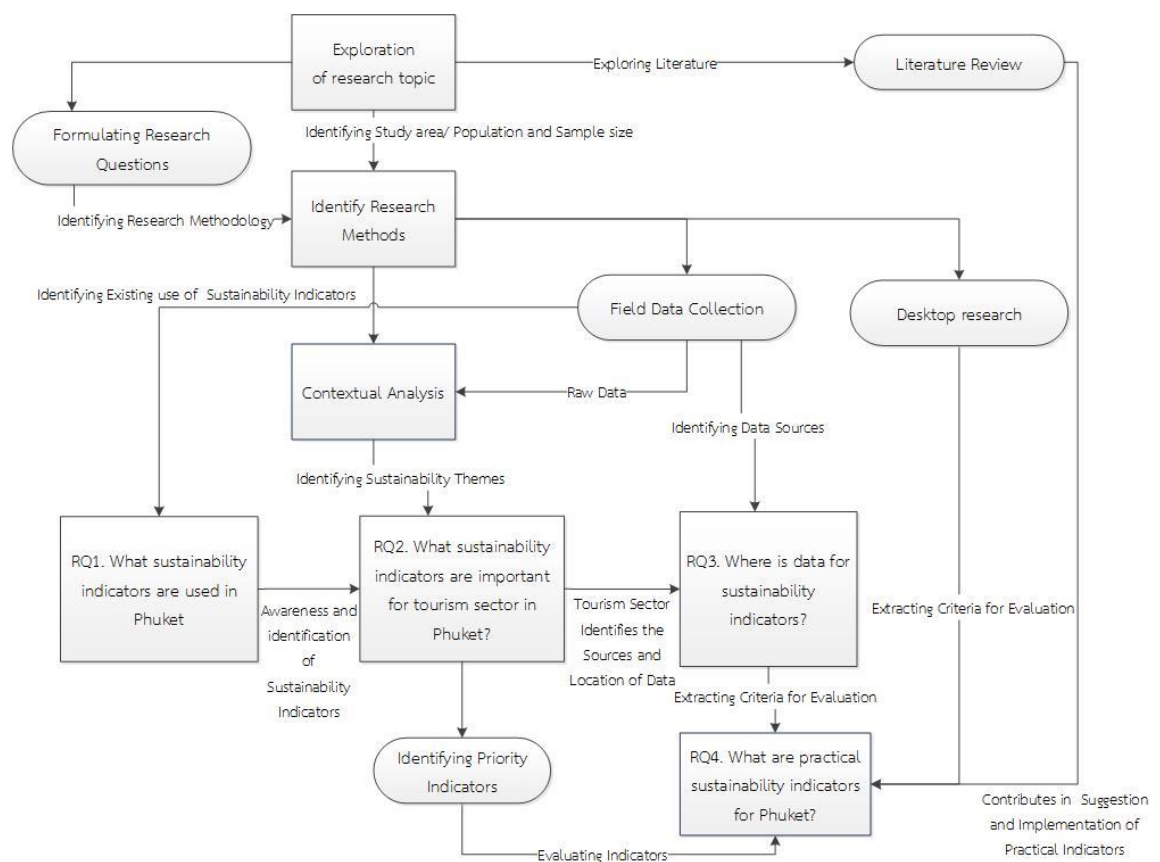


Figure 3.1 Research questions and methods

3.4 Study area

The study area is Phuket province which is the biggest island located in the south of Thailand covering 543 square kilometers (World Tourism Organization, 2005). The province is divided into 3 districts, 17 sub-districts and 103 villages (Phuket Provincial Administration Office, 2010).

3.5 Sampling and field data collection

The population in the research is divided into two groups for an interview and one group for a survey as shown in Figure 3.2.

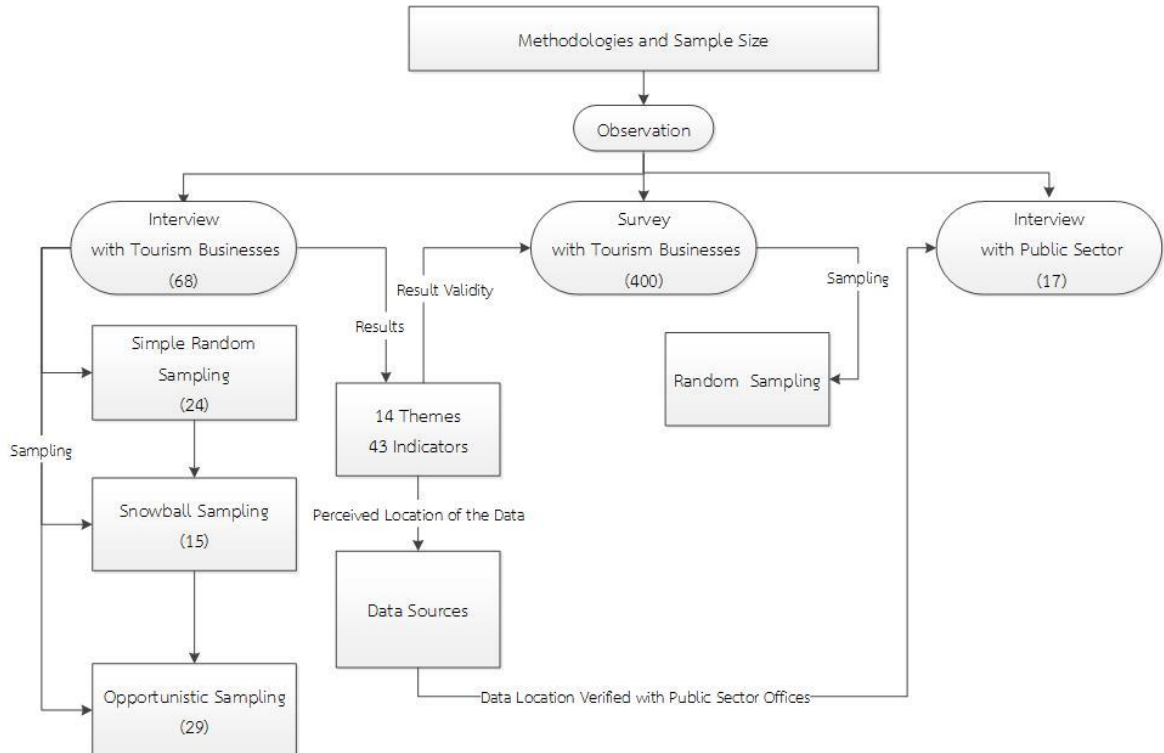


Figure 3.2 Sampling size and collection methods

3.5.1 Interviews with tourism businesses

The first set of interviews with the tourism businesses consisted of sixty eight informants from tourism sector in Phuket (Table 3.2). Three sampling methods were used to recruit informants. Twenty four informants were identified by simple random sampling (Hansen, *et al.*, 1953; Moore and George, 2006; Moore, 2007), fifteen informants from snowball sampling (Cooper, *et al.*, 2011) and twenty nine informants form opportunistic sampling or emergent sampling (Cohen and Crabtree, 2006) or a walk-in approach. The sample size was determined by the theoretical saturation (Mack, *et al.*, 2005) of data.

The categorization of the tourism sector in this research follows the distribution of businesses by the Phuket Tourism Association (PTA) as demonstrated in Table 3.2. The interviews were semi-structured so the questions could be adjusted to suite the context and take advantage of emerging information (See Appendix 5). Each interview lasted from 30 to 40 minutes on average which summed up to 45 hours of interview data. Once there was no more new data given by the interviewees, the interview reached a saturation point. The first group of the interview with the tourism business concluded at 68 informants.

Table 3.2 Distribution of interviewees in the first round according to business type and location

Businesses	Kathu	Mueang	Thalang	Outside Phuket	Total
Hotels and resorts	11	8	1	1	21
Tour agents	5	2	5		12
Miscellaneous	4	0	4	1	9
Restaurants	3	1	5		9
Real estates	2	2	4		8
Spas	2	0	3		5
Dive centers	1	2	1		4
Total	28	15	23	2	68

It is noteworthy that two informants from outside Phuket were included in the interview due to their high involvement in the previous compilation of Phuket sustainability indicators. One of them led a consultancy firm which was involved in the indicator development and the other was a hotel manager from an award winning hotel and was highly recommended by other informants.

The informants in the first round of interviews identified data sources for sustainability indicators and the organizations which they perceived to hold data for these indicators. This led to the second round of interviews with the public sector offices in Phuket as discussed in 3.5.3.

3.5.2 Survey

The objective of the survey was to validate the sustainability indicators identified by the informants from the in-depth interviews. The sample size of 400 was determined using Yamane equation (Yamane, 1967). The tourism sector was categorized into five groups for the survey. They were tour agents/operators (diving, sightseeing, package tour companies), transport (airlines, taxies, busses, boats and yachts), food and beverage (restaurant, café, and bars), accommodation (hotels, villas, resorts, hostels, and serviced apartments), and others (fitness centers, massage and spas, and tattoo shops). The distribution of the sample size across these categories is shown in Table 3.3.

Table 3.3 Survey sample size according to tourism category

	Tourism category	Sub categories	Total size	Sample size
1	Tour operators and travel agencies		11,346	213
2	Transport		5,323	105
	Land	Taxi (45) Busses (13)		
	Air	Airlines (15)		
	Water	Long tail boat and yacht (34)		
3	Food and Beverage		2,230	42
4	Accommodations		1,800	34

5	Others	299	6
Total		20,998	400

The total size was retrieved from the public sector offices in Phuket. Using the findings from the interviews with the tourism businesses, survey questions were designed to validate the indicators identified by the informants of the first set of interviews for their importance and applicability. The structured survey questions were divided into three sections. Firstly, the survey asked the demographic information. Secondly, there was the list of the indicators and the scale of 5 to 1 where, 5 was Strongly agree, 4 was Agree, 3 was Neutral, 2 was Disagree and 1 was Strongly disagree to measure the importance of the indicators perceived by the respondents. Finally, there were questions on the demand for official sustainability indicators, government's role in reporting sustainability, integrated sustainability database and the public access to data.

3.5.3 Interviews with the public sector

A structured interview was conducted with representatives from 17 public sector organizations and sub-units that were perceived to hold data on sustainability indicators to verify the availability of the data (See Table 3.4). Furthermore, a snowball sampling was also adopted as a supplementary method to recruit informants during the interviews.

Table 3.4 Informants from public sector

	Public Sector Offices	Sub-units
1	Phuket Marine Biological Center	
2	Phuket Provincial Statistic Office	
3	Phuket Provincial Land Office	
4	Phuket Weather and Radio Station (Thailand Meteorological Department)	
5	Phuket Provincial Fisheries Bureau	
6	Phuket Provincial Chamber of Commerce	
7	Phuket Provincial Public Health Office	
8	Phuket Provincial Forestry Office	
9	Department of Tourism and Sports	
10	Department of Business Development	
11	Department of Revenue Phuket	
12	Phuket Department of Community Development	
13	Marine Office Phuket 5	
14	Phuket Immigration (Airport)	
15	Phuket Provincial Offices of Public Works and Town & Country Planning	
16	Provincial Office of Natural Resources and Environment	Department of Ground Water Resources Department of Environment
17	Royal Thai Police	Department of Drug Control

3.5.4 An observation

The researcher observed several events where notes were taken and analyzed to complement data collection from an interview and a survey. An estimate of 48 hours of observation was interpreted as results and suggestions in chapter 4 and 5. An observation helped gain information that were not written or spoken in the public such as subtle cultural meanings and social interactions.

3.6 Desktop research

Secondary data was collected through the interview with public sector offices, businesses and community groups for statistical data and official documents. To ensure the comprehensiveness of data, a desktop research was used to help gain access to materials such as documents, journals, news articles, reports, presentations, and written works from the local media and international organizations.

3.7 Analysis

The data gathered from the interviews with the tourism businesses was contextually analyzed (Mayring, 2000; Morse and Niehaus, 2009). This method was used to help determine the information and situation that reflect the changing trends and challenges (International Union for Conservation of Nature, 2000) of tourism in Phuket.

The data from the interviews with the tourism businesses was transcribed, coded and grouped into themes. The themes were identified at three levels that highlighted the current sustainability issues in Phuket. The hierarchies of these three levels of themes are described as follows. Firstly, “Sub-theme level one” highlighted the problems in Phuket that were mostly direct quotes. “Sub-theme level two” was grouping of common issues. Finally, “Sustainability themes” was the third level that represented the issues under a broader topic. The analyses of the perceived importance of the themes are presented in Appendix 2. These themes were also shaped with the analysis of the frameworks using the literature review.

The interviews with the public sector were analyzed mostly using contextual analysis and the notes from observations which were presented in chapter 5. Official data on sustainability indicators identified by the tourism businesses were obtained from the public sector offices to verify reliability of the information gathered. These help build the criteria for evaluation of the practical indicators for Phuket to resolve research question 4.

The survey was analyzed quantitatively. Basic statistical parameters such as average scores were calculated and ranges were determined to rate the perceived importance of the indicators in each theme. The scores were interpreted by normalization equation.

$$X_{\text{new}} = \frac{(X_{\text{max}} - X_{\text{min}})}{\text{Total number of intervals}}$$

Where; X_{new} =Size of the range
 X_{max} =Maximum value
 X_{min} =Minimum value

The size of the range can be calculated by using the above equation where the maximum score is 5, the minimum score is 1 and the total number of intervals is 5. The size of the range was calculated as 0.80. This value was applied to interpret data into 5 intervals (Table 3.5).

Table 3.5 Interval range and description

Score interval	Descriptions
4.21-5.00	Strongly agree
3.41-4.20	Agree
2.61-3.40	Neutral
1.81-2.60	Disagree
1.00-1.80	Strongly disagree

The same method described above was used to interpret the second section of the survey questions on the perceived importance for sustainability indicator database in Phuket. The results from all research methodologies of data collection were analyzed to resolve research questions by identifying the practical indicators for Phuket. Data triangulation was used to evaluate the practical indicators and also to identify patterns and relationships among the themes to conceptualize the interest of the tourism sector in Phuket.

Chapter 4

Results

1.1 Introduction

This chapter reports how the informants perceived development and sustainability in Phuket. The findings reveal the perspectives of tourism sector towards sustainable development and sustainability indicators. This chapter addresses research questions one, two and three on existing sustainability indicators, priorities of indicators by the tourism sector and the accessibility of data, respectively.

4.2 Sustainability indicators in Phuket

The first research question aims to identify the history of existing sustainability indicators in Phuket. Data to address this question came from both desktop research and interviews.

From the media and internet search, the first formal attempt to develop the holistic indicators of sustainability for Phuket was organized by a civil society group called SEEK Phuket (Society, Environment, Economy and Knowledge

Phuket). In 2012, SEEK Phuket with Sustainability Asia and AtKisson¹ consulting company initiated a series of workshops to identify indicators for sustainability in Phuket (SEEK, 2012). As a result, 26 indicators were proposed using a sustainability compass designed by the AtKisson group (SEEK, 2013). The compass concept categorized sustainability into nature's health (N), economic growth (E), social development (S) and wellbeing of the individuals (W) (Healthy Community Initiative of Greater Orlando, 2002; Borough of Canonsburg and the Canonsburg Renaissance Group, 2004). The sustainability indicator report was published and presented to Phuket governor in 2013 (SEEK, 2013)

Although SEEK Phuket sustainability report was successful in recruiting a voluntary participation from active citizens and funds from the local businesses to support the discussions on the desired future of Phuket, the progress on the actual monitoring of these indicators has been unknown.

According to the findings from the interviews, only seven percent of the interviewees were aware of the existence of SEEK Phuket sustainability indicators because of their involvement in the workshops and media release (AK1, SK8, JW21, IU9, and PN7). There were a few interviewees who had heard of sustainability indicators but could not provide details as exemplified by KP10 in the following statement. *"Heard about it but never checked because it is not interesting and also because I am busy all the time. I don't have time to check about it."* Similarly another informant stated, *"Heard about indicators but never practiced and never saw others practicing too"* (ID5).

In addition to SEEK Phuket sustainability indicators, there were mentionings of general indexes and indicators that may exist in Phuket. Seven percent of the interviewees talked about indicators such as tourist arrivals (BA16,

¹ AtKisson Group is a consultancy firm based in the United States of America which provides sustainability training and consultation to resolve issues and has global affiliation. Details available at <http://atkisson.com/>

PH7, JW21, CB5, AI8, and NL6) and hotels and flight occupancy (BM14, NL6, SC7, PC9, HA7). Four percent of the interviewees identified wastewater as an indicator (NV15, MT9, and AC2). Other indicators mentioned were the energy consumption (MP14, RA8), air quality (LM20), corruption (BA16), beach and water quality (FT4, OD1), construction (RP4), income and cost of living (PK6, OS5). However, 82 percent of the informants were completely unaware of any sustainability indicators for Phuket as they immediately responded “No” or “*Never heard of it*” when asked if they knew of a sustainability indicator.

4.3 Priority indicators from the perspective of tourism sector

This section provides the resolution of research question two on how tourism sector perceives and prioritizes sustainability indicators. The transcripts from 68 interviews were coded and grouped into sustainability themes according to related topics. The interview results were summarized into 14 major themes and 61 sub-themes. The number of informants who mentioned these themes is presented as percentage in Table 4.1.

Table 4.1 Sustainability themes from the first round of interviews

	Main Themes	Percentage of mentioning (n=68)
1	Economy	95
2	Nature	82
3	Governance	64
4	Data Management	59
5	Infrastructure	57
6	Transportation	54
7	Phuket Brand Positioning	54
8	Public Health	53
9	Population	53
10	Tourism	43
11	Culture	38
12	Evaluation Satisfaction	31
13	Social Inclusion	28
14	Education	25

More than fifty percent of the interviewees mentioned economy, governance, data maintenance, infrastructure, transportation, Phuket brand positioning, public health and population. Other themes such as education and social inclusion were also raised by one fourth of the interviewees.

The sub-themes were presented in two levels (See Appendix 2). The sub-theme level one presented the list of primary issues mentioned by the informants. The sub-theme level two presented the primary issues that were grouped into common specific topics. The sub-theme level two was further categorized into main themes as a comprehensive representation of the sub-themes.

The most mentioned sub-themes were safety followed by littering and solid waste. Other popular topics were tourist arrivals, uncontrolled construction, increased cost of living, tourist behaviors, beach services, education and awareness. There were also sporadic mentioning in the sub-themes of data for housing and

labor force, monitoring carbon footprint, promoting Buddhism and the need for a baseline study for sustainability data. The main sustainability themes are discussed in the next section.

4.3.1 Economy

Majority of the informants in Phuket were concerned about the influence of tourism sector on Thai economy. The economic indicators were the most mentioned theme by ninety five percent of the informants. Business structure was the most mentioned sub-theme as sixty six informants discussed about business competition in Phuket and in Southeast Asia. Thirty four percent of the informants discussed wealth distribution, improved standards of living with access to infrastructure and job availability as a positive attribute of tourism. Phuket's cost of living was said to be twenty to thirty percent higher than other provinces in Thailand (C9 Hotelworks, 2015). Double standard for pricing between tourists and locals was remarked by an informant (BA16) as *"pure rip-off from the tourist."* Tourists spending and consumption patterns were considered important by sixteen percent of informants. However, thirteen percent of the informants were concerned about ongoing global economy crisis. Ten percent considered foreign investment as a threat to Thai economy while nine percent were worried about the negative economic impact of increasing migrants to Phuket.

4.3.2 Nature

This theme discusses various issues that affect the environment mentioned by eighty two percent of the informants. Littering, solid waste and wastewater were the most mentioned sub-themes. Waste management problem was highlighted by fifty six percent of the informants whose opinion can be demonstrated by this statement *"Waste is a huge problem in Phuket"* (MP14). The problem of waste volume exceeding the landfill capacity and lead to inappropriate disposal was highlighted by BM4 that *"There is an illegal practice of dumping near klong (canal)."* Littering also affected the beaches as demonstrated in the comment by ET11 *"Trash*

is increasing, beaches are becoming dirty.” Undoubtedly, thirty four percent of the informants called for better management and conservation of the beaches.

The need to minimize electricity consumption and save energy was mentioned by fifteen percent of the informants. Solar energy was perceived to be an alternative energy for Phuket (WB3, MP14). Fresh water scarcity in Phuket was a concern shared by ten percent of the informants. The same number of interviewees mentioned the need to regulate tourism impacts on marine ecosystem and marine parks. Other issues included exploitation of wild life and natural resources (six percent) and air pollution (three percent).

4.3.3 Governance

This theme highlights the role of government in monitoring, implementing and evaluating sustainable development. It was discussed by sixty four percent of the informants. Inefficient communication amongst stakeholders and government organizations raised concern for reliability and transparency of Phuket’s development in thirty two percent of the informants. Different rules in different municipalities were stated to be a problem as remarked by KP12, *“Different municipalities have different rules and it confuse tourist.”* Corruption, bribery and unclear regulations were highlighted by twenty five percent of the informants while twenty one percent blamed the decline in tourist arrivals on unstable political situation. Considerable number of the informants (nineteen percent) discussed the direction of the government in policy implementation, and monitoring sustainable development. Corrupted police officers and dishonest public officials were perceived to fuel the public distrust in the government and its management by seven percent of the informants.

4.3.4 Data management

Fifty nine percent of the interviewees stated the significance of data maintenance to monitor development activities in Phuket. Four percent of the informants mentioned the need for an efficient integrated database system to help monitor and update information as well as making the information accessible to the public (TK5, LB10 and SC3). Most informants identified Tourism authority of Thailand (TAT) as the organization that had tourist statistics such as number of tourist arrivals and hotel occupancy. Such expectation was reflected in a statement by LB10 *“TAT has all tourist records. In Thailand the businesses have to rely on TAT.”* Similarly, another informant stated that *“TAT is the only one, no one else can access this key data, and they can collect from immigration, airlines, airports, hotels”* (PJ12).

Some interviewees saw the need for independent entities such as the universities and research institutes to present the facts without bias. This is shown in a statement by PN7 that *“[We should] not only rely on statistics from the government because the government has a job to show a positive image so it needs to be from independent parties who don't necessarily have to maintain the image but shed light on reality.”*

4.3.5 Infrastructure

The lack of proper town planning and infrastructural facilities to sustain tourism was discussed by fifty seven percent of the informants. This can be summarized in JW21's expression that *“As a tourist destination Phuket is not planned properly.”* Sixty one percent of the informants discussed the developmental plans and forty one percent of the informants talked about environmental problems from Phuket's uncontrolled construction of hotels, resorts, and condominiums. While some informants saw Phuket infrastructure as inefficient to accommodate the increasing tourists (twenty eight percent), others felt that the Phuket infrastructure were adequate in comparison to other provinces in Thailand (three percent).

The need to improve infrastructure is demonstrated by IU9's remark that *"Phuket has undergone plenty of physical developments but it still lacks infrastructures to support the current number of tourist visiting Phuket."* This was contrasted by SJ1's statement that *"Phuket is ready with infrastructure and it is the only island destination that is accessible to international standard facilities and services."*

4.3.6 Transport

The need for an improvement in transport system was highlighted by fifty four percent of the informants. Inefficient implementation of transport regulation such as road safety, driver's licenses, vehicle emission tests and helmet usage were pointed out by twenty six percent of the informants. Such issues were demonstrated by C9's statement *"The narrow street and so many cars and huge buses are on the road. People do not have license to drive and it is dangerous."* Introducing an efficient public transport system was discussed by forty percent of the informants. A need for a cost efficient local transport in Phuket was suggested by ten percent of the informants. The high cost of transport was also a problem as remarked by MT3 *"The public transport in Phuket is not good enough and the price of transport is very expensive."* Congestion on the roads and insufficient anchoring space for boats were seen as emerging problems as mentioned by twenty four percent of the informants.

4.3.7 Phuket brand positioning

Positioning Phuket brand with a specific selling point such as beautiful beaches, marinas, cultural and heritage sites, and historical background was discussed by fifty four percent of the informants. This was exemplified by PD4's statement *"A master plan needs to be there to give Phuket a brand name for sustainable business in Phuket."* The attitude that quality of tourists was more important than quantity was expressed by twenty eight percent of the informants. This was consistent to the projection of Phuket becoming a meetings, incentives, conference,

exhibition (MICE) destination using 4M strategy namely MICE, Marine, Manpower development and Medical Hub (Tuarob, 2013; The Phuket News, 2014; Sakolnakorn *et al.*, 2013). This was reflected in PH18's statement *"Right now Phuket should be limiting the number of tourist and promoting quality tourism."* The concern of Phuket losing the quality tourists to budget travelers was displayed in SS4's statement *"Phuket is doomed to become a second rate destination attracting budget travelers, ruining its reputation permanently."* Thirty one percent of the informants discussed the contradicting mission of the destination marketing organization to increase the number of tourists annually with sustainability. The important role of media in presenting positive images of Phuket was expressed by twenty five percent of the informants. This was especially after the military rule which led to skepticism towards Thailand as reported by thirteen percent of the informants. There was also an expression that Phuket should follow other international destinations such as Singapore, Hong Kong and Bhutan which had a controlled and well planned sustainable tourism (HI8). This could be demonstrated by LB10's statement *"Phuket should follow Singapore and Hong Kong as they have grown so fast with a proper planning and management."*

4.3.8 Public health

Wellbeing issues were mentioned by fifty three percent of the informants. Safety was the most mentioned sub-theme (fifty percent of the informants) which covered personal welfare, security of possessions, crime, traffic accidents and drowning. Safety issues were often linked to the non-compliance with regulation as summarized in a comment by BC5 *"People barely respect traffic rules."* Other public health issues discussed were sexually transmitted diseases (STD) and teenage drug use. Teenage drug use was also mentioned as an issue that increased the exposure of youths to health issues and crime (WB3). STD in connection to sex tourism was raised as a concern by three percent of the informants as exemplified by AK1's statement *"Sex tourism gives Phuket a bad name and there is risk of exploitation."*

4.3.9 Population

The concern about increasing population and uncontrolled tourist arrivals to Phuket was expressed by fifty four percent of the informants. The objectives of destination marketing organizations were seen to influence unsustainable direction which was demonstrated by IU9's statement "*TAT focused only on increasing number of tourists.*" This was especially worrying to the local businesses in the rise of "*Zero-Dollar Tour*" (MT7) in which Chinese tourists in a package tour were completely controlled by Chinese operators and business owners which threatened the local economy (Rungsisawat, 2013).

The difficulty of identifying the actual population of Phuket was raised by thirteen percent of the informants as demonstrated by BT1's statement "*Current population of Phuket is the number of tourists and number of residents rather than only [what is on] census record.*" This contributes to the lack of budget from the central government which is calculated by the number of population in the census as commented by SE8 "*Next to Bangkok, Phuket makes the most income compared to other provinces but it hardly gets back anything.*"

4.3.10 Tourism

Tourism services, tourist behaviors and trends of tourism in Phuket were mentioned by forty three percent of the informants. The tourist behaviors and attitudes, especially undesirable traits such as being loud and disrespectful were discussed by thirty two percent of the informants. This can be exemplified by BT1 statement that "*Other European guests are running away from the Chinese tourists.*" Tourist behavior was seen to relate to travel motivation as remarked by RA8 "*Tourist behavior is determined by the reason they choose the place.*"

Sixty four percent of the informants reported concerns about the tourism services. From this twenty four percent of the informants mentioned degrading service standards as stated by CK2 that "*People in business only think about money and service is degrading and food quality too.*" Twenty six percent of the informants stated the need to improve quality of the services and fourteen

percent of the informants mentioned the need to embrace international standards of hospitality and tourism businesses in Phuket. New tourism markets were also mentioned by four percent of the informants as they talked about the increasing numbers of medical tourists to Phuket due to low cost for the medical procedures in Thailand.

4.3.11 Culture

The importance of Thai culture preservation and cultural diversity was discussed by thirty eight percent of the informants. This was displayed by BC5's remark "*Phuket town is proactive in preservation of culture like the Thai-Chinese culture.*" Sixty four percent of the informants discussed the need to preserve Thai culture such as Thai etiquettes and Thai architectural infrastructures. Eighteen percent of informants shared their concerns over degrading local values due to the influence from Thais from other provinces, tourists and expats. This can be demonstrated by RA8's statement "*People from other provinces just come here to make money so the attitude of culture is changing and it affects the mind of local people.*" Nevertheless, six percent of the informants had the opposite view that the rich culture and diverse community in Phuket was a positive thing.

4.3.12 Satisfaction evaluation

Tourist satisfaction and feedback were discussed by thirty one percent of the informants. One-fourth of the informants acknowledged that the feedback and survey forms could be an effective way to evaluate sustainability indicators. Two different kinds of surveys were suggested by the informants; tourist satisfaction and resident satisfaction. Some suggested survey at entry or exit point as shown in PH7's statement "*Evaluate service through guests in a feedback form or a survey at the airport.*" Informants also stated the evaluation for tourism businesses through website ratings, awards given by popular online sources such as Booking.com, Trip Advisor and reputable accreditation agencies including Green Leaf, Green Globe, Earth Check and International Organization for Standardization (NV15). Very few

informants who operated under the international chains of hotels evaluated their businesses based on indicators developed on their own or by their head offices as exemplified by NV15 *“Accor Hotels standard procedures are used to measure sustainability like the PLANET 21 program.”*

4.3.13 Social inclusion

The significance of social responsibility in business practice and benefits for the local communities was discussed by thirty one percent of the informants. Community engagement in beach cleaning, planting mangroves, involving in public hearing and sharing corporate social responsibility was seen very important as discussed by seventy four percent of the informants. Making ethical investment, promoting sustainable consumption and environmental advocacy were mentioned by thirteen percent of the informants. The demand for business to be ethical and socially responsible was exemplified by IV5’s statement *“Tour operators cheat the tourist and it’s not good. They need to sell honest tours.”*

The need to integrate expat communities with the local Thais were also raised by thirteen percent of the informants as demonstrated by AK1’s statement *“There has to be joint shared vision and ownership amongst business, expats and locals.”* The need for interaction was perceived important because the expat community was seen to have the potential to contribute towards sustainability (AK1 and RA8). The lack of social integration could lead to disempowerment as demonstrated in BL9’s statement *“As a foreigner there is nothing I can do.”*

4.3.14 Education

The role of education sector in improving skills and knowledge of tourism stakeholders, tourists and youth were discussed by twenty five percent of the informants. This could be summarized by CK2’s statement, *“Hospitality education and English language proficiency is very important in tourism and specially Thailand because it is an international destination.”* The need of professional hospitality education and multiple language proficiency were highlighted

three percent of the informants as remarked by D211 statement *“Education for tourism and hospitality should be a mainstream system for people looking employment in tourism sector.”* Similarly it was also mentioned by H18’s as *“Cooperation of tourism and education department is important for tourism standard and English skills needs to be improved or start a new school for hospitality.”* However, low level of awareness and understanding of SD in the society was seen as a major barrier for sustainability. MT3’s statement best summarized this issue as, *“A lot of business policies do not comply with sustainable development principals”* (MT3).

4.4 Evaluating sustainability themes for Phuket

Fourteen sustainability themes were grouped into five major themes that represented the sustainability indicators identified by the tourism sector of Phuket namely environment, economy, people and living, tourism and governance (Figure 4.1). They show similar conceptual connections to the themes of sustainability frameworks identified in the literature review.

For example, EU SDI themes such as socio-economic development and sustainable consumption and production are comparable to tourism and economy themes in this study. Social inclusion, demographic changes and public health bear similarities to people and living theme. Climate change, energy, and natural resources reflect the environment theme while good governance and global partnership can be related to the governance theme. Although not being presented in the major theme, transport was the major problem in Phuket that needs to be addressed as well. The themes developed by the EU SDI were closely related to the sustainability themes drawn in Phuket.

These themes were also comparable to MDGs. The first six MDGs heavily focus on the people and living theme which highlights social health and

wellbeing (See 2.4.1). The 7th MDG on ‘ensuring environmental sustainability’ addresses the issues on the environment and the 8th MDG, ‘developing a global partnership for development,’ can be related to the governance, economy and tourism.

The two national sustainability concepts present mostly the people and living theme. For instance seven GNH domains including living standard, health, education, time use, community vitality, culture diversity, psychological well-being and resilience correspond to the environment and governance themes. Sufficiency Economy Theory can be seen as an emphasis on the balance of the environment, economy and people and living theme.

These 14 themes represent various dimensions of Phuket development which affect its sustainability. They should not be viewed in isolation but a network of interrelationships that are linked to each other. The relationships amongst these themes are shown in Figure 4.1.

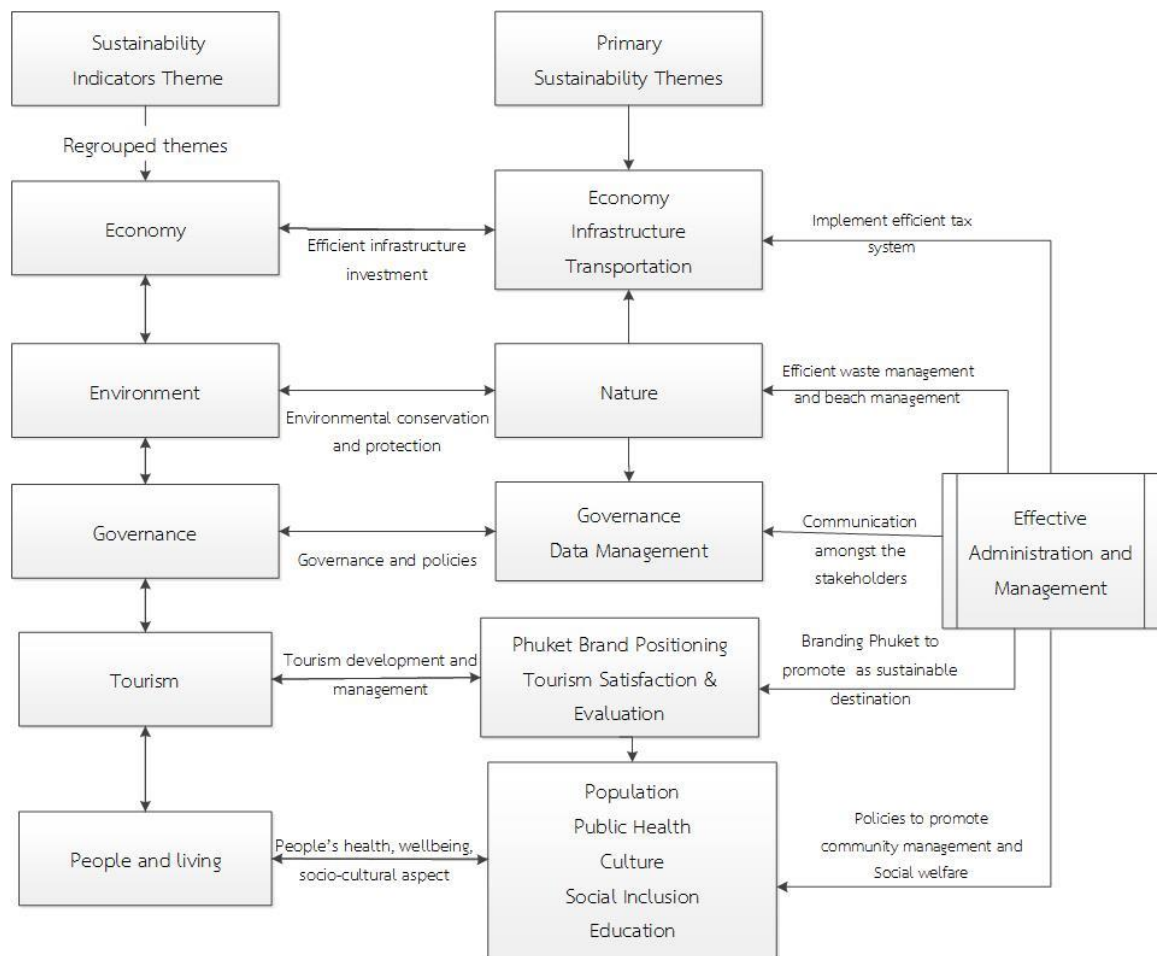


Figure 4.1 The relationships between the 14 sustainability themes and sustainability indicator themes.

The sustainability themes were grouped together based on the close relationships to the themes of the sustainability indicators. Effective administration and management of the government is central to promoting the economy, for instance by monitoring economic indicators such as import and export rates and tax collected. Effective administration is also important in endorsing green policies and environmental indicators such as encroachment in protected areas and vice versa.

4.5 Sustainability indicators

A total of 43 indicators were identified by 68 informants during the first round of in-depth interviews. To verify their representativeness, a survey questionnaire was designed to evaluate their importance and applicability. The indicators were classified into five themes of environment, economy, people and living, tourism and governance (Table 4.2).

Environmental indicators include coral health index, water quality, encroachment, species, solid and water waste. Interestingly, weather was also highlighted because it was seen to be related to tourist arrivals and global warming. Economic indicators mostly consist of hotel, flight and restaurant occupancies, income of businesses, sale of properties, investments, import and exports. People and living indicators encompass social well-being, community engagement and the population size. The theme tourism was interpreted by indicators such as feedback sheets, tourist arrivals and number of tour operators. Governance indicators were illustrated by efficiency of the government administration, corruption and crime rates.

Table 4.2 Sustainability indicators identified by the informants; number in the bracket represents the number of indicators

Environment (11)	Economy (11)	People and living (10)	Tourism (6)	Governance (5)
<ul style="list-style-type: none"> ● Water quality ● Marine species ● Drinking water system ● Wastewater ● Weight of garbage ● Weather ● Green space/ Green index ● Coral health Index ● Number of trees ● Encroachment ● Environmental impact assessment 	<ul style="list-style-type: none"> ● Employment and unemployment rates ● Tax collected ● Currency exchange rate ● Import and export ● Hotel occupancy ● Average room rate ● Restaurant occupancy ● Foreign investment ● Flight occupancy ● Prices of properties ● Number of apartments for sale 	<ul style="list-style-type: none"> ● Number of road accidents ● Hospitality education centers ● Healthy life index ● Teenage drug use rate ● Disease control ● Community engagement ● Promotion of local products ● People infected with sexually transmitted disease ● Population ● Researches 	<ul style="list-style-type: none"> ● Tourist arrival ● Number of registered tour operator ● Feedback sheets ● Number of repeating tourist ● Length of stay ● Nationality of tourist 	<ul style="list-style-type: none"> ● Crime rate ● Corruption rate ● Regulation for driver's license ● Permit of construction ● Number of boats

A quantitative analysis of the survey results showed the ranking of the indicators perceived importance by the tourism sector (Table 4.3)

Table 4.3 Sustainability indicators in Phuket presented by the average score out of five

Environment		Economy		People and living		Tourism		Governance	
Indicators	Avg.	Indicators	Avg.	Indicators	Avg.	Indicators	Avg.	Indicators	Avg.
Water quality	4.44	Employment and unemployment rates	4.11	Number of road accidents	4.38	Tourist arrivals	4.28	Crime rate	4.44
Marine species	4.44								
Drinking water system	4.36	Tax collected	4.10	Hospitality education centers	4.32	Number of registered tour operator	4.20	Corruption rate	4.34
Wastewater	4.34	Currency exchange rate	4.07	Healthy life index	4.30	Feedback sheets	4.15	Regulation to acquire driver's license	4.26
Weight of garbage produced	4.33	Import and export	4.02	Teenage drug use rate	4.28	Number of repeating tourists	4.14	Permit of construction	4.24
Weather	4.33								
Green space / green index	4.32	Hotel occupancy	3.99	Disease control	4.26	Length of stay	3.95	Number of boats	4.11
Coral health index	4.31	Average room rate	3.95	Community engagement	4.12	Nationality of tourist	3.39		
Number of trees	4.31								
Encroachment	4.29	Restaurant occupancy	3.93	Promotion of local products	4.17				
Environmental impact assessment	4.17	Foreign investment	3.93	Number of people infected STD	4.11				
		Flight occupancy	3.93						
		Prices of properties	3.82	Population	4.10				
		Number of apartments for sale	3.74	Researches	4.02				

*Shaded cells display indicators that have average score higher than 4.21 or were highly agreed by the survey

The survey results showed that all indicators had an average score above 3.41 which indicated agreement from the respondents (See Appendix 4). From a total of 11 environmental indicators, 10 indicators showed average score that ranged between 4.21-5.00 which indicated strong agreement or high importance. “Environmental impact assessment” was the only indicator below 4.21 mark (4.17). All 11 economic indicators scored below 4.21 showing moderate importance. Indicators such as number of road accidents (4.38), hospitality education centers (4.32) and healthy life index (4.30) in people and living theme scored above 4.21 marks demonstrating strong agreement in the importance of these indicators. Tourist arrival was the only indicator with strong agreement among tourist indicators (4.28). In the governance theme, four indicators including crime rates (4.44), corruption rate (4.34), regulation to acquire driver’s license (4.26) and permit of construction (4.24) showed strong agreement.

This result may be explained by the Maslow’s hierarchy of needs in which physical well-being forms the first level of basic need concerned by human. Environmental indicators were perceived important due to its linkages to physical needs such as air, food, water and shelter. Indicators such as water quality, drinking water system, number of trees and green space suggest the need to protect the environment and natural resources.

Indicators such as crime rate, corruption rate, regulation to acquire driver’s license, road accidents, healthy life index, and teenage drug use were related to Maslow’s second level of need for safety such as protection, orderliness, control, security and stability. The results of the survey showed high level of acceptance towards 43 indicators. Interestingly, the survey showed different ranking from those of the interviews. In the in-depth interviews, economy was mentioned most frequently followed by nature and governance. Meanwhile the survey result reflected that the environment was a leading concern over the economy.

4.6 Accessibility of sustainability indicators

The third research question attempts to identify the source of data for sustainability indicators and its accessibility. The informants from the first round of in-depth interviews identified the possible sources in the public sector but were uncertain about data availability. Due to the lack of official indicators to measure sustainability for Phuket, data were found scattered amongst multiple organizations. Relevant public offices were contacted to verify the actual location of these 43 indicators. The findings are presented in Table 4.4.

Table 4.4 Perceived data sources and the actual data sources for Phuket sustainability indicators

Themes	Indicators	Sources identified by informants	Official sources
Environment	Water quality	-Phuket Marine Biological Center -Regional Environmental Office 15	-Phuket Marine Biological Center
	Marine species	-Phuket Marine Biological Center -Shark Guardian and Green Fins	-Phuket Marine Biological Center -Phuket Provincial Fisheries Bureau
	Drinking water system	-None	-Department of Ground Water Resources (Ground water)
	Wastewater	-Local Municipal offices	-Local Municipal offices
	Weight of garbage produced	-Magic Eyes	-Provincial Office of Natural Resources and Environment -Phuket Marine Biological Center (Reef and beach cleaning)
	Weather	-Media	-Phuket Weather and Radio Station
	Green space/ Green index	-Phuket Provincial Forestry Office -Regional Environmental Office 15	-None
	Coral health index	-Phuket Marine Biological Center	-Phuket Marine Biological Center
	Number of trees	-Phuket Provincial Forestry Office -Regional Environmental Office 15	-None
	Encroachment	-Media and Land Department	-Phuket Provincial Land Office
	Environmental impact assessment	-Phuket Provincial Forestry Office -Regional Environmental Office 15	-Department of Environment under Provincial Office of Natural Resources and Environment

Table 4.4 Perceived data sources and the actual data sources for Phuket sustainability indicators (continued)

Themes	Indicators	Sources identified by informants	Official sources
Economy	Employment and unemployment rates	-Phuket Provincial Employment Services Office	-Phuket Provincial Statistic Office
	Tax collected	-Phuket Area Revenue Office	-Department of Revenue Phuket
	Currency exchange rate	-Commercial Banks -National Banks	-Bank of Thailand
	Import and export	-Phuket Customs Office Region 5 -Phuket Provincial Internal Trade Office	-Phuket Provincial Chamber of Commerce
	Hotel occupancy	-Phuket Commercial Registration Office -Media	-Department of Tourism and Sports
	Room rate	-Phuket hotel association -Thai hotel association -Tourism Authority of Thailand Southern Office Region 4	-None
	Restaurant occupancy	-Restaurants	-None
	Flight occupancy	-Airport Authority of Thailand -TAT	-Phuket Provincial Statistic Office
	Foreign investment	-Phuket Chamber of Commerce	-Department of Business Development
	Prices of properties	-Property developers	-None
	Number of apartments for sale	-Property developers	-None

Table 4.4 Perceived data sources and the actual data sources for Phuket sustainability indicators (continued)

Themes	Indicators	Sources identified by informants	Official sources
People and living	Number of road accident	-Health Office	-Royal Thai Police
	Hospitality education centers	-Phuket Rajabhat University -Prince of Songkla University, Phuket campus	-Phuket Rajabhat University -Prince of Songkla University, Phuket campus
	Healthy life index	-Phuket Provincial Public Health Office	-Phuket Department of Community Development
	Teenage drug use rate	-Police	-Royal Thai Police
	Disease control	-Phuket Provincial Public Health Office	-Phuket Provincial Public Health Office
	Community engagement		-Phuket Department of Community Development
	Promotion of local products	-Phuket Provincial Cooperatives Office -Phuket Provincial Agriculture Office	-Phuket Department of Community Development with OTOP (One Tambon One Product)
	Number of people infected with sexually transmitted disease (STD)	-Vachira Hospital Phuket -Phuket Provincial Public Health Office	-Phuket Provincial Public Health Office
	Population	-Prince of Songlka University	-Phuket Provincial Statistic Office
	Researches		-Prince of Songlka University -Phuket Marine Biological Center -Phuket Provincial Public Health Office

Table 4.4 Perceived data sources and the actual data sources for Phuket sustainability indicators (continued)

Themes	Indicators	Sources identified by informants	Official sources
Tourism	Number of tourist arrivals	-Tourism Authority of Thailand Southern Office Region 4	-Department of Tourism and Sport
	Number of registered tour operator	-The Association of Thai -Travel Agents	-Department of Tourism and Sport
	Feedback sheets	-Tourism Authority of Thailand Southern Office Region 4	-None
	Number of repeating tourist	-Hotels	-None
	Length of stay	-Hotels -Phuket Immigration	-Phuket Provincial Statistic Office
	Nationality of tourist	-Hotels -Phuket Immigration	-Department of Tourism and Sport
	Governance	Crime rate	-Police stations
Corruption rate		-Media	-None
Regulation to acquire driver's license		-Phuket Provincial Land Transport Office	-Phuket Provincial Land Transport Office
Permit of construction		-Royal Phuket Marina	-None
Number of boats			-Marine Office Phuket 5 -Phuket Provincial Statistic Office

Environmental indicators such as water quality, coral health, and marine species are monitored by Phuket Marine Biological Center, Phuket Provincial Forestry Office and Regional Environmental Office 15. Economic indicators and tourism indicators including tourist numbers, services, occupancies and income were collected by Tourism Authority of Thailand Southern Office Region 4, Phuket Customs Office Region 5 and Phuket Immigration. Data for people and living indicators, for instance health, safety and education were found at Phuket Provincial Public Health Office, media reports and educational institutes.

4.7 Conclusion

Research question one of this study is addressed using document search and in-depth interviews. SEEK indicators developed in 2013 (SEEK, 2013) was the first attempt to guide sustainability indicators in Phuket. However, it was not widely known or used as most of the informants were unaware of its existence.

The second research question is answered using the in-depth interviews and survey. Forty three indicators were identified through 68 in-depth interviews with tourism sector. They were then validated with 400 respondents in the survey. All indicators were accepted above the average score of 3.41 out of 5 which shows high level of acceptance. The detailed rating of the indicators is presented in Appendix 4.

The third research question is resolved from the in-depth interviews with 17 public sector offices on data availability and the location of the actual data sources with locations and web links where they are applicable are shown in the Appendix 3.

Chapter 5

Practical sustainability indicators for Phuket

5.1 Introduction

This chapter addresses the final research question of determining the practical sustainability indicators from the tourism sector in Phuket. It is based on the triangulation of answers to research questions one, two and three.

Fourty three primary indicators identified by the tourism sector and their perceived importance for Phuket were analyzed to identify practical indicators for monitoring in reality.

5.2 Roles of indicators in Phuket

Phuket holds the abundance of natural assets that support tourism. These valuable assets need to be measured and monitored so that the development does not destroy the environment and livelihood in the future.

Through a bottom up process, the tourism sector identified sustainability issues and indicators that were perceived important for Phuket. These issues and indicators can be used to address the current development problems in the area as well as guide the policies to prevent future issues.

5.2.1 Indicators reflect sustainability issues

The indicators identified through the interviews with the tourism businesses and the perception on their importance reflects the problems Phuket is currently facing. For instance, direct discharge of wastewater in the sea without being treated was perceived as problem that can be monitored by the indicators “water quality.” The problem of over-crowding can be reflected in “population” indicator. Concerns in economic disadvantage of the local people were expressed in the indicators such as “prices of properties” and “foreign investment.” Meanwhile, illegal activities that threaten the social wellbeing can be reported by the indicators “number of people infected with STD” and “teenage drug use.”

It is also noteworthy that tourism operators tend to take interest in the sustainability in their fields of business operations. For instance, the informants from the dive centers were keen to talk about the sustainability of the marine ecosystem, marine species, coral health and encroachment in the marine parks. The informants from the hotels were more focused on the quality of services, average room rate, hotel occupancy, flight occupancy and nationality of tourists because these variables influenced their business success. The informants from the real estates discussed about the prices of properties, uncontrolled constructions of accommodations and taxes as it created competition among real estates in Phuket. The tour and travel agents mostly discussed the increasing number of tourists and businesses that caused the competition. They also discussed the importance of business ethics and suggested the need to control permits to tour operators that employed non-Thai staffs.

These various perspectives and insights can be used for management, planning and development of Phuket.

5.3 Problems of sustainability indicators identified by the tourism sector

Some indicators developed from the interviews with the tourism business operators were unclear and unspecific. The interviews with 17 public offices and survey results revealed several problems and questions of the indicators.

5.3.1 Ambiguous indicators

Many indicators were not specific and hard to translate in actions. For instance, the indicator “number of trees” was considered ambiguous by the public sector because it could be interpreted as the number of trees in protected areas or different species of trees or the quantity of trees in Phuket. Another indicator that was ambiguous was “water quality.” It was unclear if it was referred to surface water, sea water or drinking water quality. “Drinking water system” could not be easily understood whether it was referred to the natural sources or water from pipelines. Similarly, “green space and green index” may need to be simplified into the area of public parks and protected areas. It was not clear which methodology or international framework the “green index” was referred to.

5.4 Problems of data accessibility for sustainability indicators

This research was able to identify most of the sources and locations of the data for the sustainability indicators identified by the tourism sector. Available online data sources with the direct webpages (URL) are presented (Appendix 3). However, there were a few indicators that data location could not be identified. In some cases, data was only available to the public upon request. The problems of data accessibility are discussed below.

5.4.1 Scattered data

Some data was found in several public offices. For example, data for “permit of construction” used to be available at Phuket Provincial Office of Public Works and Town Planning (PPOPWTCP) but this responsibility was transferred to 19 different local administrative organizations across Phuket after the Decentralization Act. Although primary data is collected by multiple organizations in the public sector, most of these offices have limited capacity due to their specific jurisdiction function, human resource and budget.

While most informants from the tourism sector were certain that data would be available at TAT, TAT did not collect primary data. Instead, TAT uses information from various organizations such as Department of Tourism and Sports and relies on TAT Intelligent Center to analyze the data and publish a national report yearly. Similarly, the media such as newspaper and television also uses secondary data in their reports and broadcasts. Interestingly, some informants saw the potential problems with the validity of the data presented by these sources. This was demonstrated by CS5’s statement that *“What I read in newspapers is not real, we are being fed stories and I don’t believe in statistic from TAT.”*

5.4.2 Data disclosure policy

While some data are available on the internet or as a hard copy, few primary data are publicly disclosed. Data disclosure policy depends on the sensitivity of the information. For instance, data on drug use and crime rate collected by Royal Thai Police and confidential information from Immigration office were not available online. These were only available on request for research purposes. Data such as teenage drug use, number of road accidents and disease control were collected and stored in an online database system that was only accessible to the organization staff via intra-database system. These practices were used in the Public Health Office, government hospitals in Phuket, Royal Thai Police and police stations. However some organizations allowed public users to create a user account to login before

gaining access to data for authenticity and security reasons. Some authorities provided a hard copy of data upon request but this could be limited by the availability of the documents. Due to the absence of official or government accredited sustainability indicators, data collection was not mandatory for some indicators.

5.4.3 Unavailability of data and data update

Data unavailability includes out of date, uncollected and incomplete data. For example, data on restaurant occupancy and corruption rate is unavailable from any organizations in the public sector. This presents a gap in data monitoring that should be addressed. In some cases, data was not updated. For example, data on encroachment at the Phuket Provincial Land Office was not up-to-date because a lot of cases on illegal construction remained unresolved.

5.5 Evaluating sustainability indicators for Phuket

Not all 43 indicators identified by the informants during the interviews were realistic for data collection. A set of practical indicators were identified by evaluating 43 indicators using the criteria based on the findings from the interviews with 17 public offices. The themes of the sustainability indicators and the criteria for their evaluation are discussed below.

5.5.1 Criteria for practical sustainability indicators for Phuket

The main criteria to evaluate the indicators were derived based on the practicality of data collection for the sustainability indicators in Phuket. These include the feasibility for data collection and availability of primary data, being specific and easy to understand, being up-to-date, data accessibility at a single source, and accessibility to the general public. Furthermore the survey scores were used to weight the perceived importance of the indicators. The survey score above 4.21 represented highly important indicators. The information on data availability from the public sector offices was also used as the criteria for reliability.

To ensure validity of the selected sustainability indicators, they were further scrutinized using “SMART” criteria (United Nations Development Program, 2016).¹ Most indicators satisfied the criteria by being specific, measurable, achievable, and reliable. Evaluation of these indicators is presented in Table 5.1.

¹ The definition of SMART criteria by the United Nations Development Group are available at web.undp.org/evaluation/documents/methodology/rbm/Indicators-Paper1.doc

Table 5.1 Evaluation of practical sustainability indicators for Phuket

Themes	Indicators	Specific	Available	Update	Data at a single source	Public access	Survey scores
Environment	Water quality	√	√	√	√	√	4.44
	Marine species	×	√	√	√	√	4.44
	Drinking water system	×	√	√	√	√	4.36
	Wastewater	×	×	×	×	×	4.34
	Weight of garbage produced	√	√	√	√	×	4.33
	Weather	√	√	√	√	√	4.33
	Green space / Green index	×	×	×	×	×	4.32
	Coral health index	√	√	√	√	√	4.31
	Number of trees	√	×	×	×	×	4.31
	Encroachment	×	×	×	×	×	4.29
	Environmental impact assessment	×	√	√	√	√	×

*The cells shaded in grey are considered as practical indicators

Table 5.1 Evaluation of practical sustainability indicators for Phuket (continued)

Themes	Indicators	Specific	Available	Update	Data at a single source	Public access	Survey scores
Economy	Employment and unemployment rates	√	×	√	√	×	4.11
	Tax collected	√	√	√	√	√	4.10
	Currency exchange rate	√	√	√	√	√	4.07
	Import and export	√	√	√	√	√	4.02
	Hotel occupancy	√	×	×	×	×	3.99
	Average room rate	√	×	×	×	×	3.95
	Restaurant occupancy	×	×	×	×	×	3.93
	Flight occupancy	√	×	×	×	×	3.93
	Foreign investment	√	√	√	√	√	3.93
	Prices of properties	×	×	×	×	×	3.82
	Number of apartments for sale	√	×	×	×	×	3.74

*The cells shaded in grey are considered as practical indicators

Table 5.1 Evaluation of practical sustainability indicators for Phuket (continued)

Themes	Indicators	Specific	Available	Update	Data at a single source	Public access	Survey scores
People and living	Number of road accidents	√	√	√	√	×	4.38
	Hospitality education centers	×	√	√	√	√	4.32
	Healthy life index	√	×	√	√	×	4.30
	Teenage drug use rate	√	√	√	√	×	4.28
	Disease control	×	×		√	×	4.26
	Community engagement	√	√	√	√	√	4.12
	Promotion of local products	√	√	√	√	√	4.17
	Number of people infected with STD	√	√	√	×	×	4.11
	Population	×	√	√	×	×	4.10
	Researches	×	√	√	×	×	4.02

*The cells shaded in grey are considered as practical indicators

Table 5.1 Evaluation of practical sustainability indicators for Phuket (continued)

Themes	Indicators	Specific	Available	Update	Data at a single source	Public access	Survey scores
Tourism	Tourist arrivals	√	√	√	√	√	4.28
	Number of registered tour operators	√	√	√	√	√	4.20
	Feedback sheets	√	√	×	√	×	4.15
	Number of repeating tourists	√	×	×	×	×	4.14
	Length of stay	√	√	×	×	×	3.95
	Nationality of tourists	√	√	√	√	√	3.39
Governance	Crime rate	√	√	√	√	×	4.44
	Corruption rate	√	×	×	√	×	4.34
	Regulation to acquire driver's license	√	√	√	√	√	4.26
	Permit of construction	√	×	√	×	√	4.24
	Number of boats	√	√	√	√	×	4.11

*The cells shaded in grey are considered as practical indicators

Four out of 11 environmental indicators the qualified as practical indicators. They include water quality, weight of garbage produced, weather and coral health index. Marine water quality is reported by Phuket Marine Biological Center based on principal parameters such as salinity, temperature, pH and coliform bacteria every two months. Water quality also scored an average of 4.44 out of 5 in the survey making a highly important environmental indicator perceived by the tourism sector. The primary data for weight of garbage is available as a document at the Phuket City incinerator. The weight of garbage is measured daily in tones. Weather conditions are broadcasted live from the two weather stations in Phuket and the data is recorded digitally. Weather was perceived to reflect environmental conditions and climate change as demonstrated by AI8's statement "*We can see negative impact on environment in the weather.*" Coral health index is monitored by Phuket Marine Biological Center which also reports the conditions on coral bleaching. The health of the corals and the water quality both are important factors that sustain diving industry and attract tourists. This was supported by OD1's statement "*Phuket needs records of coral's growth and death and the fish numbers as Phuket is known as a dive destination because of the diversity of life.*"

Five economic indicators were considered practical for monitoring. Employment and unemployment rates, tax collected, import and export, currency exchange rate and foreign investment are self-explanatory and accessible online. Employment and unemployment rates reflect the concern of the locals losing jobs to foreigners as demonstrated by TP4's statement "*Local people are losing their jobs to migrants because they have better English skills.*" Its importance was supported by the notion that "*Government is currently trying to take out the illegal tour guides by employing tourist police*" (PK6).

Two out of 10 indicators under people and living theme were deemed achievable. They both were related to safety. Number of road accident and teenage drug can be acquired from Royal Thai Police. Due to the sensitivity of the issue, the data is not accessible to the public but can be obtained upon request for educational purposes.

Four indicators in tourism theme met the practicality criteria. Data for tourist arrivals, number of registered tour operator, feedback sheets and the nationality of tourist were all available at Department of Tourism and Sports. Most of them were also ranked highly important in the survey with the tourism sector. The difference in tourist nationality was seen to affect tourism revenues. This was demonstrated by LB10's statement "*The length of stay of current tourist trends is that the Chinese and Asian market seems to stay for 3-5 days but Europeans stay longer.*"

For the governance theme, three out of five indicators were considered practical for monitoring. According to the Royal Thai Police, indicators that specified particular type of crime would be more effective for monitoring. Regulation to acquire driver's license was highly accepted by the survey respondents. The number of boats is collected by Marine Office Phuket 5, and Phuket Provincial Statistic Office and seen as important indicator for the impacts on reef. This was demonstrated by SS4's that "*Phuket should limit the number of boats going to scuba, snorkeling and sightseeing in beautiful natural locations and penalize operators polluting the waters and destroying the reefs.*"

Useful indicators need to be defined with the clear goals and are practical to allow timely assessment. Furthermore, the indicators should be focused on monitoring current and emerging problems. Employing the sustainability indicators without the consideration of the local context and capacity can lead to unrealistic representation of the development condition. A shortlist of practical sustainability indicators are presented in Table 5.2.

Table 5.2 A shortlist of practical sustainability indicators identified by the tourism sector in Phuket

Environment (4)	Economy (5)	People and living (2)	Tourism (4)	Governance (3)
-Water quality	-Employment and	-Number of	-Tourist arrivals	-Crime rate
-Weight of garbage produced	unemployment rates -Tax collected -Currency exchange rate	road accident -Teenage drug use rate	-Number of registered tour operators -Feedback sheets -Nationality of tourists	-Regulation to acquire driver's license -Number of boats
-Weather -Coral health index	-Import and export -Foreign investment			

5.6 Guiding principles for sustainability in Phuket

In 2015, Phuket was assigned to be a pilot smart city as a part of “Smart Thailand 2020” policy (Ministry of Information and Communication Technology, 2014). Smart city can act as a guiding principle to achieve sustainability in Phuket. The concept of a smart city can be matched to the sustainability themes developed for Phuket, namely smart environment, smart economy, smart governance, smart people and living and smart tourism (Das, *et al.*, 2016).

In addition, using information technology as a core of smart city project can help build a system for digital monitoring and storing data for sustainability. A technological and financial investment can make data more easily accessible and analyzed for reporting. This should be optimized by using a digital database system to allow users to provide or obtain data via an online registration system. In addition, a web portal allows an easy linkage to web pages of SD practices in different cities and countries.

Knowledge management (KM) can be used as an instrument to achieve a balance between tourism development and sustainability. An efficient

channel of sharing and exchanging knowledge can help address the communication gap among different organizations and disciplines. KM processes at local level can help identify not only the appropriate indicators but also the key stakeholders for implementations (Sontivanich, 2014). While the public sector has the responsibility to collect and provide information for better management of the city, this can be supplemented by the involvement and participation of the business and community partners. Creating a KM community for sustainability indicator monitoring that includes the public, private and civil society representatives can lead the steps towards SD in Phuket.

5.7 Phuket sustainability reporting system

The absence of a central organization and integrated reporting system for the sustainability indicators in Phuket causes the difficulty in collecting and accessing data for sustainability reporting. There is a need for Phuket to establish an efficient communication system amongst the public sector offices, ensure seamless data sharing using an integrated data system to monitor and evaluate and report on Phuket's sustainability. Phuket Provincial Statistic Office is currently is the only public office that is actively reporting data on development in Phuket. A governing body for data gathering and analysis for the sustainability indicators should be established for Phuket. Collaboration with research institutes and other tourism research bodies in the private sector can help provide human capitals for data collection, consultancy and data storage system at a single source. This was supported by ED2's statement that "*Phuket needs an independent organization from the government and entrepreneurs to foresee tourism sustainability in Phuket.*" The survey results also showed a high demand for a database for sustainability reporting (Table 5.3).

Table 5.3 The survey result on Phuket sustainability database (n=400)

Sustainability Database Questions		Average Score	Description
Q1	Phuket should have official sustainability indicators.	4.55	Strongly Agree
Q2	Sustainability indicators should be centralized by the government.	4.34	Strongly Agree
Q3	There should be an integrated digital database system for sustainability indicators for Phuket.	4.44	Strongly Agree
Q4	Sustainability indicators should be accessible to general public.	4.52	Strongly Agree

Majority of the respondents strongly agreed that there should be a Phuket sustainability database that was centralized and digitally accessible to the public. Information and communication technology should be applied to assist data collection. For example, e-reporting system for tourists when they check in and out of the hotels can help measure hotel occupancy and address the issues of data unavailability. Providing a mechanism that can link data from all types of accommodations to a data center will be crucial in solving the problem highlighted by CS7 that *“Data is not respective of truth, not all hotels report to immigration about the guests.”*

5.8 Limitations and recommendations for future studies

This study is limited to the perceptions of the tourism sector in Phuket. Sustainability is a multidisciplinary concept and requires participation of all

key stakeholders such as members from the public sector, private sector, local community and tourists (World Tourism Organization, 2004). The indicators identified and evaluated in this study represents inconclusive opinions and perspectives of the informants from the tourism sector in Phuket which largely contributes towards tourism development. Although the tourism sector is a major driving force of economy and livelihood in Phuket, the role of other sectors cannot be ignored. Future studies may build upon the work in this research by collecting data from the public sector, tourists and the local communities for comparison.

5.9 Conclusion

There is a low level of awareness of sustainability indicators among the tourism sector in Phuket. Although SEEK report identified 26 indicators for Phuket sustainability in 2013, the lack of institutional support and implementation resulted in the lack of awareness and action. From the perspective of tourism sector, indicators such as water quality, drinking water system, wastewater, crime rate and corruption rates were of high importance due to its direct linkage to physical needs, safety and wellbeing. There is a high demand for Phuket sustainability indicators and public access to such information. Better integration of data reporting across different government agencies and publication using digital technology can increase the awareness and action on sustainability. Phuket should adapt the concepts of a smart city and KM discussed in this study to implement SD. KM can contribute to a more effective data gathering and transformation through collaboration of the public, private and civil society sectors which will also be beneficial in tourism development. Practical indicators for Phuket must take into consideration the local capacity and needs. It is vital for Phuket to implement a system for monitoring and reporting sustainability indicators that are relevant and applicable to its context in order to sustain its position as a smart and sustainable tourist destination.

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Appendices

Appendix 1

Attributes of the interviewees from the first set of in-depth interviews

Table 1 Attributes of the interviewees from the first set of in-depth interviews

	Code	Gender	Age	Nationality	Length of stay in Phuket	Education / Qualification
Hotels and resorts	BT1	F	41 years	Thai	3 years	Business administration
	AC2	F	31 years	Thai	9 years	Bachelor in business administration
	W3	F	40 years	Thai	4years	Management
	SS4	M	56 years	Australian	5 years	High school
	TK5	F	27 years	Thai	5 years	Bachelor degree of arts & humanities
	PT6	M	53 years	Dutch	8 years	Bachelor of hospitality
	PH7	M	33 years	Thai	2 years /lived in Phi phi	Diploma in accounting
	HI8	M	57 years	Finish	23 years	Business administration hotel management,
	BL9	M	59 years	Thai	20 years	Business administration
	LB10	M	33 years	Thai	33 years	Masters in tourism and general management
	D211	M	26 years	Thai	26 years	Tourism management
	KP12	M	50 years	Thai	20 years	Diploma
	AS13	F	30 years	Thai	8 years	BA tourism management
	MP14	F	42 year	Thai	15 years	Master degree of international economic
	NV15	F	26 years	Pilipino	4 years	Degree in mass communication
	BA16	M	48 years	Danish	16 years	Book and stationary sales
	FB17	F	34 years	Thai	16 years	BA
	PH18	F	53 years	Thai	50 years	Diploma in tourism
	SR19	F	71 years	Thai	31 years	MA
	LM20	M	31 years	Thai	31 years	Bachelor in engineering Professional tennis player but did school of
	JW21	M	45 years	British	13 years	sustainability
Tour agents	SE1	M	41 years	Thai	15 years	Bachelor in arts
	RS2	M	43 years	Korean	2 year 3 month	Bachelor in English

Table 1 Attributes of the interviewees from the first set of in-depth interviews (continued)

	Code	Gender	Age	Nationality	Length of stay in Phuket	Education / Qualification
	MT3	M	56 years	Thai	20 years	BA
	FT4	M	39 years	Thai	more than 20 years	Diploma in tourism
	ID5	F	35years	Thai	7 years	MBA in hospitality and tourism management
	PK6	F	43 years	Thai	7 years	Business administration
	MT7	M	31 years	Thai	6 years	Bachelor of arts & humanities
	MP8	F	41 years	Thai	41 years	Primary school
	MT9	F	53 years	Thai	53 years	High school
	KP10	F	49 years	Thai	49 years	BA in business management
	ET11	F	20 years	Thai	20 years	College drop out
	PJ12	M	42 years	Iranian	1 year	Degree in software computing
Restaurant	BC1	M	33 years	Thai	5 years	High school
	CK2	M	31 years	Thai	3 years	Physical education
	PS3	M	35 years	Thai	20 years	Diploma in hospitality
	TP4	F	50 years	Thai	22 years	No formal education
	BC5	F	33 years	Thai	33 years	BA from Rajabhat university
	NL6	M	31 years	Thai	14 years	BA
	CS7	M	62 years	German	22 years	High school
	RA8	F	31 years	Thai	7 years	BA in business management
Real Estate	PC9	F	28 years	Thai	28 years	BA in communication arts
	SJ1	M	42 years	Finish	7 years	High school
	ED2	M	55 years	American	9 years	GCSE/O levels
	PR3	F	26 years	Thai	26 years	Continuing higher education
	SV4	F	28 years	Thai	22 years	Communication arts
	CB5	F	27 years	Thai	3 years	Sales and marketing

Table 1 Attributes of the interviewees from the first set of in-depth interviews (continued)

	Code	Gender	Age	Nationality	Length of stay in Phuket	Education / Qualification
	RP6	M	33 years	Thai	12 years	BA in tourism management
	HA7	M	17 years	Thai	2 months	BA in communication arts
	AI8	F	45 years	Thai	45 years	Master's in business administration
Massage and Spa	DF1	M	51 years	Thai	30 years	Bachelor degree
	NO2	F	41 years	Thai	20 years	High school
	DS3	F	38 years	Thai	7 years	Massage school
	BM4	F	45 years	Thai	25 years	Lower secondary school
	OS5	F	23years	Thai	2 months	BA in cosmetic science
Dive centers	OD1	F	32 years	British	More than 6 years	BA
	SB2	M	42 years	British	5 years	Business administration
	SC3	F	44 years	British	6 years	Degree in chemistry
	MD4	M	54 years	German	25 years	Degree in economics
Others	AK1	M	54 years	NA	Less than 5 months	BA
	KC2	F	61years	Australian	9 years	High school and book keeping
	PY3	F	60 years	Australian	4 years	land and horse riding management, Degree in glass engineering, biology, physics,
	PD4	M	66 years	American	19 years	chemistry, geology and math
	HW5	M	56 years	NA	15 years	BS degree
	PD6	F	34 years	Thai	10 years	Bachelors in accounting
	PN7	M	32 years	Thai- American	On and off for 10	BA in communication
	SK8	F	63 years	Australian	On and off for 20 years	Degree in education
	IU9	F	31 years	Thai	3 years	Masters in natural resource management

Appendix 2

Themes and sub-themes from first round of in-depth interviews

Table 2 Themes and sub-themes

Main Themes	% of informants	Sub-theme level 2	% of mentioning	Sub-theme level 1
Economy	95%	Labour and employment	9%	Unemployment of Thais
		Migrants	9%	None
		Business operation		Average room rate
				Hotel occupancy
				Restaurant occupancy
				Length of stay
				Business use their own indicator to monitor and evaluate their business
		Flight occupancy		
		Consumption	16%	Consumption pattern and tourist spending
		Wealth and distribution	34%	Increased cost of living and prices
				Uneven wealth distribution
				Increased income for locals and country
		Global economy crisis	13%	None
		Business structure	66%	Chinese tourist increased and Russian decreased
				Competition with new tourist destination in SEA
Phuket is cheap and affordable place for travel/ living for tourist				
Grouping small business				
Foreign business operation				
Competition amongst business in Phuket				
Increasing number of local and foreign investor and new business				
Management /ethics and operation				
		False promises/tourist traps		

Table 2 Themes and sub-themes (continued)

Main Themes	% of informants	Sub-theme level 2	% of mentioning	Sub-theme level 1
Economy (continued)		Investment	10%	Increased foreigners owning property in Phuket
				Thai owners attitude needs to change
Nature	82%	Beach management	34%	Beach services /regulations and standards
		Reef control and regulations	15%	No enough reef control/ need to maintain health of corals reef
		Protected area/national park	10%	Protected area regulations on entry to national parks / fees / and budget management
				Area of forest and biodiversity
		Air pollution	3%	Air pollution /quality
				People don't test vehicle for emission levels
				Need to monitor and lower carbon footprint
		Fresh water	10%	Water scarcity
		Natural resources	6%	Exploiting the natural resource
				Recovery time tourist season
Weather	15%	Changes in weather condition due to climate change and weather as a factor influencing tourism		
Energy	15%	Electricity consumption is high		
Wild life	6%	Using wild animals for tourist entertainment like tiger kingdom and elephants		

Table 2 Themes and sub-themes (continued)

Main Themes	% of informants	Sub-theme level 2	% of mentioning	Sub-theme level 1
Nature (continued)		Waste Management	56%	Waste disposal
				3r's
				Littering and solid waste
				Waste segregation
				Organic waste
				Wastewater
Governance	64%	Corruption	25%	Corruption and corrupted police
		Communication among stakeholders	32%	Need of communication amongst public, private, government and tourism sector
		Direction and policy	19%	Clarity and uniformity of amended policies and ensuring efficient implementation
				Current political situation is unstable /new military rule is scaring people
		Politics and management	21%	Government should be active and leading initiatives
		Distrust in government	7%	None
		Ineffective tax system	6%	Missing or incomplete tax figures

Table 2 Themes and sub-themes (continued)

Main Themes	% of informants	Sub-theme level 1 and 2	% of mentioning
Data Management	59%	Need of an integrated storage of data system	4%
		Need of permanent budget allocation for data collection	8%
		Need to publish water quality data	21%
		Monitor no of marine species - data keeping	11%
		Need Base line data	5%
		Government body will be a trusted source of data	5%
		Import /export regulation and data maintenance	1%
		Need a record of infrastructure (like hotel, cars , taxi, boats, construction, businesses)	8%
		Housing occupancy	3%
		Record of labor force	3%
		Data should be accessible to public	19%

*Sub-theme level 1 and 2 for data management are the same.

Table 2 Themes and sub-themes (continued)

Main Themes	% of informants	Sub-theme level 2	% of mentioning	Sub-theme level 1
Infrastructure	57%	Development plans	61%	Phuket has no long term goals
				Uncontrolled construction and development
		Infrastructural development	38%	Phuket has better infrastructure
				Phuket needs better and efficient infrastructure
				Development in process (airport is expanding to accommodate more tourist)
		Transportation	54%	Transport cost
Traffic jam and parking	24%			None
Public transport	40%			Need improved and efficient public transport for convenience of tourist and people
Transport regulation	26%			No respect to transport regulation (wearing helmet/ license, traffic lights)
Phuket brand positioning	54%	Making Phuket an international destination	25%	None
		Destination management organization's vision	31%	TATs mandate is to only increase tourist
		Phuket needs to promote quality tourist than quantity (high value , low impact)	28%	None
		Modeling	3%	Using examples of best practices
		Need better marketing	13%	None

Table 2 Themes and sub-themes (continued)

Main Themes	% of informants	Sub-theme level 2	% of mentioning	Sub-theme level 1
Public health	53%	Safety	50%	Crime/ traffic accidents/drowning
		Health/wellbeing	18%	Risk and access to drug / teen drugs use
		Drugs	7%	None
Population	53%	Phuket's Population	53%	Tourist arrivals
				Carrying capacity
Tourism	43%	Service	64%	Need better service standards
				Thai's should embrace western standards
				Relation with returning guest
		Behaviors	32%	Different nationality of tourist have different behaviors
		Trend	4%	Increasing medical tourism
Culture	38%	Preserving (cultures / etiquettes /architectures)	64%	Preserving ancient buildings
		Changing Thai values	18%	None
		Cultural diversity	6%	Phuket has become multicultural (rich in culture)
				Buddhism
Thai values	12%	Sufficiency economy		
Satisfaction evaluation	31%	Evaluation sheet in airport for tourist and surveys locals	31%	Evaluation on website rating Evaluation on accreditation own indicators

Table 2 Themes and sub-themes (continued)

Main Themes	% of informants	Sub-theme level 2	% of mentioning	Sub-theme level 1
Social Inclusion	31%	Lack of support and promotion of expats	13%	Improvise people's attitude towards business operations
		Peoples attitude	13%	Corporate social responsibility like beach clean ups/planting mangroves
		Encourage community engagement	74%	None
Education	25%	Hospitality and sustainability education and awareness	25%	Tourist knowledge and skills

Appendix 3

Data sources for indicators in reality

Table 3 Data sources for indicators in reality

Themes	Indicators	Sources	Data sources
Environment	Water quality	Phuket Marine Biological Center	Hard Copy
	Marine species	Phuket Marine Biological Center	http://marinegiscenter.dmcr.go.th/km/#.V069g_l97Dc
		Phuket Provincial Fisheries Bureau	Hard Copy
	Drinking water system	Department of Groundwater Resources under Provincial Office of Natural Resources and Environment	http://app.dgr.go.th/newpasutara/xml/Krabi.files/
	Wastewater	local Municipal Offices	Documents available at local municipal offices
	Weight of garbage produced	Provincial Office of Natural Resources and Environment	Available in hard copy (Primary source from the Incinerator)
		Regional Environmental Office 15 Phuket Marine Biological Center	http://marinegiscenter.dmcr.go.th/
	Weather	Phuket Weather and Radio Station	http://www.aws-bservation.tmd.go.th/web/main/index.asp
	Green space/ Green index	None	None (Phuket Provincial Forestry Office has documents on area of protected areas)

Table 3 Data sources for indicators in reality (continued)

Themes	Indicators	Sources	Data sources
Environment (continued)	Coral health index	Phuket Marine Biological Center	http://marinegiscenter.dmcr.go.th/km/coral_doc01/#.V07Gbfl97Dc http://marinegiscenter.dmcr.go.th/km/general-knowledge/#.V07GbPl97Dc
	Number of trees	Phuket Provincial Forestry Office Regional Environmental Office 15	None
	Encroachment	Phuket Provincial Land Office	Only hard copy of cases
	Environmental impact assessment	Department of Environment under Provincial Office of Natural Resources and Environment	Data available on digital database at Provincial Office of Natural Resources and Environment but not accessible to public

Table 3 Data sources for indicators in reality (continued)

Themes	Indicators	Sources	Data sources
Economy	Employment and unemployment rates	Phuket Provincial Statistic Office	http://phuket.mol.go.th/labour_statistic
	Tax collected	Department of Revenue Phuket	http://www.rd.go.th/publish/5999.0.html
	Currency exchange rate	Bank of Thailand	https://www.bot.or.th/english/statistics/financialmarkets/exchangerate/_layouts/application/exchangerate/exchangerate.aspx
	Import and export	Phuket Provincial Chamber of Commerce	http://pcocmartsch.moc.go.th/doclib/forms
	Hotel occupancy	Department of Tourism and sports	Hard copy
	Prices of properties	None	The general regulation for average prices of land for sale is available in hard copy with Phuket Provincial Land Office
	Number of apartments for sale	None	None

Table 3 Data sources for indicators in reality (continued)

Themes	Indicators	Sources	Data sources
People and living	Number of road accidents	Royal Thai Police	Hard copy
		Phuket Provincial Public health Office	Hard copy
	Hospitality education centers	Phuket Rajabhat University Prince of Songkla University, Phuket Campus	http://www.pkru.ac.th/en/ http://www.phuket.psu.ac.th/en/
	Healthy life index	None	Primary data unavailable but Phuket Department of Community Development has most data available at http://www.cdd.go.th/web/
	Teenage drug use rate	Royal Thai Police	Hard copy
		Phuket Provincial Public Health Office	Thai new year road accident data are available at Phuket Provincial Public health office in an digital database but not accessible to public
Disease control	Phuket Provincial Public Health Office	Unavailable (Primary data stored in online database system and but not accessible to general public)	

Table 3 Data sources for indicators in reality (continued)

Themes	Indicators	Sources	Data sources
People and living (continued)	Community engagement	Phuket Department of Community Development	http://www.cdd.go.th/web/
	Promotion of local products	Phuket Department of Community Development	http://www.cdd.go.th/web/
	Number of people infected with sexually transmitted disease (STD)	Phuket Provincial Public health office	http://www.hiso.or.th/aidsdatasystem/login/index.php
	Population	Phuket Provincial Statistic Office	Provincial statistical report (Hard copy)
	Researches	Phuket Marine Biological Center Phuket Provincial Public health Office	http://marinegiscenter.dmcg.go.th/ http://library.phuket.psu.ac.th/index.php?option=com_weblinks&view=category&id=55&lang=en

Table 3 Data sources for indicators in reality (continued)

Themes	Indicators	Sources	Web sources	
Tourism	Tourist arrivals	Department of Tourism and Sports	http://www.tourism.go.th/home/listcontent/11/221/276	
	Number of registered tour operators	Department of Tourism and Sports	http://www.tourism.go.th/subweb/details/6/6265/24430	
	Feedback sheets	Department of Tourism and Sports	Analysis of the Feedback sheet available in hard copy	
	Number of repeating tourists	None	None	
	Length of stay		Phuket Provincial Statistic Office	Provincial statistical report (Hard copy)
			Department of Tourism and Sports	(Hard copy)
Nationality of tourists	Department of Tourism and Sports	http://www.tourism.go.th/home/details/11/221/25515		
Governance	Crime rate	Royal Thai Police	Hard copy	
	Corruption rate	None	None	
	Regulation to acquire driver's license	Phuket Provincial Land Transport Office	http://phuket.dlt.go.th/index/index.php?option=com_content&view=category&id=25&Itemid=14	
	Permit of construction	None	"City Planning Act" of 1975 and the "National Environmental Control and Maintenance Act" of 1992 available at Phuket Provincial Land Transport Office	
	Number of boats	Marine Office Phuket 5	Hard copy	
Provincial Fisheries Bureau		Hard copy for only number of fishing boats		

Data Appendix 4
Analysis of the average scores from the survey

Table 4 Analysis of average scores of the survey

Indicators		Average	Interpretation
Environment	Water quality	4.44	Strongly agree
	Marine species	4.44	Strongly agree
	Drinking water system	4.36	Strongly agree
	Wastewater	4.34	Strongly agree
	Weight of garbage produced	4.33	Strongly agree
	Weather	4.33	Strongly agree
	Green space / green index	4.32	Strongly agree
	Coral health Index	4.31	Strongly agree
	Number of trees	4.31	Strongly agree
	Encroachment	4.29	Strongly agree
	Environmental impact assessment reports	4.17	Agree
Economy	Employment and unemployment rates	4.11	Agree
	Tax collected	4.10	Agree
	Currency exchange rate	4.07	Agree
	Import and export	4.02	Agree
	Hotel occupancy	3.99	Agree
	Average room rate	3.95	Agree
	Restaurant occupancy	3.93	Agree
	Flight occupancy	3.39	Agree
	Foreign Investment	3.93	Agree
	Prices of properties	3.82	Agree
	Number of apartments for sale	3.74	Agree

Table 4 Analysis of average scores of the survey (continued)

Indicators		Average	Interpretation
People and living	Number of road accidents	4.38	Strongly agree
	Hospitality education centers	4.32	Strongly agree
	Healthy life index	4.30	Strongly agree
	Teenage drug use rate	4.28	Strongly agree
	Disease control	4.26	Strongly agree
	Community engagement	4.12	Agree
	Promotion of local products	4.17	Agree
	Number of people infected with sexually transmitted disease	4.11	Agree
	Population	4.10	Agree
	Researches	4.02	Agree
Tourism	Tourist arrivals	4.28	Strongly agree
	Number of registered tour operators	4.20	Agree
	Feedback sheets	4.15	Agree
	Number of repeating tourists	4.14	Agree
	Length of stay	3.95	Agree
	Nationality of tourists	3.39	Agree
Governance	Crime rate	4.44	Strongly agree
	Corruption rate	4.34	Strongly agree
	Regulation to acquire driver's license	4.26	Strongly agree
	Permit of construction	4.24	Strongly agree
	Number of boats	4.11	Agree

Appendix 5

Questions for the in-depth interview with the tourism business

A questionnaire on sustainability indicator for tourism sector in Phuket

Name:

Position:

Business Name:

Contact info:

Member of (Organization):

1. What comes to your mind when you think about sustainability and sustainable tourism in context of Phuket?
2. What sustainability indicators (data measurement) are you aware of in Phuket
 - How do you monitor them for positive and negative impacts?
 - How would you rank them in order of importance? (5 at least)
 - What and where can we find the data for these indicators (Name of offices)?
3. What has been the most recent initiative that your business or organization has organized or participated that contributes to sustainable tourism? Do you publish a report on your sustainable practice?
 - Do you have any strategies or indicators or data measurement that you have developed that promotes sustainability? If yes, what? Please explain the system.
4. Can you provide suggestions for an effective method of what data to monitor that contributes towards Phuket sustainability?
5. Do you think sustainability data should be centralized? If so by whom and where?
6. Can you recommend other people I should talk to about this?

Appendix 6
Questionnaire for the survey



This is a survey questionnaire for a masters research on “Sustainability indicators through the lenses of tourism sector in Phuket” This survey aims to identify sustainability indicators, verify their significance and practicality for Phuket

Part 1. General Information

- i Age <20 20-30 31-40 41-50
 50+
- ii Gender Male Female
- iii Nationality Thai Non-Thai
- iv Occupation Accommodation Tour agent and Guide Food & Beverage
Transport
- Others (please specify) _____

Part 2. Please rate the sustainability indicators according to their importance and applicability in Phuket on the scale of 5-1 where, 5=Extremely Important, 4= Important, 3=Unsure, 2=Not Important and 1=Not at all important

Indicators		5	4	3	2	1	Remarks
1	Coral health Index						
2	Water quality						
3	Weather						
4	Encroachment						
5	Marine species						
6	Wastewater						
7	Weight of garbage produced						
8	Drinking water system						
9	Green space / green index						
10	Number of trees						
11	Environmental impact assessment reports						
12	Hotel occupancy						
13	Flight occupancy						
14	Average room rate						

	Indicators	5	4	3	2	1	Remarks
15	Restaurant occupancy						
16	Number of apartments for sale						
17	Prices of properties						115
18	Foreign investment						
19	Employment and unemployment rates						
20	Currency exchange rate						
21	Tax collected						
22	Import and export						
23	Community engagement						
24	Population						
25	Promotion of local products						
26	Tourism and hospitality education centers						
27	Healthy life index						
28	Number of people infected with STD						
29	Number of road accidents						
30	Teenage drug use rate						
31	Disease control						
32	Researches						
33	Tourist feedback sheets						
34	Number of registered tour operators						
35	Number of tourist arrivals						
36	Nationality of tourists						
37	Length of stay						
38	Number of repeating tourists						
39	Corruption rate						
40	Regulation to acquire driver's license						
41	Number of boats						
42	Permit of construction						
43	Crime rate						

Part 3. Please provide opinion on the demand for the sustainability indicators on the scale of 5-1 where, 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree and 1=Strongly Disagree

	Database Questions	5	4	3	2	1	Remarks
Q1	Phuket should have official sustainability indicators.						
Q2	Sustainability indicators should be centralized by the government.						
Q3	There should be an integrated digital database system for sustainability indicators for Phuket.						
Q4	Sustainability indicators should be accessible to general public.						