

# **An Evaluation Model for Sustainable Hotel Buildings: A Case of Northern Cyprus**

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## ABSTRACT

While hotel buildings exist throughout the world in diverse forms to serve travelers' needs, their pervasive existence can also serve the environment and local communities through sustainable design. As structures representative of local culture and designed to impress visitors, hotel buildings possess the potential to influence and inspire broad dissemination of sustainable building practices and their benefits. This study aimed to develop an evaluation model for sustainable hotel buildings (EMSHB). As an adaptable model for different countries and regions according to local conditions and priorities, the EMSHB serves as a guideline to decision makers in defining the characteristics most suitable for local, sustainable hotel design. The foundational method of this study is the synthesis of sustainable building assessment criteria, such as Leadership in Energy and Environmental Design (LEED) and other sustainability measurement tools developed for buildings. To serve this purpose, various methods of measuring sustainability, sustainability indicators, and criteria of certificates for sustainability were studied. The resulting EMSHB can be used to measure sustainability among the environmental, economic, and socio-cultural aspects of hotel buildings at the first stages of design, during new construction, and in the midst of renovations of existing buildings. Upon developing the EMSHB as a globally-applicable evaluation model, this research further proposed adaptation of the model according to the local conditions and priorities of the selected context. For more reliable and comprehensive results, this study employed a mixed-methods approach incorporating both qualitative and quantitative forms of data. The qualitative method was developed based on interviews with and observations from various stakeholders, while the quantitative method was adopted from the LEED system. With the

parameters of the EMSHB in mind, a localized version of the model (Local-EMSHB) was applied to one hotel building as a case study. The selected hotel was investigated in order to analyze and test the effectiveness of the method. The results of the study suggest that to have a more sustainable hotel building in the selected context, the hotel building should be evaluated based on the localized model rather than the generalized EMSHB. Defining sustainability standards according to local conditions and priorities achieved more sustainable results in hotel buildings. More broadly, the localized evaluation model can help the tourism sector and hotel industry of different countries promote sustainable development via consideration of the socio-cultural aspects, as well as environmental and economic aspects. Ultimately, application of the Local-EMSHB can help the local community achieve better quality of life.

**Keywords:** Sustainability, Sustainable Development, Tourism Sector, Measurement of Sustainability, Sustainable Hotel Buildings.

## ÖZ

Bu çalışmada, sürdürülebilir otel binası modelini irdeleme ve geliştirme amaçlanmaktadır (EMSHB). Bunun yanında, söz konusu çalışma, farklı ülke ve bölgelerdeki otel binalarının en elverişli durumlarını tanımlamada ve sürdürülebilirlik seviyesini ölçmede yardımcı olacaktır. Bu araştırma içinde bilgi toplama yöntemi olarak, Enerji ve Bina Tasarımında Liderlik (LEED) ve benzeri ölçme metotlarının esas alınıp, evrensel sürdürülebilir bina değerlendirme kriterlerinin sentezinin yapılması olarak belirlenmiştir. Bu sentez ışığında, elde edilen veriler Kuzey Kıbrıs örneği için yerleştirilip değerlendirilecektir. Bu bağlamda, bu araştırma evrensel değerlendirme modeli oluşturmayı ve oluşturulan modelin çalışma alanı olarak seçilen Kuzey Kıbrıs için yerleştirilerek değerlendirilmesi hedeflenmektedir. Geliştirilecek olan model, yeni otel binalarının tasarım ve inşaa aşamalarında veya mevcut binaların yenileme aşamalarında, çevresel, ekonomik ve sosyokültürel nitelikleri ışığında sürdürülebilirliklerini ölçmede kullanılacaktır. Bu hedefe ulaşabilmek için birçok sürdürülebilirliği ölçme metodu, sürdürülebilirlik ilkeleri ve evrensel ölçekteki sürdürülebilirlik sertifika nitelikleri incelenmiştir. Bu inceleme, EMSHB'nin geliştirilmesi için temel oluşturmuştur. Bu bakımdan, Kuzey Kıbrıs örneği için yerleştirilen metodun, durum ve önceliklerini anlamak için seçilen bir otel binası, en uygun metodu analiz etmek ve sürdürülebilirliğini ölçmek amacıyla incelenmiştir.

Bu çalışma sonucunda, Kuzey Kıbrıs bağlamında, en sürdürülebilir otel binası tasarımı için geliştirilen “Yerel-EMSHB” metodunu takip etmesi önerilmektedir. Ek olarak, çevresel, ekonomik ve sosyokültürel faktörleri esas alınıp geliştirilen sürdürülebilir gelişim modelinin, farklı ülkelerin turizm sektörüne ve otel endüstrisine de yardım

edebileceđi öngörölmüştür. Aynı zamanda, yerel halkın birçok açıdan daha iyi yaşam şartlarına sahip olabilmesine olanak sağlayabileceđi de saptanmıştır.

**Anahtar Kelimeler:** Sürdürülebilirlik; Sürdürülebilir Gelişim, Turizm Sektörü; Sürdürülebilirliđi Ölçme, Sürdürülebilir Otel

# DEDICATION

*To My Family*

*For their boundless love, encouragement and support*

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# Chapter 1

## INTRODUCTION

In the recent three decades, sustainability and sustainable development have gained more and more importance at every scale from globally to locally and in every economic sector including the construction and tourism industries. Nowadays, sustainable buildings have appeared in most developed countries, and there are numerous methods employed globally to attain sustainable buildings. More specifically, there are many sustainability criteria for hotel buildings in the different regions of the world. However, categorization and localization of sustainability models to enhance buildings region by region is of great importance. One sustainable hotel buildings in Northern Cyprus became the focus of this study and the study's aim to develop a model for sustainable hotels according to local conditions. The hotel in Northern Cyprus was selected for this study because there have been few studies and little research related to this issue in the local area.

As indicated, the primary aim of this research study was to develop a model for sustainable boutique hotels according to the local conditions of Northern Cyprus. Secondly, this research incorporates socio-cultural and economic dimensions of sustainability, which are rarely paired with the environmental aspects of most sustainable building models. While non-localized sustainability methods can be used to measure the sustainability of hotel buildings, a locally designed model was required to address the most problematic issues of Northern Cyprus.

Nevertheless, according to the definitions of boutique hotels in other research studies, is considered as one of the stylish and fashionable small-sized hotels and with five-star hotel rooms' quality, which is located in the urban area (Anhar, 2001). Therefore, by reviewing the related literature on boutique hotels and their various types as well as their different indicators and the related regulation of Ministers of Northern Cyprus Council (about the facilities and beds capacity), this study found that none of those hotels has the standards requirement of boutique hotels. Therefore, the title of the study has changed to the developing an evolution model for sustainable hotel buildings; because there is a different type of following a localized model, Northern Cyprus' hotel buildings can have a broader impact on local sustainability.

Sustainable hotel buildings can begin the process of overcoming the numerous socio-cultural, environmental, and economic problems that have negatively influenced the economy of the local community (a priority of the present research study). Also, since tourism plays a very pivotal role in the economy of selected region, the local community can be helped by creating new employment opportunities in this sector through local investment, promoting cultural understanding, reducing the inflation rate, and decreasing hotel prices in order to attract and host more tourists. To achieve these aims and objectives, this study first developed an evaluation model for sustainable hotel buildings at the global scale (Global-EMSHB), and then localized the model (Local-EMSHB) to measures the sustainability of hotel buildings (of different types and scales) according to the local conditions and priorities of selected region. Thus, the data analysis process investigated the sustainability of a hotel building by measuring the environmental, socio-cultural, and economic aspects. This process aided in understanding the conditions of hotel buildings in this region.

## **1.1 Background Information**

Sustainability and sustainable development are principal concepts used by the current generation for the benefit of future generations. They are a way of understanding the world and a method for solving local and global problems (Brundtland, 1985). The overall goal of sustainable development is the long-term stability of the economy, the environment, and society; this is only reachable through the integration and acknowledgement of economic, environmental, and socio-cultural concerns throughout a decision-making process (Blackman & Rivera, 2010; Emas, 2015). In addition, sustainable buildings have an important role in the sustainable development of a nation not only due to their contribution to the national economy, but also due to their impact on quality of life, comfort, security, health, et cetera.

Sustainable building design is based on a number of factors; the primary factors are climate, place, culture, resource consumption, and building types (Ortiz, Castells, & Sonnemann, 2009). With ever-growing environmental concerns, the demand for sustainable buildings is growing day by day. Both private and public organizations increasingly require architects and contractors to design and construct buildings with minimal negative environmental effects (Azhar, Brown, & Farooqui, 2009). Since the present study addresses sustainable hotel buildings in the tourism sector, which continues to grow, applying sustainability principles becomes increasingly important for operators, tourists, and local communities (Brida, Osti, & Barquet, 2010).

When it comes to sustainability and tourism, the modes of travel may not be sustainable but tourists may participate in and support local sustainable efforts upon arrival. Tourism is the action of visiting a place and trying to make a positive impact

on the local environment, society, and economy (Swarbrooke, 1999). Touristic activity can help balance the economies between richer and poorer regions, support public infrastructure in the visited locale, and consequently improve the quality of life for those residing and working in visited places. Also, tourism can be a catalyst for better understanding and tolerance between people and regions at a local, national, and global level. Tourism can also have harmful impacts; therefore, especially in popularly visited islands and coastal cities, tourism must be planned and implemented for positive integration into the socio-economic environment and natural and cultural settings to have locally, sustainable impacts (Telfer & Sharpley, 2015). Tourism offers opportunities for the development of holiday activities, cultural awareness, and international exchanges as well as employment and income for seaside cities (Coccosis & Nijkamp, 1995). Touristic activity can also instigate development and enhancement of primary transportation to the visited location, local transportation modes, accommodations, entertainment, recreation, nourishment, and shopping centers (Azhar, Carlton, Olsen, & Ahmad, 2011). According to the World Tourism Organization (2004), sustainable tourism should make optimal use of environmental resources, respect the socio-cultural authenticity of host communities, and ensure viable, long-term economic operations by providing socio-economic benefits to all core stakeholders. Following the World Tourism Organization's guidelines, sustainable hotels have a very critical role in developing the tourism sector and can be one of the main factors in the progress of tourism sector. Such hotels also play important roles in attracting tourists, contributing to their prosperity, and encouraging sustainable tourism and sustainable construction by considering the environmental, socio-cultural, and economic needs of host communities. In this way, Rutes, Penner, and Adams (2001) affirm:

With the growth in the demand for tourism, hotel designs have become a very important aspect of architecture on the global scale and the importance of sustainable hotels in the lodging industry has attracted the attention of hospitality scholars to small islands since the late 1990s.

Further, this research found that most hotels in Northern Cyprus have faced many problems due to their large scale and unsustainable building design and construction techniques. Relatedly, a number of researchers have emphasized the advantages of small-scale hotels in terms of the social dimensions of sustainability. For example, Mowforth and Munt (2015) noted that small hotel buildings have become increasingly popular in recent years and that larger, international chains have started to focus on the small hotel market. Small hotels bring certain benefits in terms of operations and profitability. Besides strong customer demand, the economic aspects are of great importance for operators (Lee, Capella, Taylor, & Gabler, 2014). Once established, small hotel buildings also tend to have a higher percentage of repeat business compared to the industry in general, which may reflect a lower degree of volatility when going through difficult economic times (Ravetz, 2000). Generally, designing a sustainable hotel will help optimize energy and water consumption for economic and environmental advantages, especially in places suffering from lack of natural resources (Azhar et al., 2009). For all of these reasons and relative to the existing conditions of Northern Cyprus, small-scale hotels might be more suitable than large hotels in terms of the socio-cultural aspects of sustainability.

Furthermore, there have been few studies focused specifically on sustainable hotel buildings and sustainable development and considering the existing conditions of Northern Cyprus. While Kilic and Okumus (2005) argued that there are lots of small-size and family-run hotels in Northern Cyprus, they noted that these are not ever

inclusive of sustainability aspects. In addition, the Ministry of Economics and Tourism (2015) reported that the tourism sector of Northern Cyprus' economy has enjoyed having many tourists supported by hospitality businesses and many small family-run hotel-bars, cafes, restaurants, and gift shops, but most of the hotels in Northern Cyprus have been designed based on touristic and casino features without considering the sustainability aspects. Recognizing that these can have a negative impact on the environmental, socio-cultural, and economic dimensions of the local community and that these dimensions of sustainability are often overlooked in this region, investigation into the sustainability of hotel buildings considering these three dimensions is a worthwhile effort. The present study believes that the tourism sector will expand into a profitable industry in the future; therefore, it is worthwhile to make more investment in the sustainability of this sector.

In order to have the required infrastructure for encouraging and accepting sustainable hotels into the identified area, a new method of measurement to evaluate the sustainability of hotel buildings while considering the environmental, economic, and socio-cultural aspects is needed. Sustainability efforts in this sector can help the local community, which is suffering from poverty, weak economy, and graduate/youth unemployment as well as other economic and socio-cultural issues. Similarly, sustainable hotel design can play an important role in terms of environmental issues by offering affordable prices, reducing water consumption, optimizing energy consumption, increasing energy efficiency, and investing locally. Sustainable tourism, and particularly sustainable hotels, can also help in terms of socio-cultural aspects by establishing understanding between tourists and the community.

Development of a new method of measurement to evaluate the sustainability of hotel buildings – one that considers local environmental, economic, and socio-cultural aspects – needs guidance from tested sources. Interestingly, a large number of hotel buildings in developed countries have started sustainability and environmentally friendly movements by following sustainability criteria and applying for certification. This has led to the development of numerous measurement methods and approaches for measuring the sustainability of buildings and certifying their green movements at various local, regional, and international levels. To serve Northern Cyprus’ needs better and to develop a replicable method that can measure the sustainability of hotel buildings with consideration of local conditions, diverse, internationally used methods of sustainability measurement, sustainability indicators/frameworks, and green certifications were studied. Together, these presented the basis for the development of the Evaluation Model for Sustainable Hotel Buildings (EMSHB) – both the global and the local versions. Some of the studied sustainable building measurement methods were:

- LEED (Leadership in Energy and Environmental Design) a method developed in the USA and Europe with a worldwide application,
- BREEAM (Building Research Establish Environmental Assessment Method) in the United Kingdom,
- ST Tool is a software method that evaluates the environmental and sustainability performance of buildings.
- GB Tool is an international system used to evaluate US buildings for the green building challenge, including a GSA building.
- CASBEE (Comprehensive Assessment System for Building Environmental Efficiency) developed in Japan,

- HQE (High Environmental Quality) recently developed in France,
- VERDE method developed in Spain,
- BCA Green Mark Scheme initiated by Singapore's construction industry for construction of more environment-friendly buildings,
- HK-BEAM belonging to HK-BEAM Society undertaken by the Hong Kong building construction industry, and
- Green Star scheme developed by the Green Building Council of Australia (GBCA) (Darus et al., 2009; Sinou, Kyvelou, Sinou, & Kyvelou, 2006; N. Wang & Adeli, 2014).

According to the evaluation of mentioned methods and based on the theoretical information, this work has found that every green certificate and sustainability measurement method has its own peculiar function and are particularly devised to be used in specific regions under specific conditions and applied to any type of building. The primary concerns of these methods are environmental and ecological conditions with directly related issues in a given region. Apart from environmental conditions, a number of other factors such as economic and socio-cultural considerations influence the sustainability of a hotel building. However, studies addressing particularly the socio-cultural aspects of sustainability in hotel buildings are rare. Moreover, those sustainable certification standards that were developed to measure the socio-cultural and economic aspects (e.g. well-being, safety, health) evaluated the tourism industry in general rather than specifically hotel buildings. A number of criteria such as local ownership, local investment and local employment have been excluded from the existing certification standards and sustainable building measurement methods; issues such as these should be taken into account when developing new comprehensive



sustainability measurements. Consequently, most of the sustainability measurement methods commonly used on the global scale are not suitable to be used when considering the local conditions in Northern Cyprus – a place where socio-cultural issues are not separated from environmental issues. This research first has developed evaluation model globally and then localized the model according to conditions and priorities of selected region with specific focus on social-cultural aspect. To obtain more reliable and comprehensive results, this study employed a mixed methods approach incorporating both qualitative and quantitative data. The qualitative approach was based on interviews with and observations from people associated with the selected hotel building or the Ministry of Tourism and Environment. The quantitative method adopted the LEED certification (the application of LEED for developing present study method application) to measure the sustainability of hotel buildings and determine appropriate hotel conditions in terms of environmental, economic, and socio-cultural factors.

Within this research study, the Evaluation Model for Sustainable Hotel Buildings (EMSHB) measures sustainability while considering the environmental and economic factors and specifically focusing on the socio-cultural aspects. The Local-EMSHB can determine both sustainability and suitability of hotel buildings because it is adaptable for different regions with different conditions and priorities. To analyze the corresponding Local-EMSHB methods and the outcomes obtained from the literature review, one hotel building was selected as a particular case. The results of the initial analysis suggest the Local-EMSHB should be used to evaluate the sustainability of Northern Cyprus hotel buildings according to the priorities of region. Localized

evaluation helps architects design sustainable hotel buildings in the selected area, the tourism sector improve, and municipalities achieve sustainable development goals.

## **1.2 Problem Statement**

Nowadays, sustainability and sustainable development goals are becoming one of the most watched issues in the world, especially in countries suffering from the various problems associated with unsustainable practices. Also accruing are the many methods and certification processes developed as tools to measure the level of sustainability of buildings around the world. The standards and criteria defined by these tools can guide the architect in designing sustainable buildings from the early stages. Unfortunately, most of these tools for measuring sustainability do not measure all dimensions of sustainability; especially, social-cultural aspects are often lacking though they have a significant role in improving quality of life in a community.

Northern Cyprus is one such developing community that suffers from unsustainable practices and many socio-cultural issues correlated with economic and environmental problems. Therefore, Northern Cyprus was selected as the case study for this research, and the place to test the proposed model in anticipation of solving these problems.

Cyprus is the third largest island in the Mediterranean Sea and a major attraction to several different types of visitors (tourists, students, workers, etc.); however, it has faced many environmental, economic, and social problems as a result of past conflict and the ongoing political situation. The environmental problems pointed out in different studies include limited natural resources (Alipour, Altinay, Hussain, & Sheikhani, 2007), limited contextual design (Doratli, Hoskara, & Fasli, 2004), and an unsustainable trend in the construction sector with limitations on energy and water resources (Katircioğlu, 2014). The island has also been facing numerous economic

challenges including unemployment; limited sources of raw materials, finished goods, and on-demand services; limited goods and services production; high rates for energy (electric, heating, and cooling), high levels of water consumption, and political isolation. Socio-cultural issues include the challenges of inequal distribution of capital as well as endangerment of the social values influencing employment, education, local business, et cetera in the community (Table 1). Optimistically, some studies have pointed to available potentials of the island; for instance, studies conducted by Okonkwo (2014) and the TRNC Ministry of Education (2016) show “over 95% of Turkish Cypriots have completed a tertiary educational degree,” so demand for new jobs is high in the area. Together these situations and conditions have led to widespread unsustainable development and many buildings of unsustainable design. Overall, the island hosts a significant challenge in terms of sustainable tourism and the tourism sector. Compounding these problems, there have been few studies to address current economic and socio-cultural issues – particularly those related to sustainable development and sustainable hotel buildings in Northern Cyprus. Although the tourism and construction sectors are very promising sectors of employment, the unique socio-cultural characteristics of Northern Cyprus means that a great number of employees in the hotels are foreigners and mainly from Turkey (Cansel, Ekiz, & Bavik, 2009). This fact makes it difficult for locals to find employment within the industry on the island. A solution to these problems may be found in the development of small-scale hotel buildings and the development of the tourism sector (Kilic & Okumus, 2005). Pursuing these developments in sustainable ways can further support the local community in their pursuit of a better quality of life. At the same time, sustainability measurement methods used around the world for the hotel industry do not work accurately under Northern Cyprus’ existing conditions. Because few sustainability measurement

methods have focused on the socio-cultural aspects, a number of local conditions such as local ownership and local investment, in regards to sustainable hotels, have been overlooked by most of the criteria. Table 1 is a summary of problems related to hotel buildings in Northern Cyprus and categorized according to environmental, economic and socio-cultural aspects.

Table 1: Problems of Hotel Buildings in Northern Cyprus Considering the Environmental, Economic and Socio-Cultural Aspects.

<b>Problems of hotel buildings in Northern Cyprus</b>	
<b>Environmental</b>	<ul style="list-style-type: none"> <li>Buildings are not adapted to their environment</li> <li>Lack of contextual design</li> <li>Lack of natural resources</li> <li>Lack of local materials</li> <li>Lack of environmental stewardship</li> <li>High energy consumption (electric, heating, cooling)</li> <li>High water consumption</li> <li>The unsustainable trends in the construction sector</li> </ul>
<b>Social - culture</b>	<ul style="list-style-type: none"> <li>Lack of local employees (foreigners mainly from Turkey)</li> <li>Social equity not available</li> <li>Social exclusion</li> <li>Poverty</li> <li>Ownership of hotels (by foreigners)</li> <li>High education of local people</li> </ul>
<b>Economical</b>	<ul style="list-style-type: none"> <li>Highest rent of hotel room</li> <li>Politically isolated</li> <li>Limited goods and service</li> <li>High rates for energy (electric, heating, cooling)</li> <li>The high rate of water consumption</li> <li>High investment and high budget for building construction</li> <li>Lack of economic responsibility</li> </ul>

### **1.3 Aims, Objectives, and Research Questions**

Hotels are one of the main components in the development of the tourism sector and they play an important role in attracting tourists, which contribute to local prosperity, especially in Northern Cyprus. The aim of this study is to discover the main indicators for developing a localized criteria-evaluation model (L-EMSHB) to measure the sustainability of hotel buildings and investigate how the hotel building can be made more sustainable according to the local conditions of Northern Cyprus. The evaluation model provides guideline to decision makers and strategies for improved sustainability in hotels. Subsequently, this model helps the tourism sector and the hotel industry of selected context to benefit from sustainability in terms of environmental, socio-cultural, and economic aspects. In turn, these improvements help the local people in a numerous ways to have better quality of life.

This study pursues the following three objectives:

- (OJ1) To offer the principles of sustainability.
- (OJ2) To help the tourism sector to design sustainable hotel buildings.
- (OJ3) To develop an evaluation model for sustainable hotel buildings which can be localized by considering the local conditions of selected regions.

In addition, considering the idea of developing an evaluation model for sustainable hotel buildings in Northern Cyprus, the main research question in this study is as follows:

- (RQ) How can we evaluate the sustainability of buildings according to the local conditions?

In order to answer this main question, some sub-questions are raised below:

What is the definition of sustainability and sustainable development?

What is the definition of the tourism sector and sustainable tourism?

What are the measurements of sustainable buildings on the global scale?

#### **1.4 Research Methodology**

To have a better understanding of the research issues, a mixed-method research approach has been adopted by many social and health researchers all around the world (Johnson & Onwuegbuzie, 2004). Mixed-method employs both the qualitative and quantitative methods in collecting data throughout the process to gain a more comprehensive understanding (Ivankova, Creswell, & Stick, 2006). The reason quantitative and qualitative methods are preferred together is that each method of research alone cannot provide sufficient understanding of the trends and details of a situation. Quantitative and qualitative methods complement each other and offer a more precise and comprehensive analysis of the research issues (Miles & Huberman, 1994; Moghaddam, Walker, & Harre, 2003).

To capture a comprehensive understanding of the issue raised in this study, a mixed-methods approach was incorporated in this study. This research pursues one main goal of developing an evaluation model for sustainable hotel buildings (EMSHB), first for global application then localized to the contextual conditions. This model develops local criteria to evaluate the sustainability of different types of hotel buildings. The proposed model is based on some primary dimensions of sustainability, namely environmental, socio-cultural, and economic. This method is of great use especially in taking the several types of hotel buildings into account in Northern Cyprus. Based on the findings of previous studies as well as theoretical review, the qualitative section

used interviews, observations, and documentation to investigate sustainability issues in hotel buildings. It focused on a number of issues such as hotel types, bed capacity, hotel quality services, et cetera. Moreover, the quantitative method used the LEED certification system application and incorporates the missing socio-cultural indicators with the model. The incorporation of the second set of data permits the model to measure the sustainability of the hotel buildings and to identify the most suitable hotel building for selected area conditions via inclusion of environmental, economic and socio-cultural factors.

To build up this study, first the most common sustainability measurement methods, sustainability indicators/framework, and approaches in the world were reviewed, and the overlooked issues and dimensions were identified by considering the local, political, socio-cultural, and economic conditions of Northern Cyprus. Based on these primary steps, several sustainable measurement methods related to sustainable buildings were analyzed, and from among them, the Leadership in Energy and Environmental Design (LEED) method was adopted for this research. The LEED method was selected because it is the most widely-used method and can be applied globally.

However, LEED does not cover the socio-cultural and economic aspects, which are the missing factors for local conditions in Northern Cyprus. These aspects are among the essential issues encompassing sustainable tourism development and development of high quality of the life for the local community because they provide new opportunities for employment, finances, et cetera. Thus, this research collects key elements about the hotels throughout Northern Cyprus, including the size of the hotel, type of the hotel, the area, the number of local people involved, the percentage of

investment and ownership by local people; and education level of staff. These indicators are all considered to impact supportability. Data collection was conducted via face to face interviews because there was not enough recorded information, documents, or studies about these issues. The interviews were conducted between 2015 and 2017 following the methods proposed by (Brinkman & Kvale, 2015; Pop & Borza, 2016). Eighteen participants were interviewed for the study and each interview lasted around one hour and the research participants were selected from Salamis Bay hotel building as well as the Department of Ministry of Tourism from various levels of management, top, middle and low-level employees. The interviews were all open-ended and were prepared by modification of the study findings of previous research as well as the author's experience and perceptions. The interviews were all in a semi-structured. For reliability reasons, the staff were selected from various background, capacities, positions, and gender and the transcripts are available in Appendix A. The interviews were all audio-recorded and transcribed for later research purposes.

Considering the characteristics of Northern Cyprus, the selection of the case hotel reflects the intentions for this study by addressing economic sustainability. Large hotels with investment from outside the country, predominant employment of foreign citizens, and heavy reliance on foreign goods and products are among the main hindrances to local economic sustainability and sustainable development in Northern Cyprus. One way to begin to resolve these problems is through offering sustainable hotel buildings. One type of hotel building was used for analysis and testing of the localized model. The criteria for the selection came from the criteria found in the literature review and were used to assess the sustainability of the hotel building according to LEED certification standards. Finally, the localized model was developed within the present study to determine the characteristic of the most appropriate



sustainable hotel building for Northern Cyprus by referencing the required local criteria and guidelines for sustainable hotel buildings.

### **1.5 Limitation of Study**

This study, like any other study, has some limitations. Although the study took into account the various dimensions and aspects, a number of other intervening factors could have had influence. There are numerous approaches and directions for carrying out an enquiry into the sustainability of hotel buildings. Therefore, in this research, at first most of the measurements for sustainable building methods around the world were found and evaluated. Then a globally applicable evaluation model was developed for measuring the sustainability of hotels. In this way, the model can be used flexibly according to the different regions and countries' conditions. Later the model was adapted and localized according to the priorities and existing conditions of Northern Cyprus. The localized model dealt with early stage building design, site design, construction, and operation. Measurements were gathered by observation and interview. The localized model also can help the tourism sector develop by creating more job opportunities for the local people to enjoy a higher quality of life.

### **1.6 Structure of the Thesis**

This study revolves around issues of sustainability, sustainable development, the tourism industry, sustainable tourism, and sustainable hotel buildings, and is composed of seven chapters. The first chapter reviews the background of the study, the research questions and objectives as well as the research methodology. The second chapter presents the theoretical review of sustainability and sustainable development by focusing mainly on sustainable buildings via consideration of the environmental, economic, and socio-cultural aspects. The third chapter presents the theoretical information about the tourism sector, sustainable tourism, types of tourism, and hotels.

The fourth chapter discusses the theoretical parameters of measuring sustainability, sustainability indicators, and framework indicators in order to find and compare different methods.

The fifth chapter discusses and describes the process of developing a global evaluation model for sustainable hotel buildings. Then, the sixth chapter introduces the local conditions, tourism of Northern Cyprus, evaluation of the selected hotel, as well as adaptation of the evaluation model to the localized criteria for Northern Cyprus. Finally, chapter seven presents the findings, the conclusions, and suggestions for further research (Figure 1).

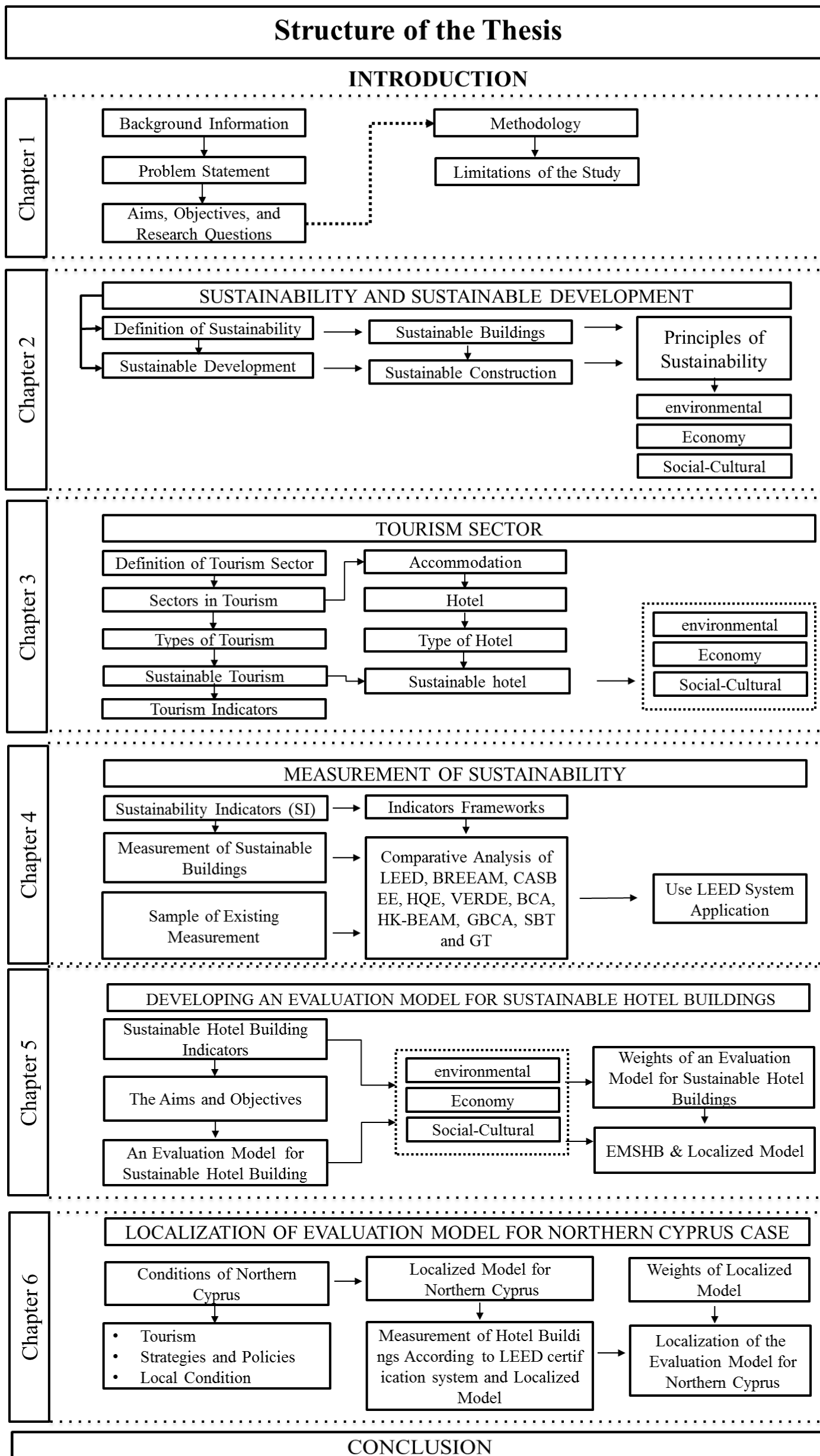


Figure 1: Structure of the Thesis.

## **Chapter 2**

# **SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT**

### **2.1 Definition of Sustainability**

Sustainability can be defined as meeting current needs of a population without jeopardizing the ability of future populations to meet their needs. The idea of sustainability came into its own in the 1980s and was intended to find a solution to the ever-increasing destructive human activities on the environment on one hand and the socio-political concerns raised over human development issues on the other hand (Cohen, Demeritt, Robinson, & Rothman, 1998). Since its conception, sustainability has received a lot of attention both locally and globally with various entities researching and establishing policies and strategies to improve the environment and economy for human well-being now and in the future (Kibert, Thiele, Peterson, & Monroe, 2011). Though the concept was initially directed toward environmental and economic issues, interdisciplinary issues such as equality, poverty alleviation, and local-community empowerment have become core issues in sustainability and sustainable development (Ahn, Lee, & Shafer, 2002; Dymond, 1997).

Societal changes and continued development alongside advances in technology and population increases have obliged political and business agendas to emphasize sustainability ever more in their organizing frameworks (Dymond, 1997). Incorporation of sustainability policies are intended to protect resources and improve

quality of life without stalling growth or development (Barbier, 1987). The aim of sustainable efforts is to make appropriate choices for long-term stability through development of ecological or whole-system solutions that address problems in the economic, environmental, and social dimensions (Blackman & Rivera, 2010).

### 2.1.1 Principles of Sustainability

It is difficult to completely separate the concept of sustainability from the process of sustainable development but distinctions between the principles of sustainability are possible. Both sustainability and sustainable development integrate the three principles of environmental sustainability, economic sustainability, and socio-cultural sustainability (Figure 2).



Figure 2: Principles of Sustainability.

### **2.1.1.1 Environmental Sustainability**

Environmental sustainability involves the conservation and protection of the environment through maintenance of ecological processes, biodiversity, and natural resources as well as decreasing pollution, increasing use of renewable energy resources, and appropriately using non-renewable resources. Boniface (2013) categorized the principle of environmental sustainability into two groups: the natural ecosystem and the physical plant. Ecosystems deal with the complex, adaptive natural systems and how the parts interact and support each other (Briguglio, 1996b). Physical plants consist of man-made systems and facilities designed to perform certain functions, the manners by which the parts interact to perform the intended functions, and the plant's interactions with the natural environment. A hotel is a notable example of a physical plant with its various components designed to host guests comfortably and the manner in which the development, operation, and maintenance of the hotel affects the natural environment.

The opportunity for sustainable design standards arises where the two categories of environmental sustainability come together. Sustainable tourism development is uniquely positioned to enhance environmental sustainability and therefore it should be considered in the development plans of hotels or other recreational resorts as well as in other tourism sectors (Zabihi, Habib, & Mirsaedie, 2012). Moreover, any activities or development in the tourism sector should consider aspects of biodiversity, natural resource sustainability, and degradability and renewability of wastes matters and rubbish (Zabihi, Habib, & Mirsaedie, 2013).

### **2.1.1.2 Economical Sustainability**

Economic sustainability is concerned with economic viability and cost-effective management of natural resources, the preservation of such resources for use by future generations as well as durable economic profitability now and in the future (Daly & Cobb, 1994). Economic sustainability may be defined as the capacity of an economic system to generate employment through conventional industries and green industries, and the capability of the region, based on its local resources, to generate and maintain value-added products and services for its local population (Milman & Pizam, 1988; Roseland, 2000). Sage, Mowforth, and Munt (1998) go on to say that economic sustainability also includes the costs of catering to tourists, of environmental damage caused by their presence, and of repair or damage to the local community and businesses. Economic sustainability should be considered in all aspects of tourism because it can affect local quality of life (Milman & Pizam, 1988), the cost of housing and land, income distribution (Perdue, Long, & Allen, 1987), the local cost of living, the price of goods and services, (Johnson, Snepenger, & Akis, 1994); the cost of maintenance for facilities and infrastructure, and the cost of developing local resources.

### **2.1.1.3 Social-Cultural Sustainability**

Socio-cultural sustainability focuses on the compatibility of development with traditional cultural and community values and the maintenance of cultural and linguistic identity (Keitumetse, 2011; Mbaiwa, 2005). Though socio-cultural sustainability is the least studied of the three principles because of the abstract nature of culture and identity (Milman & Pizam, 1988), its concern for enhancing the quality of life of current and future populations revolves around consideration of individual and public wellbeing within a community (Dempsey, Bramley, Power, & Brown,

2011). It relates to the bonds and interactions between the community members who live in and share a particular environment and how infrastructure can bring the population closer together, get them involved in opportunities, help them to evolve and develop together (Dempsey et al., 2011; Steg & Gifford, 2007), and help to equitably distribute resources among society's different strata, classes, and genders. Further, socio-cultural sustainability is concerned with the ability of the social actors or stakeholders to communicate effectively with each other and collaborate towards common goals. Kariel and Kariel (1982) argued that besides all the internal efforts of a community to establish socio-cultural sustainability, tourists can have a significant impact, either positive or negative, on the socio-cultural sustainability of the places that they visit.

Coordination between ecologists, economists, and sociologists safeguards natural ecosystems for both local and tourist enjoyment and benefit now and in the future while development (including tourism) continues to benefit the economy and local socio-cultural conditions (Hobson & Essex, 2001; Swarbrooke, 1999). Tourism can promote long-term ecological sustainability, economic feasibility, and ethical and social propriety and acceptability; therefore, sustainable tourism should be considered an integral aspect of development of the natural, economic, and social environment.

## **2.2 Sustainable Development**

Just as the concept of sustainability is complex, and it can be defined from various perspectives. Zabihi et al. (2012) defined it as a set of measures intent on making everyone's life easier and ensuring a good quality life for the future generations as well. Zabihi's measures are activities that build understanding of and resolutions for



known problems. A more comprehensive definition of sustainable development was offered by Burton (1987):

Sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. (p. 9)

Sustainable development both benefits from and benefits the environment by first considering environmental conditions for more sustainable design and operations and in turn decreasing undesirable consequences on the environment (Eriksson et al., 2003). It tries to strike a balance between multiple environmental, social, and economic needs and limitations by raising individual awareness (Gursoy & Rutherford, 2004). Sustainable development has been applied in many sectors of the economy and it has been shown capable of offering environmental, economic, and social services to the public without causing any interference to the already established natural, economic, and social systems (Roseland, 2000). Regardless, Staley (2006) argued that institutional context needs to be taken into account and the role of the responsible institution (s) should be identified and clarified when making sustainable development decisions and setting goals.

For example, the European Council set up the Sustainable Development Strategy (SDS) to stop the ever-increasing rate of loss of biodiversity, natural resources, and energy resources. Its 2010 priority objectives addressed environmental, social, and economic issues. Its action plan called for a set of tasks and responsibilities that planners, designers, and decision-makers should abide by which included rules and regulations of sustainability, and sustainability tools, measurements, and standards for

sustainable design, architecture, and construction. Since this study investigates hotel building sustainability, such guidelines for sustainable buildings are helpful.

From the goals of sustainable development and guidelines introduced through research, the following sustainable development strategies can be defined:

- Sustainable transportation systems;
- Sustainable production and consumption activities;
- Conservation and management of natural resources;
- Sustainable public health;
- Sustainable migration and colonization measures and schemes;
- Eradication of poverty and sustainable environmental development plans;
- Energy recycling and reuse;
- Reduction of waste by using materials that are naturally degradable, recyclable, or reusable and by harnessing renewable energy sources;
- Reducing consumption or use through using the same material repeatedly either through reuse or through recycling;
- Reduction of any impact on the environmental ecosystem and using and designing materials based on biological processes;
- Reduction or banning of toxic materials and those, which are harmful to nature after degradation;
- Focus on physical setting, space and environment, design and construction;
- Consideration of social and economic factors as the key problems.

### **2.3 Sustainable Buildings**

A large number of studies have investigated sustainable buildings around the world. According to the International Council of Building (CIB) (1997), sustainable buildings are defined as manmade constructs that take ecology and energy into account (Kibert,

2016; Zabihi et al., 2013). Such buildings consider environmental and local conditions by constructing spaces which are flexible, adaptable, and changeable according to the population's needs while also being desired by the population without disturbing the balance of nature (Taylor, 2009). Sustainable buildings follow a set of environmentally-responsible practices and positively influence the environmental, economic, and social elements of their settings (Carroon, 2011). Hooper (2008) named two more (technological, organizational) to establish the five key elements of sustainable buildings. Addressing these elements, the goals of the sustainable building movement are (Cole, 2012; Ding, 2008; Sirola & Edgar, 2012):

- Recycling and reusing energy
- Reducing environmental impacts such as climate change through reduction in greenhouse gas emissions
- Reducing waste through the use of degradable or recyclable materials or by harnessing their energy after use
- Reducing consumption through reuse or recycling
- Reducing impact on the ecosystems by designing and using materials based on biological processes
- Reducing or banning toxic materials and those which are harmful to nature after degradation
- Prioritizing quality and durability over price.

While sustainable buildings involve preservation and protection of energy and earth's resources (Hobson & Essex, 2001), they are made possible through careful and thoughtful planning and design as well as through environmentally-responsible

construction and operation that together consider the needs of the future generations, available technologies, and human factors.

## **2.4 Sustainable Construction**

For some, sustainable building and sustainable construction are synonymous; the distinction lies in buildings being an outcome of the process of construction. By combining appropriate building materials and products with the best methods of design, production, and management, one can provide resource-efficient, ecologically-friendly, healthy, and otherwise sustainable buildings in any region (Cole, 2012; Weber, 2014).

Compared to conventional construction<sup>1</sup>, the sustainable construction process saves energy and protects the environment by using fewer resources and designing strong, efficient, and durable facilities and infrastructure which cause less damage to the environment over their lifespan (Shrivastava & Hart, 1995). For this purpose, Wahlström et al. (2013) introduced building end-of-life scenarios and material efficiency as major issues in today's environmental policies. As well, Ortiz et al (2009) assert that the following three factors are taken into account in sustainable construction:

- A focus on physical setting, space, and environment,
- Consideration of social and economic factors as the key issues, and
- A focus on design and construction.

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<sup>1</sup> A huge proportion of natural resources extracted in Europe goes into conventional construction work to which adding the considerable amount of energy used to transform resources into buildings results in an enormous extent of resources and energy loss.

## **2.5 Chapter Summary**

The concepts of sustainability and sustainable development from related literature permit alignment of the principles of sustainability with sustainable buildings and sustainable construction. Considering the environmental, socio-cultural, and economic principles of sustainability in building design, construction, and operation can help address factors such as natural resource and energy management; human and environmental well-being; and human rights, poverty, equality, and other socio-economic issues.

## Chapter 3

### TOURISM SECTOR

#### 3.1 Definition of the Tourism Sector

Though tourism may be defined by a variety of parameters throughout time, Milman and Pizam (1988) explained tourism as basically people's movement from one location to another within a specific period of time. As an active and widespread industry in modern society, tourism has the potential to either positively or negatively impact the environmental, economic, and social conditions of a place (Archer, Cooper, & Ruhanen, 2005). While some researchers believe that the disadvantages of tourism outweigh its advantages, others argue that every industry has upsides and downsides and the manner of dealing with problems to improve the situation is important (Legrand, Sloan, & Chen, 2016). For tourism, one of its greatest disadvantages is how it can negatively affect sustainability.

With today's transportation advances and improvements to the social and financial foundation of urban communities, travelling has become more accessible for people around the globe. As the number of travellers increase (Figure 3)<sup>2</sup>, existing issues compound and new issues arise requiring new methods of evaluation and assessment (Sloan, 2010). When the tourism industry affects the environment, it impacts natural, cultural, and historical resources (Yolal, Gursoy, Uysal, Kim, & Karacaoğlu, 2016).

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<sup>2</sup> Tourism across the globe is expected to rise 3.3% percent between years 2010 and 2030 reaching 1.4 billion by 2020 and 1.8 by 2030 tourist (Organization, 2014; UNWTO, 2015a).

Legrand et al. (2016) believe that in places where tourism is a main source of income, it has a major economic impact on the host, the source countries, and the local people. Such impacts can manifest on the local landscape as construction of new facilities and infrastructure, establishment of dense resort areas for travelers, construction of new roads and public facilities, and changes to historical and cultural resources (Inskeep, 1998; Murphy, 2013).

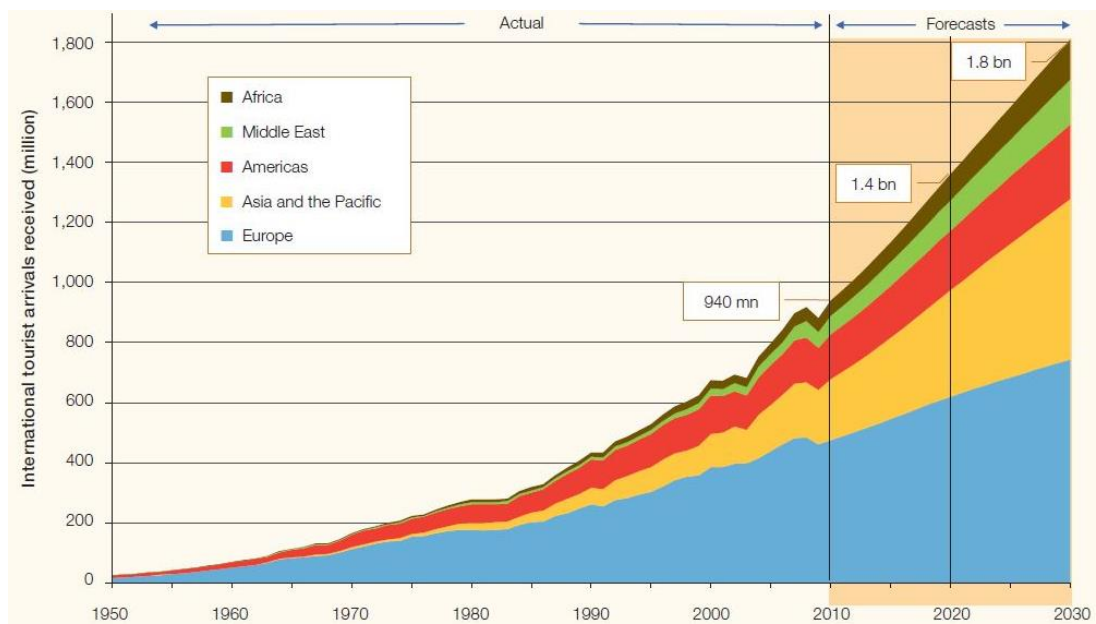


Figure 3: International Tourist Arrivals, 1950-2030. World Tourism Organization (UNWTO, 2015a).

Any of these can have positive or negative effects on the host community but when tourism is sustainable, it brings positive benefits to a community through the protection, preservation, and conservation of the environment and cultural amenities, and the resilient improvement of socio-economic conditions. Tortella and Tirado (2011) noted that sustainable tourism can raise public awareness for the protection and preservation of their environment and can provide the community with the financial and economic assets for this purpose. Sustainable tourism should not only protect the environment to ensure its ecological acceptance but also prove economically viable by

producing enough revenue for long-term community benefit and establish social and ethical acceptance in the community by supporting the integral parts of the local natural, cultural, and historical environs (UNWTO, 2015a). Tourism's preservation of the physical and social fabric of society is essential since tourism depends on the persistence of the natural, cultural, and historical elements to attract tourists (Fennell, 2014; Harper & Snowden, 2017). The United Nations World Tourism Organization (UNWTO) (2015a) explained that these efforts are especially important for coastal cities and those on islands.

For all these reasons, authorities, tourists, and stakeholders of host communities need to pay serious attention to sustainability and sustainable development principles in the region as they pertain to tourism (Brida et al., 2010). Tourism's development and construction of restaurants, resorts, transportation services, entertainment venues, lodging, and other accommodations for travellers contributes much to the local economy by attracting tourists and travellers who bring outside funds to pay for goods and services (Williams & Lew, 2014). Sloan (2010) maintained that broader income sources gained through tourism can be spent on community development efforts that may be directly impacted by tourism (e.g. infrastructure for clean water and sanitation systems) as well as those indirectly affected (e.g. education). According to the UNWTO (2015b), despite investments in local infrastructure and income opportunities provided by the industry, tourism needs to be managed sustainably otherwise it can inflict irreparable damage on the host community and its local environs. Development of the tourism industry requires attractive, high-quality, low-cost destinations and traveler accommodations in each of its subsectors but also sustainable approaches and



ameliorization of the environment for the damage and destruction caused by massive numbers of tourists arriving in any particular region.

### **3.2 Types of Tourism**

Phillips and Hardy (2002) stated that tourism should be defined with reference to the conditions of the region under study. Many types of tourism have been envisaged for the tourism industry. Eriksson et al. (2003) classified tourism into two overarching categories: unsustainable and sustainable. Unsustainable tourism refers predominately to mass tourism, whereas the authors considered sustainable tourism to include ecotourism, adventure tourism, and social-cultural tourism.

#### **3.2.1 Mass Tourism**

Mass tourism refers to a type of tourism in which thousands of travelers flood an area, usually during a specific time of the year. This type of tourism is usually contrasted with alternative or sustainable tourism as being environmentally unfriendly. Dorobantu and Nistoreanu (2012) offered a number of characteristics and outcomes of mass tourism:

- Masses of people visit a specific area.
- The sheer quantity of tourists and their combined actions negatively affect the environment.
- Masses of tourists negatively affect macroeconomics causing exaggerated fluctuations in the economy.
- Mass tourism requires intensive programs of touristic facility development and urbanization.
- Mass tourism requires mostly temporary entertainment activities rather than long-term training or educational activities.

Ccoastal cities and small islands are frequently sufferers of mass tourism. They are usually crowded by various types of tourists and hence are faced with numerous issues such as seasonality of jobs, over dependency on foreign tourists, and protection of their natural and unique environment (Sharpley & Harrison, 2017).

### 3.2.2 Alternative tourism

Alternative tourism is the opposite of mass tourism wherein small numbers of tourists visit an establishment or location throughout the year, spreading and lessening their impacts. Alternatives were developed as reactions to mass tourism’s negative impacts on its host destinations. There are several different types of alternative tourism which are briefly introduced in Table 2.

Table 2: Different Type of Alternative Tourism (Developed by Author) (Bookman, 2007; Cheung & Jim, 2014; Fodness, 1994).

<b>Different Types of Alternative Tourism</b>	
<b>Health and Medical Tourism</b>	Tourists visit a place advanced in the healthcare field for tending health-related matters. Special facilities offer health services and accommodations.
<b>Leisure Tourism</b>	Tourists spend their time relaxing and taking a break away from their everyday routines and work.
<b>Business Tourism</b>	Travellers conduct business such as meetings with business partners, attend industry conferences and conventions, or participate in industry training.
<b>Educational Tourism</b>	Tourists travel to another country for educational purposes such as studying in a new field, attending workshops, or conferences.
<b>Cultural Tourism</b>	Tourists travel to other places to learn about local cultures and histories by visiting exhibitions, unique places, and historical sites.

<b>Eco- and Sustainable Tourism</b>	Travellers visit natural or ecological locations, often under the supervision of a naturalist, with the aim of learning about the environment, its wildlife, and its preservation.
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Of these types, eco- and sustainable tourism are most relevant to this study. These types of alternative tourism are considered safe tourism because they are environmentally-friendly (Smith, 1992), helping to preserve the natural environment of the host area (Newsome, Dowling, & Moore, 2005). These aim to maintain balance between natural, social, and community values by minimizing negative impacts on the environment and increasing positive economic impacts (Smith, 1995).

### **3.2.3 Sustainable Tourism**

Sustainable tourism is defined as that which can be sustained over a long period of time by simultaneously investing in the social, economic, natural, and cultural environments of the region. Swarbrooke (2005) gave an expanded definition of sustainable tourism as that which contributes to the economic viability of a region without causing any negative impacts on the physical environment or the social structure. The negative impacts of tourism on local people should be limited, neither damaging their environment or nor the future of the region (Leksakundilok, 2004).

According to the UNWTO (2015b), sustainable tourism development is:

Meet the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems.

This definition was further elaborated as (Organization, 2014):

- Tourism not only brings advantages to the region, it also helps protect the cultural, historical, natural, and other resources for future use.

- Improvements in tourism are made in a way that it will not cause any socio-cultural or environmental damages to the community or region.
- Where it is required, the general environmental quality of the tourist region is preserved and enhanced.
- Great effort is made to satisfy the needs of the tourists and travellers to retain and continue the popularity and the marketability of the region.

Another definition of sustainable tourism improvement integrates the ideas of development, stability with natural and social integrity, economic viability, and growth protection (Wall, 1993). Since its inception and expansion worldwide, sustainable tourism has improved the rate of employment especially in remote and poor countries (Economic & Union, 1989). Sassen (2011) noted that sustainable tourism is the main source of income and revenue of many countries, accounting for 5% of global gross domestic product (GDP) and creating millions of employment opportunities throughout the world. Besides the economic benefits (economic viability, local community prosperity, local employment), sustainable tourism aims to achieve efficient use of natural resources, a clean atmosphere and environment, social equity, community wellbeing, cultural preservation, conservation of historical features, and local diversity (Degert, Parikh, & Kabir, 2016; UNWTO, 2008). Sustainable tourism usually starts from a small-scale tourism industry and its parallel development – enhancement of its positive impacts and reduction of its negative effects – within the three aspects (socio-cultural, economic, and environmental) of society is a precondition to successful, sustainable development and improvements to local quality of life (Sharpley, 2001). The UNWTO attempts to increase both the employment and economic advantages of tourism by cooperating with other sectors and sharing their

technical expertise so that the people in affected regions (especially in coastal towns and on small islands) can benefit equally.

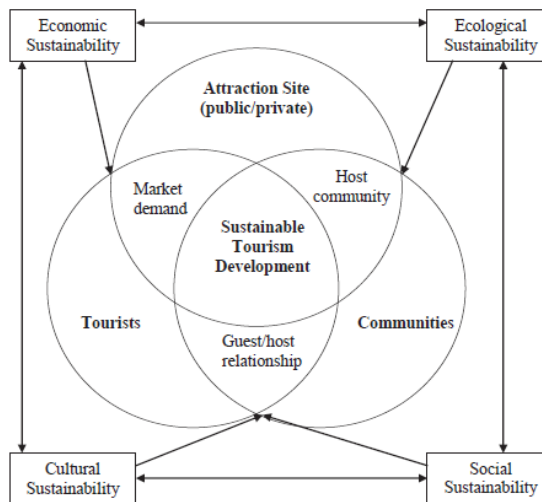


Figure 4: Model for Sustainable Tourism Development (De Kadt, 1979).

The model for development of sustainable tourism (Figure 4) demonstrates its fundamental ideas and relationships between the different aspects. The direct connections between tourism and local communities (Giaoutzi, 2017) means that tourism can affect the cultural elements, activities of the host communities, appreciation of these elements and activities in local communities, and the cultural and social identity of the region. Points of interest and culture are the fundamental factors that constantly influence tourism attraction techniques (Mill & Morrison, 2002). Host communities that have these attractions are in dire need of sustainable tourism development to counter any negative impacts resulting from conventional tourism. Remedies may include adoption of policies and strategies for protection and preservation of natural habitats, social and cultural values, and unique, local identities; development of sustainable economic practices; and guidance toward sustainable, physical structures and infrastructure (Vehbi, 2012). As Rogers and Collins (2001) put

it, the aim of sustainable tourism development should be its ecological acceptance, its financial viability, and its ethicality and fairness to the local communities over the long term.

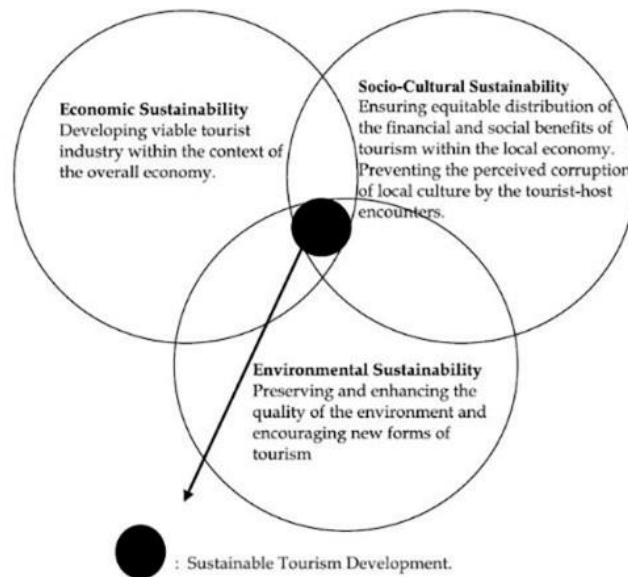


Figure 5: Three Dimensions of Sustainable Tourism Development (Briguglio, 1996a).

### 3.3 Tourism Indicators

Since 1992, the World Trade Organization (WTO) has made a lot of advancement in the areas of sustainability and sustainable tourism, infusing tourism with environmental and socio-cultural contexts (UNWTO, 2015a). Sustainability in tourism is a new and promising area of research, especially for the accommodation subsector. To define a set of indicators for sustainable tourism and accommodations, studies like this one need to view tourism holistically, considering all the interrelated factors (Choi & Sirakaya, 2006). According to Ritchie and Crouch (2003), the main principles of sustainable tourism are:

- Sustainable utilization of resources;

- Reduced use of resources and waste output;
- Conservation of diversity;
- Integration of tourism into planning and design;
- Financing of local businesses;
- Employment of local people;
- Awareness-raising among all stakeholders;
- Training courses for staff;
- Responsible tourism marketing; and
- Valuing of research and studies.

While Farsari and Prastacos (2001) proposed using the following environmental indicators, they admitted indicators of the social and cultural dimensions are difficult to enumerate because they must be assessed qualitatively rather than quantitatively;

- Use of renewable energy resources such as solar and wind energy in tourist accommodations as a percentage of total energy used;
- The reusability and recyclability of water in such accommodations and infrastructure;
- The amount of energy and resources used for each tourist;
- The amount of land or beach used in square meters per tourist;
- The amount of open spaces in square meters used per tourist;
- The proportion of open space to the percentage of the tourism infrastructure;
- The existence of rules and regulation for the continuous monitoring of swimming water;
- Possessing water supply which exceeds safe limits on a national and international scales;

- The existence of less pollutants in the water being used for drinking, bathing, and swimming purposes;
- Blue Flag award or any other similar certificates;
- The number of local people using the beaches.

During the last two decades both in developed and developing countries, tourism has brought about significant direct and indirect economic advantages, particularly in the forms of increased employment (Farsari & Prastacos, 2001) and per capita income for host communities. An alternate economic indicator of sustainable tourism should be increased demands for local products and services such as agricultural products and traditional crafts. Unfortunately because tourism is an industry that depends on foreign investment, host economies and activities might be impacted by such investment, sometimes leading to local peoples' loss of control over their economic resources (Richter, 1995). When businesses are owned and operated by non-locals, initial investments arrive to the community but ultimately a large portion of revenue may not stay in the host community. One way to evaluate such impacts would be an input-output analysis using the following indicators to reveal the relationships between sectors and their consumption patterns (Farsari & Prastacos, 2001; Meyer, 2006):

- The percentage of employment in the tourism industry to that of total employment in the region,
- The number of local people employed in tourism of a region as a percentage of total employment in the tourism industry,
- The amount of income and revenues brought to an area compared to the percentage of total revenues generated from other sectors in the area,



- The percentage of local ownership of businesses in the area to the percentage of all business establishments,
- The extent of the income increase as calculated in an input-output analysis,
- The number of revenues going out of a region due to their foreign ownership of the tourist accommodations and establishments in an area.

The identification of the main indicators of sustainable tourism assists in building an evaluation model to assess sustainability in the Accommodation Subsector.

### **3.4 Accommodation Subsector of Tourism**

The tourism industry consists of eight subsectors: accommodation, transportation, attractions, events and workshops, service, recreation and adventure-seeking, food and beverage, and travel trade (Leiper, 1979). Each subsector is capable of incorporating sustainability measures to support the host community across environmental, socio-cultural, and economic lines. For example, besides during its operational phase, the accommodation subsector can economically benefit the local community by providing a number and variety of employment opportunities and material expenditures during its design, construction, and maintenance phases (Reeson, Mason, and Sanderson (2017). In these phases, the subsector is also capable of benefiting the local community's natural environment and socio-cultural conditions. The accommodation subsector is a growing part of the tourism industry and is concerned with the capacity and quality of tourist housing which are variously called hotels, guesthouses, inns, et cetera. This study focuses on the accommodation subsector and specifically on hotels to understand the different categories and classifications of hotels, to identify those best supported by the aim of this study, and to highlight the impacts of sustainable hotels.

### 3.4.1 Categories of Hotels in Accommodation Subsector

Hotels are basically multi-room buildings designed to provide semi-private, temporary housing to travelers and tourists alike. They vary in form and function according to location and the interests and needs of travelers . Early lodging for travelers amounted to a place for sleeping and possibly the provision of food; hotels nowadays do much more by catering to the peculiar needs and wants of their customers through their services, unique designs, and special facilities and amenities (De Klumbis, Sant, Esade, & Munsters, 2010). Tourists are no longer only in search of a safe, clean, and comfortable room but also they are often looking for a unique lodging experience.

Table 3: Categories of Hotels in Accommodation Subsector (Developed by Author).

<b>Hotel Type</b>	<b>Location</b>	<b>Description</b>	<b>Bed Capacity</b>	<b>Source</b>
<b>Boutique</b>	high-class urban area	modern small-sized	10 to 150	(Anhar, 2001)
<b>Roadside and Motels</b>	usually along major travel routes	small-sized holiday inns	varies	(Rutes et al., 2001)
<b>Airport</b>	not necessarily connected to an airport but within a five-mile radius	usually offer a shuttle-bus service to and from the airports	varies	(Lawson & Lawson, 1976).
<b>Office Park</b>	suburban areas in the US	low-cost, accessible, and safe buildings with green spaces, offering business services and associated with suburban office complexes	varies	(Penner, Adams, & Rutes, 2013)
<b>Country Inns and Bed-and-Breakfasts</b>	varies	usually private family establishments ; small-sized lodgings that offer a room and breakfast	4-11 rooms	(Search, 2005)
<b>Special-Purpose</b>	response to rapid suburban development	ever-increasing diversity that cater to numerous needs of the market; serve multiple purposes	varies	(Riewoldt, 2006)

<b>Hybrid</b>		and functions such as shopping malls, educational centres, museums, amusement parks, health centres, airports and office parks		
<b>Mall</b>	near shopping centers	grew out of a need for the development of residential suburbs and led to further residential and business expansion in the 1970s	varies	(Search, 2005)
<b>University</b>	near university campuses	university-run hotels; sometimes integrated with hospitality management programs and serve as industry training for students	varies	(Lawson & Lawson, 1976)
<b>Super-Luxury</b>	varies	faultless, urbane administration and exquisite design, small-sized super-lavish; offer services to the high-class society such as royalty, foreign dignitaries, and celebrities	varies	(Search, 2005)
<b>Tennis and Golf Resort</b>	near appropriate sport facilities	golf and tennis resorts with facilities for specialized sports	varies	(Lundberg, 1971)
<b>Island Resort</b>	on an island	for recreation and entertainment; provide hotels, resorts, restaurants, and amenities which sometimes are all-inclusive	varies	(Lundberg, 1971)
<b>Spa Resort</b>	located near spas, natural hot springs, or mineral springs	provide relaxation and therapeutic services	varies	(Kramer & Barr, 1978)
<b>Ski and Mountain Resort</b>	mountainous areas	for vacationers and skiers; usually contain ski and winter sport facilities, may also accommodate summer activities (e.g. hiking and mountain biking)	varies	(Lawson & Lawson, 1976)

<b>Conference and Convention</b>	in major cities such as New York, Chicago, New Orleans, San Francisco	chains of traditional hotels associated with conference halls and convention facilities	1,000-1,500	(Rutes et al., 2001)
<b>Casino</b>	casinos with temporary lodging	customers can stay near the gambling venue	varies	(Lawson & Lawson, 1976)
<b>Residential</b>	in quiet areas of big cities but within accessible reach of businesses	for travelers staying long-term; possess full living facilities for the whole family	varies	(Rutes et al., 2001)

### 3.4.2 Sustainable Attributes of Hotels

The concept of sustainability in hotel buildings started in the 1960s by focusing on the environmental and social issues resulting from an upsurge in hotel activities and development (Shanti, 2016). Since that time, the concept of sustainable hotels has evolved and nowadays a sustainable hotel is defined as a facility which attends to the socio-cultural, environmental, and economic dimensions of the host community in its design and operations (Council, 2013). By drawing from sustainable buildings, sustainable hotels offer high-quality services via their eco-friendly facilities (e.g. adopting LEED (Leadership in Energy and Environmental Design) certification standards) by optimizing energy and resource consumption (e.g. using renewable energy and recycled water in watering their green areas); and using locally-produced goods, recycling, and minimizing waste production (Yu, Li, & Jai, 2017). These sustainable practices can lead to lower operational costs (Rahman, Reynolds, & Svaren, 2012). ‘Green’ is the notion of sustainability and eco-friendliness and having a ‘green’ approach can lead to a higher brand value and hence higher profitability in

the long term (Rahman, Kim, & Brown, 2014). Through various advertisements and promotion of the concept of sustainability, such hotels can attract numerous customers who value nature and the environment (Wang, Chen, Lee, & Tsai, 2013); around 90% of hotel guests express preference for staying at sustainably-managed hotels (Tang, Tang, Lam, & Lam, 2017). Tourists' concerns for the environment and their awareness of protection and preservation of nature has precipitated competitiveness in the hotel industry (Aragon-Correa, Martin-Tapia, & de la Torre-Ruiz, 2015). Sustainable approaches may lead to a hotel's competitive advantage (Berezan, Millar, & Raab, 2014) so long as the idea of green and greenness attracts a lot of travelers. In 2011, Kim, Chang, Lee, and Huh expected non-green hotels to soon become a 'thing of the past'. Once sustainable attributes of hotels become common attributes among all hotels, they may no longer be significant factors in increasing customer satisfaction (Robinot & Giannelloni, 2010) but such attributes will still have broad environmental, economic, and socio-cultural benefits in the host community.

#### **3.4.2.1 Impacts of Environmental Aspects in Sustainable Hotels**

When it comes to environmental sustainability, hotels need to use natural resources wisely and minimize negative impacts on the environment because they have higher potential to impact the environment than any other industry (Bohdanowicz, 2006). In general, conventional hotel buildings consume more energy and water and generate more waste and pollution than other buildings. Hotel decision-makers can adopt policies and strategies aligned with environmental and sustainability standards, such as use of durable service products instead of disposable ones as well as use of recycled items, energy-saving light bulbs, recycled water, locally-grown foods and materials, and environmentally-friendly products (Gaibee, 2015). As for sustainable energy consumption, the tourism industry uses a large quantity of energy which could be

better conserved through simple energy-efficient methods and schemes. According to Gössling et al. (2012), hotels' diverse facilities are energy intensive and it is quite common for hotels to use more energy per visitor per day than an average member of the local community uses. However, energy consumption varies between hotels depending on their size, class, location, climate, preferences of guests, and offered amenities and services (Bohdanowicz, 2005). For example, most Swedish hotels have very low energy efficiency, resulting in serious environmental issues compared to other buildings of similar scale (Bohdanowicz, 2006). A study by Deng and Burnett (2000) showed that electricity, rather than gas or oil, is the main source of energy for hotels and Table 4 shows the energy efficiency ratings for various types of hotels (Bohdanowicz, 2006).

Table 4: Energy Efficiency Rating for Different Types of Hotels (BHATIA, 2014).

<b>Efficiency rating</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	<b>Very</b>
A) Large hotels (more than 150 rooms) with heating and air conditioning, laundry, and indoor swimming pool.				
Electricity (kWh/m <sup>2</sup> year)	< 165	165-200	200-250	> 250
Fuel (kWh/m <sup>2</sup> year)	< 200	200-240	240-300	> 300
Total (kWh/m <sup>2</sup> year)	< 365	365-440	440-550	> 550
Hot water (kWh/m <sup>2</sup> year)	< 220	230-280	280-320	> 320
B) Medium-sized hotels (50-150 rooms) with heating and air conditioning in some areas, without laundry or recreational facilities.				
Electricity (kWh/m <sup>2</sup> year)	< 70	70-90	90-120	> 120
Fuel (kWh/m <sup>2</sup> year)	< 190	190-230	230-260	> 260
Total (kWh/m <sup>2</sup> year)	< 260	260-320	320-380	> 380
Hot water (kWh/m <sup>2</sup> year)	< 160	160-185	185-220	> 220
C) Small hotels (4-50 rooms) with heating and air conditioning in some areas, without laundry or recreational facilities.				
Electricity (kWh/m <sup>2</sup> year)	< 60	60-80	80-100	>100
Fuel (kWh/m <sup>2</sup> year)	< 180	180-210	210-240	> 240
Total (kWh/m <sup>2</sup> year)	< 240	240-290	290-340	> 340
Hot water(kWh/m <sup>2</sup> year)	< 120	120-140	140-160	> 160

Water is a vital natural resource for quality of life and the agriculture industry (Graci & Kuehnel, 2011) and also plays an important role in attracting tourists to hotels with recreational facilities like swimming pools, landscaped gardens, and golf courses. However, tourist activities can negatively affect water supply through over-consumption and water pollution (Zucchetto & Jansson, 2012). On a per capita basis, tourists demand more water than the locals living in a host region (Essex, Kent, & Newnham, 2004). For example, Mycoo (2006) found that Barbados' tourists consume six to ten times more water than the local people and Sunlu (2003) found that tourists in Mediterranean regions consume twice as much as water as the local inhabitants consume. Waste is a side effect of tourism both where hotels and other service providers do not uphold sustainability standards and where tourists are not environmentally aware of their impacts. In Northern Cyprus, a vast quantity of waste produced by tourism threatens the local environment (Bohdanowicz, Churie-Kallhauge, & Martinac, 2001) and the attractiveness of host communities. The Bohdanowicz and Zientara (2009) study (2009) measured an average of one kilogram of waste per hotel guest per day and found that about 30 percent of hotel waste could be recycled or reused. The tourism industry has also caused environmental pollution by producing a lot of ground, water, and air pollution. For example, sewage pollution in Cyprus (Andronikou, 1987), the pollution of Norfolk Broads in England, the pollution of Shinshu lakes in Honshu Island in Japan (Hunter & Green, 1995), and Glaesser (2006) study of air pollution from aircraft, private cars, and heating systems were caused by tourism development.

#### **3.4.2.2 Impacts of Economic Aspects in Sustainable Hotels**

In terms of economic sustainability Lewis (2015) compared other industries to the hospitality industry and perceived it to be very beneficial with the highest development

rates at the local level where new hotels generate job opportunities. Financial aids, land contracts, or tax reductions are some of the incentives offered by host communities to hotels investors (Ahmed, 2015) in anticipation that the hospitality industry will bring overseas trade, government revenue, improved sister industries, higher standards of living (Zaei & Zaei, 2013), improved work quality, improved health conditions, increased tourist satisfaction, community prosperity, societal equality, productivity of resources, biological variety, cultural growth, and sensitivity to environmental issues (Legrand et al., 2016).

#### **3.4.2.3 Impacts of Socio-Cultural Aspects in Sustainable Hotels**

In terms of socio-cultural sustainability, tourism affects the way local people live, their world perspectives, and their means of earning income as well as the standards and qualities of society at large (Lee & Park, 2009). The social sustainability of any industry affects psychological issues, levels of satisfaction, safety, security, comfort, skill acquisition, health, knowledge, and motivation of all stakeholders (Illankoon, Tam, & Le, 2016). The development of sustainable tourism profits socio-cultural aspects of the host community by establishing communication and building connections between local people, members of the tourism industry, and tourists; and inspiring economic, social, and political change (Ribeiro, Pinto, Silva, & Woosnam, 2017). Hotels can enhance employees' well-being alongside community well-being by increasing salaries, encouraging participation in charitable activities, raising awareness of the significance of their involvement in the host community, and providing education and training (Vorkapić, Čočkalo, & Đorđević, 2017)

### **3.5 Chapter Summary**

Working from general definitions of the tourism industry to the specific ways that hotels can both harm and support host communities provided a hierarchy of



characteristics, classifications, and sustainability indicators. Since tourism is one of the main sources of income for host communities to overcome local issues, the sustainability of tourist activities and outcomes hold great influence over their success and long-term viability. Inserting the principles of sustainability into the hotel industry can have very positive impacts, simultaneously benefitting the environment, cultural traditions, historical sites, the local economy, stakeholder well-being, health conditions, and the experiences of tourists. Further development of the evaluation model for sustainable hotel buildings depends on developing the environmental, economic, and socio-cultural aspects of host communities in accordance with the following sustainability indicators:

- The use of renewable energy resources such as solar and wind energy in the tourist accommodations as a replacement to the percentage of total fuel used;
- The reusability and recyclability of water in such accommodations and infrastructure;
- The amount of energy and resources used for each tourist;
- Possessing a water supply which exceeds safe limits on a national and international scales;
- The existence of fewer pollutants in the water used for drinking, bathing, and swimming purposes;
- Reduction in the use of resources and waste;
- Financing the local businesses;
- Employment of local people;
- Offering training courses for the staff;
- The percentage of local ownership of businesses in the area to the percentage of all business establishments.

## Chapter 4

### MEASUREMENT OF SUSTAINABILITY

#### 4.1 Sustainability Indicators (SI)

Sustainability indicators have been used by many organizations over the world to assess the performance of projects, buildings, policies, and activities. The indicators vary depending on the object of assessment, and different frameworks tend to use different measurement indicators (UN, 2007). These indicators were designed to improve the economy, the social environment, and environmental sustainability of manmade structures. Together, they make sustainability possible in the three main aspects of community life. As measures, indicators provide useful information about the level of sustainability of a building in the past, its performance in the present, and estimate its future conditions by considering a number of principles, issues, and assumptions about change and development (Al Waer & Sibley, 2005).

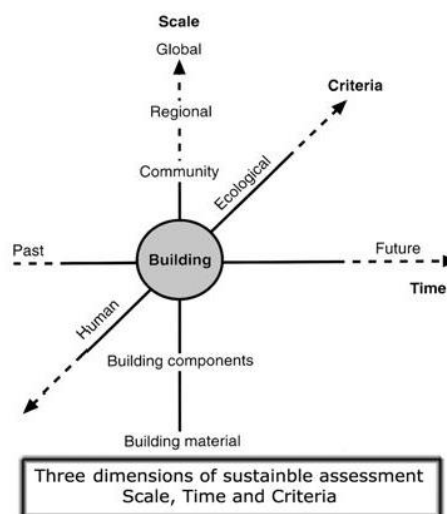


Figure 6: Three Dimensions of Sustainable Assessment (Al Waer & Sibley, 2005)

Two complementary definitions of sustainability indicators offered by (Johnston, 2004; UN, 2007) are considered the key definitions of sustainability. The first definition defines sustainability as a landmark in the spatial scale, which is the assessment of sustainability in terms of the spatial dimensions of buildings design. In this definition, sustainability indicators take two aspects into account;

- The first aspect is the geographical location of the building, an important aspect when assessing sustainability.
- The second aspect deals with the spatial level of intervention in the building by considering the issue on a regional, national, and international scale.

The second definition of sustainability indicators is concerned with the timing of sustainability of the building for which two important factors are taken into account;

- The first one considers the sustainability over a continuous period of time.
- The second one considers sustainability in a fixed period of time.

#### **4.1.1 Features of Effective Sustainability Indicators**

An indicator is defined as something that indicates the state or level of an issue or condition and is usually concerned with how a system operates. It also helps to resolve a problem by identifying the path or direction to take and to follow. Cooper, Fletcher, Gilbert, Wanhill, and SHEPHERD (1998) identified four features of indicators which are considered desirable;

- A part of the cause-effect chain should be clearly represented by the indicator.
- The indicator must be representative of the system chosen and must have a scientific basis.
- Indicators must be measurable.
- The indicator should offer implications for policy and strategy.

According to Vehbi (2012), indicators have three main uses: simplification, quantification, and communication. Al Waer and Sibley (2005); Johnston (2004); Veleva and Ellenbecker (2001) identified the following common features. Effective indicators:

- a) are usually relevant to what we look for by identifying the aspects of a system which we should have information about,
- b) can easily be understood by everyone,
- c) provide reliable information on a system, and
- d) are used to assess the available information or data which can be collected in due time.

The first two features (a & b) are straightforward while for the third feature (c) assurance of reliability is not an easy task but researchers must verify and validate the techniques employed and the data used in each case. The fourth feature (d) is always the case that one has access only to a limited amount of data which is not suitable for measuring or assessing sustainability in a system. Additionally, quantification of an acceptable level of data is not always possible, and effective indicators rely on the aspects of sustainability of the system they assess. To achieve effective indicators, adequate values of state and process indicators need to be available. An effective indicator usually warns stakeholders, such as designers and planners, before a situation gets worse by considering the issue both quantitatively and qualitatively as well as offering solutions for the stated problem.

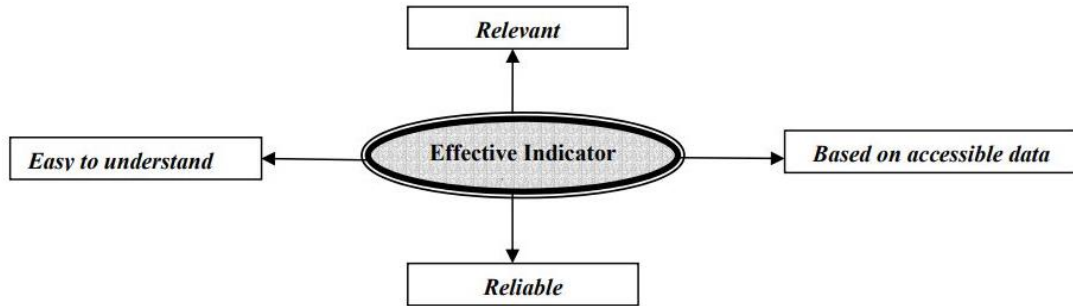


Figure 7: Characteristics of Effective Sustainability Indicators (Al Waer & Sibley, 2005).

#### 4.1.2 Indicator Frameworks

Sustainable development involves various issues and areas; so, to achieve effective indicators for sustainability in each case, a certain theoretical or conceptual framework needs to be followed. An indicator framework groups indicators into relevant categories. Three main indicator frameworks have been used by various organizations around the world.

#### OECD Indicators - PSR Framework

The Pressure-State-Response (PSR) framework was proposed by the Organization for Economic Co-operation and Development (OECD) and is referred to as the PSR model. This framework provides a number of indicators which assess environmental pressures, environmental conditions, and societal responses. In this model, indicators of environmental pressure assess the impact of human activities on the environment, such as the reduction or destruction of natural resources. Indicators of environmental conditions are concerned with the quality of natural resources while indicators of societal response deal with the actions taken by the community in response to environmental impacts of a certain structure or project (OECD, 1976).

### **UNCSD (United Nations Commission on Sustainable Development) Sustainable Development Indicators - Driving Force-State-Response (DSR) Framework**

The Driving Force-State-Response (DSR) framework was originally adopted by the United Nations in 1995 and used a number of indicators for sustainability assessment. This framework is used to measure various social, economic, environmental, and institutional aspects by first considering the driving forces (UN, 2007). The second indicators in this framework are the state indicators, which assesses the state of sustainable development. The next type of indicators are the response indicators, which shows or measures responses to the changes in the state of sustainable development.

### **EEA (European Environment Agency) Sustainable Development Indicators - DPSIR Framework**

EEA indicators are used to respond to policy issues by addressing the policy frameworks from the start of a project through monitoring and evaluating issues to communicating evaluation to policymakers and society (Vehbi, Hoskara, & Hoskara, 2010). Some of the key elements in this framework are as follows:

- Driving forces deal with issues in different sectors such as energy generation, transport system, industry, agriculture, and tourism.
- The impact of human activities on the environment is referred to as pressures, for which carbon dioxide emission is just one of them.
- The observable changes occurring in the environment such as pollution and global warming are referred to as a state in the framework.
- The changes happening to the environment as a result of natural disasters are defined as impact.

- The way society and community respond to a change in the environment as a result of human activities is called the response indicator.

#### 4.1.3 Formulation, Selection, and Measurement of Sustainability Indicators

Prior to selection of the most appropriate indicators, community members need to be involved and representatives from various groups need to define sustainability, a vision, goals for improvement, accessibility of data, the availability of resources, and what steps and measures need to be taken to ensure sustainability in the certain context (Hoşkara, 2006; Vehbi et al., 2010). Indicators are usually decided upon by various teams of people whose performance is facilitated by a smaller group of people resulting in indicators that are multi-sectoral and inter-disciplinary. Deciding on the list of sustainability indicators shows the path that the community wishes to take and moves the community towards sustainable development. Hoşkara (2006) proposed two similar processes to identify and select sustainability indicators (Figure 8 and 9). As the figures indicate, the two processes are similar in nature but are intended to be used for somewhat different purposes. In figure 8, specific target, conceptual frameworks, and participants determine indicator selection while in figure 9 the community develops the sustainability indicator lists.

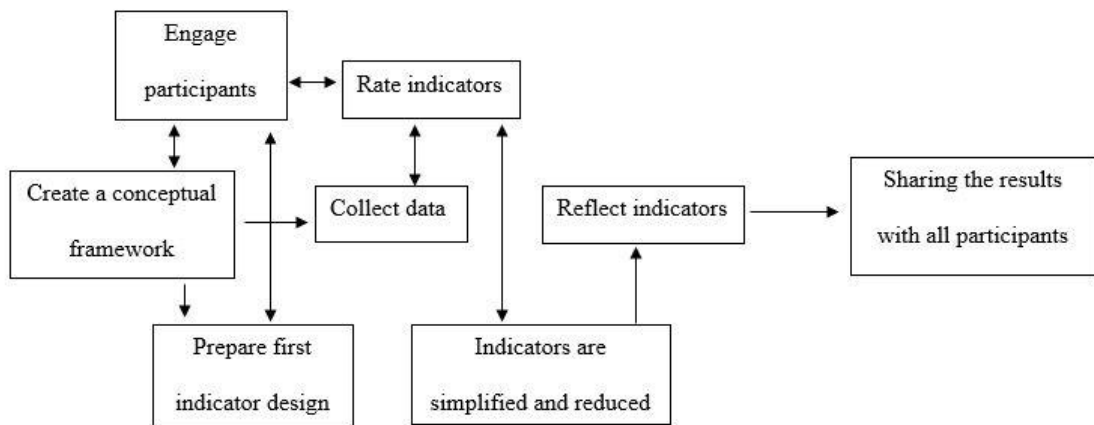


Figure 8 : Proposed Process for Identification and Selection of Sustainability Indicators I  
Author Adapted From (Hoşkara, 2006).

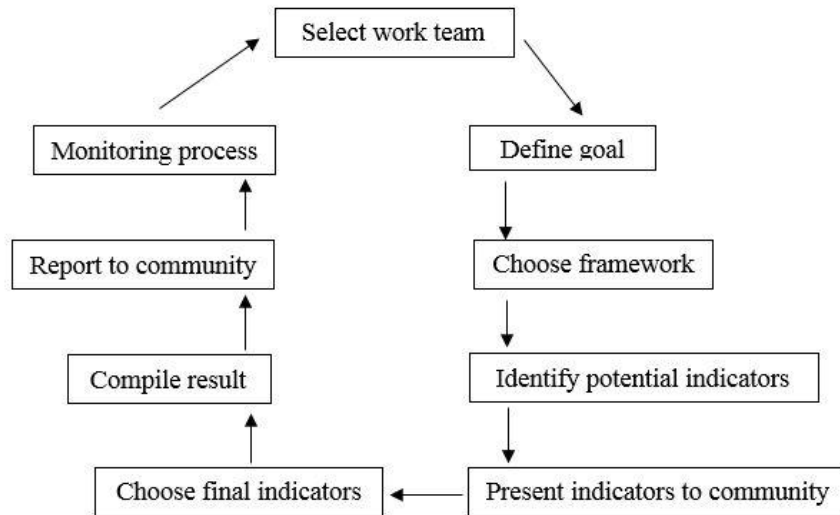


Figure 9: Proposed Process for Identifying Sustainability Indicators and Selection II Author Adapted From (Hoşkara, 2006).

Two additional methods can be identified in the literature, which are compatible with the two aforementioned processes for determining sustainability indicators. The first method was initially proposed by Vemuri (1978) and later was adopted by Rasmussen and Dalsgaard (1994) to provide various indicators for the successful assessment of the community sustainability goals. However, in this method, only goal-related indicators are used and indicators concerning economic, environmental, and social issues are missing. The method (Figure 10) is reliant on the decision-makers' goals which cannot be measured except by setting a number of objectives (B1, B2, ...), causing factors (C1, C2, ...) and finally indicators (D1, D2,...) to fulfil its intended goals (Hoşkara, 2006; Vehbi et al., 2010; Vemuri, 2014).



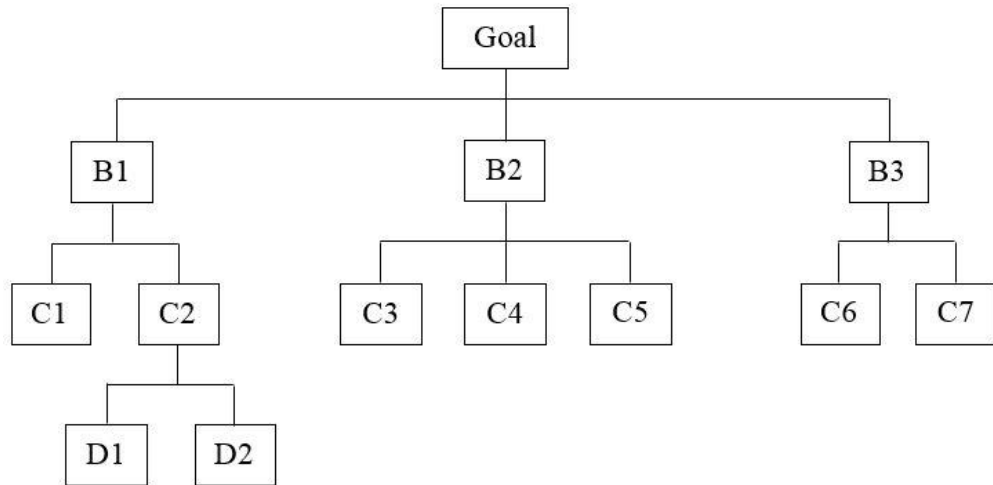


Figure 10: Goal, Aim, Impact Factors and Indicators Identification Model (Vemuri, 2014).

The second method draws heavily on the work of Mitchell (1996) conducted in the UK. Here, the community is involved in the initiation of the concept of sustainability, identification of component elements (issues), and selection of sustainability indicators in order to accurately evaluate the presence or absence of sustainability. Ultimately, evaluation of good indicators is completed by the community and the measuring methods of the selected sustainability indicators is determined in the process.

#### 4.2 Measurement of Sustainable Buildings

Measuring the level of sustainability of buildings is difficult to accomplish. Indicators of maintainability are important for deciding how well buildings perform against natural, socio-cultural, and monetary criteria on provincial, national, and international scales (Alwaer & Clements-Croome, 2010). Sustainable measurement methods have been developed as a way to assess the performance of buildings over a wide range of issues (Al Waer & Sibley, 2005). Such methods are important and helpful in many ways. Voelcker (2002) noted that measurement methods help planners and architects, through the principles of “selective environmental design,” provide user comfort by

taking the climate and environment of a region into account. Within this principle, buildings are perceived as complex systems with interdependent features of energy consumption, materials, and spaces. Sustainability assessment methods provide valuable theoretical and practical guidelines to practice sustainability and to create sustainably-responsible buildings. This issue was referred to as Agenda 21 by the WCED (World Commission on Environment and Development) in the 1992 Rio Summit and has ever since been used to monitor and evaluate the indicators of sustainable development in projects around the world.

#### **4.2.1 Samples of Existing Measurement and Rating Systems for Sustainable Buildings Methods**

The sustainable performance of buildings has attracted a lot of attention from various sectors in the last two decades. A number of sustainability assessment tools have been proposed and have encouraged planners, designers, and developers to increase the performance of buildings by ensuring their environmental, social, and economic sustainability (Al Waer & Sibley, 2005). Comparison and contrast of several methods of sustainability measurement help identify the most suitable measurement methodology, giving a better understanding of the demand for and the advantages and disadvantages of each methods in terms of indicators, applications, and scoring. A few environmental methodologies and techniques have been developed for worldwide use to assess the sustainability performance of buildings and attain a sustainable/green certification at an authoritative, provincial, or national level. In Table 5 the categories and aim of each of sustainability measurement method are given.

Table 5: Categories and Aims of Different Methods of Measurement of Sustainability (Darus et al., 2009; Hashim, Darus, Salleh, Haw, & Rashid, 2008; Sinou et al., 2006).

<b>Methods</b>	<b>Countries &amp; Established Years</b>	<b>Categories and aims of the methods</b>
<b>LEED</b>	United States (1993)	<ul style="list-style-type: none"> <li>• Location and Transportation</li> <li>• Sustainable Sites</li> <li>• Water Efficiency</li> <li>• Energy and Atmosphere</li> <li>• Materials and Resources</li> <li>• Indoor Environmental Quality</li> </ul>
<b>BREEAM</b>	United Kingdom (1990)	<ul style="list-style-type: none"> <li>• Energy</li> <li>• Transport</li> <li>• Pollution</li> <li>• Materials</li> <li>• Water</li> <li>• Land use</li> <li>• Health and wellbeing</li> </ul>
<b>SB Tool</b>	Canada (1996)	<ul style="list-style-type: none"> <li>• Climate change and outdoor air quality</li> <li>• Land use and biodiversity</li> <li>• Energy efficiency</li> <li>• Materials and waste management</li> <li>• Water efficiency</li> <li>• Occupant's health and comfort</li> <li>• Accessibilities</li> <li>• Awareness and education for sustainability</li> <li>• Life-cycle costs</li> </ul>
<b>GB Tool</b>	United States (1998)	<ul style="list-style-type: none"> <li>• Energy consumption</li> <li>• Resource consumption</li> <li>• Indoor environmental quality</li> <li>• Environmental loadings</li> <li>• Other criteria include selection of appropriate site</li> <li>• Social and Economic Aspects</li> </ul>
<b>CASBEE</b>	Japanese (2001)	<ul style="list-style-type: none"> <li>• Indoor environment</li> <li>• Quality of services</li> <li>• Environment on site</li> <li>• Energy</li> <li>• Resources and materials</li> <li>• Off-site environment</li> </ul>
<b>HQE</b>	France (1992)	<ul style="list-style-type: none"> <li>• Building decision making;</li> <li>• Design;</li> <li>• Construction;</li> <li>• Use of the building; and End of the building</li> </ul>
<b>VERDE</b>	Spain	<ul style="list-style-type: none"> <li>• HV1, the pre-design phase assessment</li> <li>• HV2, the design and construction phase assessment</li> <li>• HV3, assessment during the operation phase</li> </ul>

<b>BCA Green Mark</b>	Singapore (2005)	<ul style="list-style-type: none"> <li>• Energy Efficiency</li> <li>• Water Efficiency</li> <li>• Site/Project Development &amp; Management (Building Management &amp; Operation for existing buildings)</li> <li>• Good Indoor Environmental Quality &amp; Environmental Protection</li> </ul>
<b>HK-BEAM</b>	Hong Kong (1996)	<ul style="list-style-type: none"> <li>• Hygiene, health, comfort, and amenity;</li> <li>• Land use, site impacts and transport;</li> <li>• Use of materials, recycling, and waste management;</li> <li>• Water quality, conservation and recycling; and</li> <li>• Energy efficiency, conservation and management.</li> </ul>
<b>GBCA</b>	Australia (2002)	<ul style="list-style-type: none"> <li>• Management</li> <li>• Indoor environment quality (IEQ)</li> <li>• Energy</li> <li>• Transport</li> <li>• Water</li> <li>• Materials</li> <li>• Land use and ecology</li> <li>• Emissions</li> </ul>

The measurement methods are further explained and compared in the following paragraphs.

### **Leadership in Energy and Environmental Design Method (LEED)**

LEED certification is a method created by the US Green Building Council in 2002 to guide and identify sustainable structures based on various criteria. The method applies to new and existing structures, current structure operations, interiors and exteriors, and neighbourhood improvements (Rahman, 2014; USGBC, 2017). Although LEED's checklist of criteria is simple for the user, it is based on a complex system of technical, legal, and bureaucratic requirements (Mateus et al., 2011).

Since 2009, credits have been allocated according to environmental impacts as well as how beneficial they can be for people. In the LEED rating system, credits have a

minimum value of 1 point and each system has a base of 100 points. In addition, if there are “Innovation in Design” and “Regional Priority” credits valued up to 10 bonus points. Various criteria are assessed by a number of evaluating parties for a total score determining the sustainability of the project as Certified (40-49 points), Silver (50-59 points), Gold (60-79 points), and Platinum (80 points and above) (USGBC, 2017) (Figure11).

LEED v4 for BD+C: Hospitality		Project Checklist		Project Name:	
				Date:	
Y	?	N			
			Credit	Integrative Process	1
<b>0 0 0 Location and Transportation 16</b>					
			Credit	LEED for Neighborhood Development Location	16
			Credit	Sensitive Land Protection	1
			Credit	High Priority Site	2
			Credit	Surrounding Density and Diverse Uses	5
			Credit	Access to Quality Transit	5
			Credit	Bicycle Facilities	1
			Credit	Reduced Parking Footprint	1
			Credit	Green Vehicles	1
<b>0 0 0 Sustainable Sites 10</b>					
Y			Prereq	Construction Activity Pollution Prevention	Required
			Credit	Site Assessment	1
			Credit	Site Development - Protect or Restore Habitat	2
			Credit	Open Space	1
			Credit	Rainwater Management	3
			Credit	Heat Island Reduction	2
			Credit	Light Pollution Reduction	1
<b>0 0 0 Water Efficiency 11</b>					
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
			Credit	Outdoor Water Use Reduction	2
			Credit	Indoor Water Use Reduction	6
			Credit	Cooling Tower Water Use	2
			Credit	Water Metering	1
<b>0 0 0 Energy and Atmosphere 33</b>					
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	6
			Credit	Optimize Energy Performance	18
			Credit	Advanced Energy Metering	1
			Credit	Demand Response	2
			Credit	Renewable Energy Production	3
			Credit	Enhanced Refrigerant Management	1
			Credit	Green Power and Carbon Offsets	2
<b>0 0 0 Materials and Resources 13</b>					
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Building Life-Cycle Impact Reduction	5
			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2
<b>0 0 0 Indoor Environmental Quality 16</b>					
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
			Credit	Enhanced Indoor Air Quality Strategies	2
			Credit	Low-Emitting Materials	3
			Credit	Construction Indoor Air Quality Management Plan	1
			Credit	Indoor Air Quality Assessment	2
			Credit	Thermal Comfort	1
			Credit	Interior Lighting	2
			Credit	Daylight	3
			Credit	Quality Views	1
			Credit	Acoustic Performance	1
<b>0 0 0 Innovation 6</b>					
			Credit	Innovation	5
			Credit	LEED Accredited Professional	1
<b>0 0 0 Regional Priority 4</b>					
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
<b>0 0 0 TOTALS</b>				<b>Possible Points:</b>	<b>110</b>
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110					

Figure 11 : An Example of LEED Version 4.0 (USGBC, 2017)

### Building Research Establish Environmental Assessment Method (BREEAM)

BREEAM is an environmental performance assessment and rating system mainly used in European countries, which was created in the 1990s in the UK. It was the first method used to assess environmental issues in buildings (BREEAM, 2017; Sev, 2011); (Mateus et al., 2011; Mattoni et al., 2018). Developed from a design checklist to a

general evaluation tool, it has been applied widely. In BREEAM rating benchmarks, the evaluator grants ‘credits’ based on the criteria for each of nine sections of evaluation, then the percentage of obtained ‘credits’ for each section is calculated and multiplied by the weight allocated to that section: Management 12%, health and wellbeing 15%, energy 19%, water 6%, land and ecology 10%, transport 8%, and an extra 1% (up to a maximum of 10%) is added to the final BREEAM score for each ‘innovation credit’ achieved (BREEAM, 2017). The overall performance of the building is scored as Pass ( $\geq 30$ ), Good ( $\geq 45$ ), Very Good ( $\geq 55$ ), Excellent ( $\geq 70$ ), or Outstanding ( $\geq 85$ ). The following figure shows a sample report and certification page for BREEAM (BREEAM, 2017).

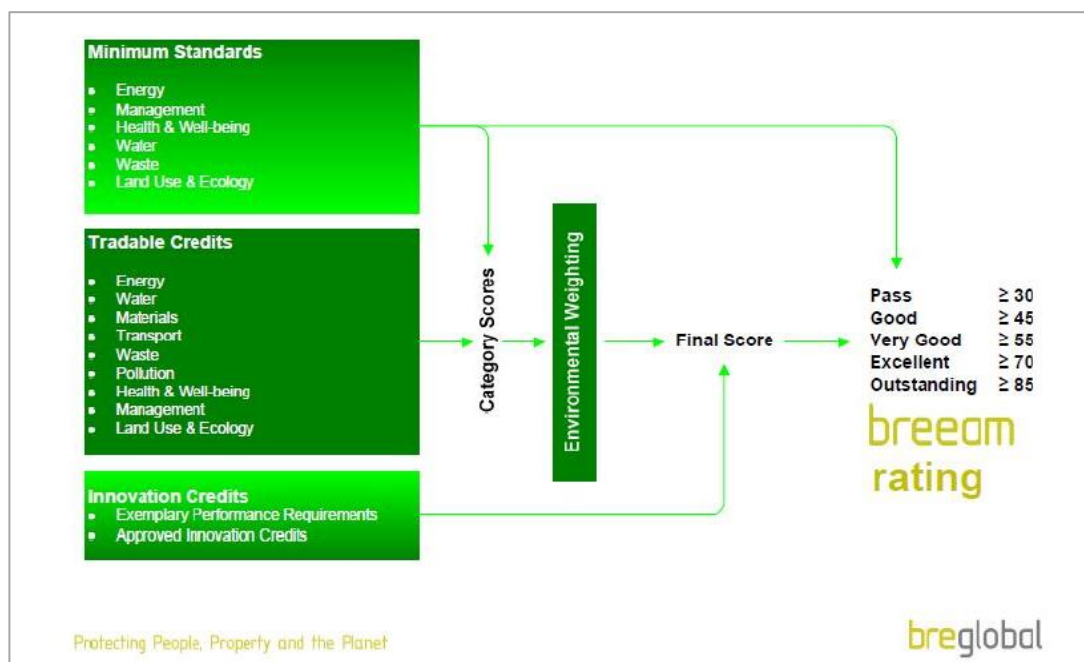


Figure 12: An Example of BREEAM Certificate (BREEAM, 2017).

### Sustainable Building Tool Method (SB Tool)

SB Tool is a software-based method that evaluates the environmental and sustainable performance of buildings. It was developed by the collaborative effort of

representatives from 20 countries and more than twelve teams of the Green Building Challenge (GBC) have implemented the measurement method since 1996. This method was the most flexible in terms of regionalist with entered criteria values and consists of two parts: Module A includes criteria and weights intended to be set by third parties in accordance with local conditions and Module B assesses the sustainability of the building (Mateus et al., 2011). The SB Tool weighs indicators according to weightings set at the national level. Each building under study is scored in relation to its national reference and the system allows for international comparison of buildings (Fowler & Rauch, 2006). Like other methods based on credits, the maximum number of BREEAM credits available for each indicator is related to its weight in the overall score and ranked from pass to excellent.

### **GB Tool Method**

The GB Tool is an international system used to evaluate US buildings for the Green Building Challenge and is applicable for all construction, operations, and maintenance plans. Since establishment in 1998, the system has been updated four times based on the experience gained from its use (Forsberg & Von Malmberg, 2004; Fowler & Rauch, 2006; Mateus et al., 2011). The GB Tool is designed so sponsors can modify standards of weightings criteria and typical practice to reflect national or local codes, and regional context, practices, priorities, and conditions. (Figure 13). GB criteria completely evaluate the building and scales are applied based on the local level of “typical” use; buildings can be -1 if they are typical up to +5 for good to very high performance.

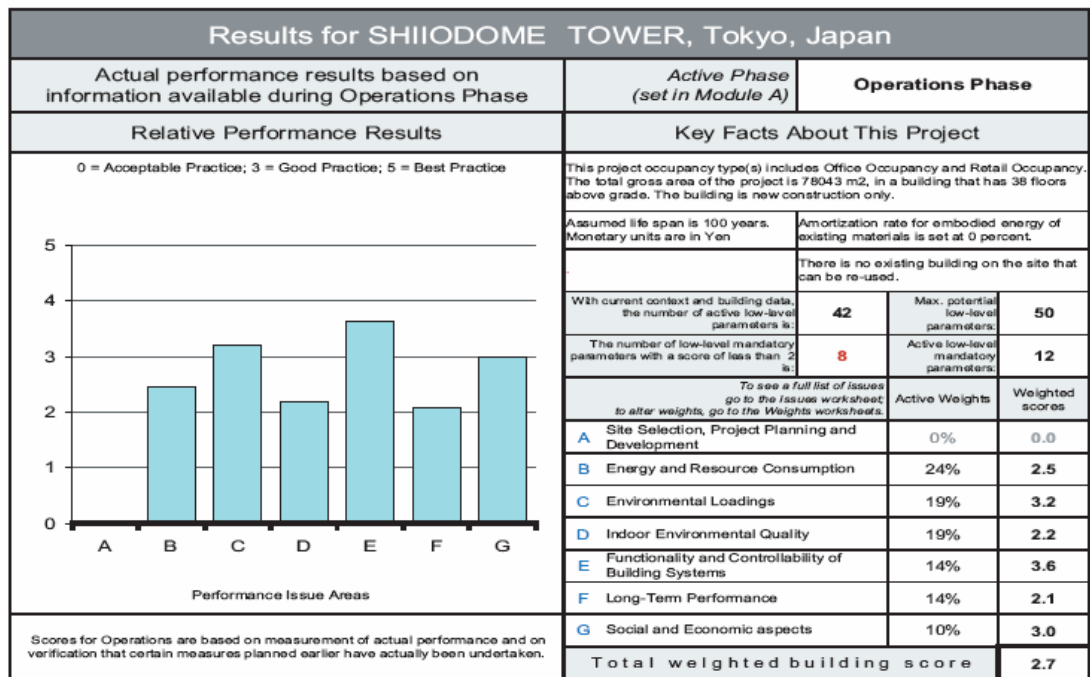


Figure 13: An example of GT Tool (Fowler & Rauch, 2006).

### Comprehensive Assessment System for Building Environmental Efficiency Method (CASBEE)

CASBEE is an environmental labelling method first developed in Japan to assess the environmental performance of private and public building as well as residential and non-residential buildings. It considers three factors: the first factor has to do with the longevity of the buildings (Chen, Clements-Croome, Hong, Li, & Xu, 2006), the second one is concerned with the environmental load of the structure as well as the quality of the structure performance, and the third factor relates to building environmental efficiency (BEE) (Hashim et al., 2008). The last factor is the most important factor in assessing the environmental issues of buildings. These factors also include the indoor environment, the quality of services offered, the ecosystem of the place, energy and resources efficiency and management (Darus et al., 2009). The criterion are scored from Level 1 to Level 5 with typical technical and social levels



defined as level 3 and the highest level of achievement is represented as level 5 (Figure 14).

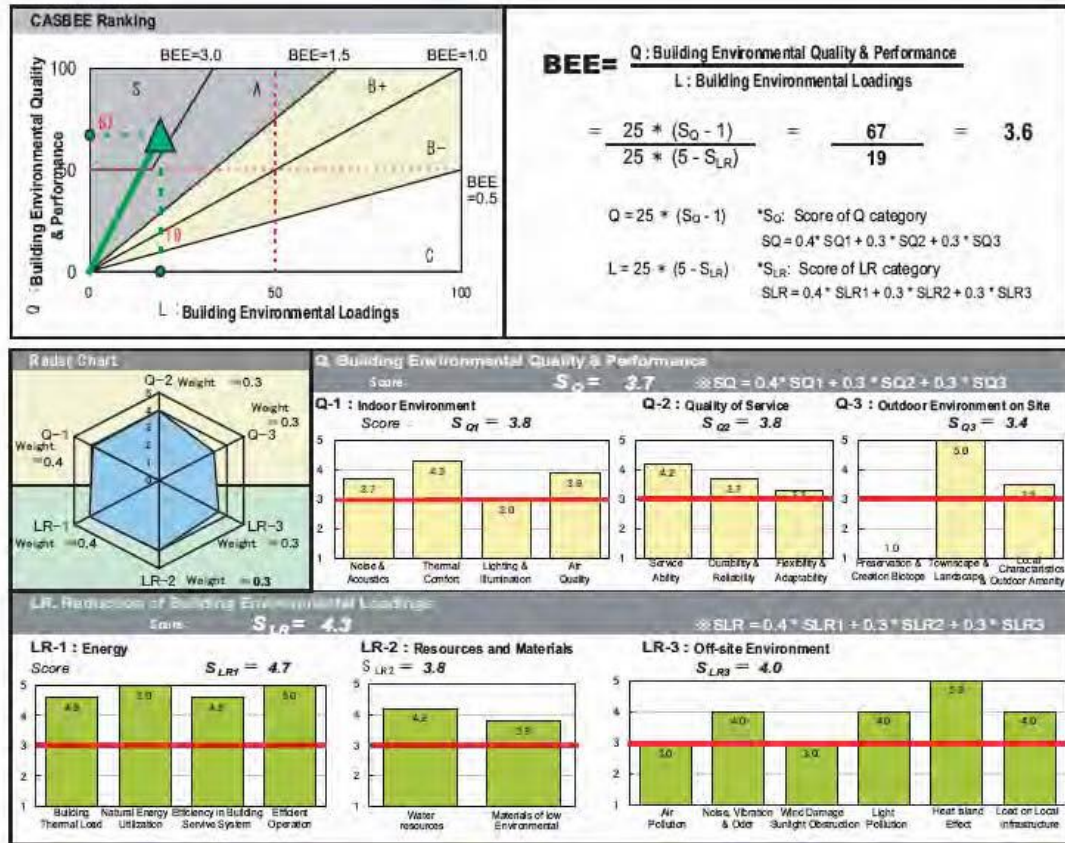


Figure 14 : An example of CASBEE Method (Fowler & Rauch, 2006).

### High Environmental Quality Method (HQE)

The HQE method was initiated in France and is a complex method including several parameters as well as the management issues in its assessment. The system integrates the international standard ISO 14001, which benefits from a project methodology unlike other available methods (Bidou, 2006). As a result, many researchers believe that the HQE method is a more useful and thus a more popular system. The method was developed in 1996 to help developers and project stakeholders observe 14 criteria of environmental requirements throughout the life cycle of their sustainable

development project (Bakar, Razak, Abdullah, Awang, & Perumal, 2010; Darus et al., 2009).

### **VERDE Method**

The Spanish VERDE method assesses various types of buildings in terms of their environmental performance (Berardi, 2012) and can also be used to assess any project from its start to its finish (Table 5). The method involves assessment at the three phases of pre-design (HV1), post-construction but pre-occupation (HV2), and post-occupancy (HV3). The last of these is the main assessment phase for the real performance of the building.

### **BCA Green Mark Method**

The BCA Green Mark method was initiated in 2005 by Singapore's construction industry in anticipation of constructing more ecologically-friendly structures and to raise awareness among the individuals involved in the construction business. It promotes understanding of building sustainability from the beginning of any project until the project is demolished (Hwang & Ng, 2013). The comprehensive method assesses and rates the environmental impact and performance of buildings. The National Environment Agency utilizes the method to evaluate, certify, and endorse buildings whose performance meets sustainability and environmental impact standards (Darus et al., 2009 ; Addae-Dapaah & Chieh, 2011).

### **HK-BEAM Method**

The HK-BEAM method was developed by HK-BEAM Society, an independent not-for-profit organization in Hong Kong. The method is used extensively by developers,

builders and those in the real estate sectors for buildings in Hong Kong (Burnett, 2005). Initially funded and supported by the Real Estate Developers Association of Hong Kong, the method includes a number of building performance assessment criteria (Darus et al., 2009; Hashim et al., 2008).

### **General Building Contractors Association (GBCA)**

Initiated in 2002, the Green Star scheme is a comprehensive environmental assessment method developed by the General Building Contractors Association of Australia to assess the environmental plan and construction of buildings (Cole, 2006). The method was developed in an effort to help the real estate industry work toward sustainable housing and building projects. Darus et al. (2009) stated that Green Star certification is a business-winning certificate nowadays in a number of countries (e.g. New Zealand and South Africa) (Chew & Das, 2008). The method uses a number of criteria to assess sustainability and sustainable development (Table 5).

### **Global Sustainable Tourism Council (GSTC)**

The GSTC scheme promotes minimum business standards for sustainable tourism that are sorted into four primary topics: effective sustainable design, increased profitability and economic gains for the neighborhood, improved social legacy, and diminished negative effects on nature (GSTC, 2016; Strambach & Surmeier, 2013). In addition a number of eco-rating systems were devised to focus on environmental dimensions of sustainability in the hotel industry: the Green Key, European Eco-Label, British Green Tourism Business Scheme, Canada Green Key Eco-rating System, Taiwan Green Mark Hotel, and ISO 14000. The Global Sustainable Tourism Council's (GSTC) criteria for lodgings were made with an end goal of understanding sustainable tourism through a number of tourism indicators (GSTC, 2016).

Today, there are many buildings-sustainability rating systems that are used throughout the world. Each system allocates scores to different aspects of sustainability; if these aspects are categorized into domains and the maximum possible points for each aspect is identified, we can determine the maximum total score for each domain, then the relative weight assigned to each domain by the ranking system. A comparison of relative weights used in the Northwest Pacific Ocean has been constructed by Fowler and Rauch (2006) (Table 6).

Table 6: Comparison of Rating System Using WBDG Principles (Chandratilake & Dias, 2013).

System	Weightage (%)						
	Site (1)	Energy (2)	Water (3)	Materials (4)	IEQ (5)	O & M (6)	Other
BREEAM	15%	25%	05%	10%	15%	15%	15%
CASBEE	15%	20%	02%	13%	20%	15%	15%
Green globes	11.5%	36%	10%	10%	20%		12.5%
LEED	20%	25%	07%	19%	22%		07%

Ali and Al Nsairat (2009) designed a green building ranking system for residential units in Jordan and based it on local conditions. Local water scarcity, for example, urged a high weighting for water efficiency. The system uses the following weights in seven domains: selection of site 10.3%; water efficiency 27.7%; energy efficiency 23.0%; quality of indoor environment 11.8%; waste and pollution 6.4%; materials and resources 10.3%; and economics 10.0%. This local evaluation system for Jordan was needed because it is remarkably different than other parts of world and its evaluation system should reflect those differences. On the topic of assessment of qualitative indicators, subjective evaluations can lead to a lack of objectivity. The qualitative rating systems cannot obtain the information that can be achieved from method of life

cycles (Forsberg & Von Malmberg, 2004). Ding (2008) has suggested indicators rather than marks in order to overcome this, and the total indicator is calculated by a whole weight approach to otherwise subjective components. Malmqvist et al. (2011) applied quantitative indicators for different aspects, put the collection of dimensions of aspects into a domain, and then the overall rating is qualitative.

In addition, Bilos, Reed, and Schulte (2010) mentioned that scoring for the various certification processes differ as well as the sustainability levels and labels. So for example, the best score ("Excellent") in BREEAM is probably a better label than the best score ("Platinum") in LEED. Moreover, Bragança and Mateus (2008); Mateus et al. (2011) have discussed the normalization and collect parameters approach. They have used the weight rating system to evaluate the level of sustainability of selected buildings as a case on the methodology of SB Tool. The goal of normalization is to avoid the influences of scale on the collection parameters within each indicator and solving the problem, with some parameters "higher is better" and others "lower is better." Normalization and collect parameters used by Bragança (2007); Díaz-Balteiro and Romero (2004); Mateus et al. (2011) (Equation 1).

$$\bar{P}_i = \frac{P_i - P_{*i}}{P_i^* - P_{*i}} \nabla_i$$

$P_i$ : The value of  $i^{\text{th}}$  parameter.

$P_i^*$  and  $P_{*i}$ : The best and worst value of the  $i^{\text{th}}$  sustainable parameter.

- a) The best value shows the best practice.
- b) The worst value shows the standard practice or the minimum legal requirement.

Normalization is turning the values between best and accepted practices into a scale defined between a worst value (0) and best value (1). In addition, this equation for both conditions is valid: “higher is better” and “lower is better” (Bragança & Mateus, 2008; Mateus et al., 2011). Due to simplify the results of interpretation, the values normalized of each parameter are turned to the grading scale (Table 7).

Table 7: Conversion of the Quantitative Normalized Parameters into a Qualitative Graded Scale.

Grade	Values
A+ (Above best practice)	$\bar{P}_i > 1,00$
A	$0,70 < \bar{P}_i \leq 1,00$
B	$0,40 < \bar{P}_i \leq 0,70$
C	$0,10 < \bar{P}_i \leq 0,40$
D (Conventional practice)	$0,00 < \bar{P}_i \leq 0,10$
E (Bellow conventional)	$\bar{P}_i \leq 0,00$

To obtain three unit indices, they collect a weighted average of the indices into categories and categories to dimensions. These three values are obtained using the equation 2. The final result provides building performance at each level of sustainability dimensions;

$$I_j = \sum_{i=1}^n w_i \cdot \bar{P}_i$$

$I_j$ : The result of the weighting average of all the normalized parameters.

$\bar{P}_i \cdot w_i$ : The weight of the  $i^{\text{th}}$  parameter.

The totality of all weights must be equal to one. The last level in this system is to calculate the sustainable score (SS). The SS is a unit index representing the global sustainability performance of the building by using equation 3 (Bragança & Mateus, 2008);

$$SS = w_E \times I_E + W_S \times I_S + W_C \times I_C$$

SS: the sustainability score.

$I_i$ : The performance at the level of the dimension.

$w_j$ : The weight of the dimension  $j^{\text{th}}$ .

Table 8 shows the weight of each sustainable result in the evaluation of the global performance.

Table 8: Weight of Each Sustainability Dimension on the Methodology SB Tool PT

Dimension	Weight (%)
Environmental	40
Societal	30
Economy	30

#### 4.2.2 Comparative Analysis of LEED, BREEAM, CASBEE, HQE, VERDE, BCA, HK-BEAM, GBCA, ST and GT

Each and every one of these methods has their own weaknesses and strengths. Also this the same table 5 likewise offers some justification for the selection of comparison these methods in our study in accounting for various dimensions and indicators of sustainability and sustainable development. Prior to developing the (EMSHB), a compilation of some of the most well-known certificates worldwide was formulated. Then, according to the evaluation and comparison of various methods of sustainable buildings measurement in the world scale, there are various evaluation criteria, but most procedures being developed are environmental ones or the ones used for measuring the environmental performance of buildings. Thus, there are very limit methods has related to social-cultural and economic aspects of a sustainable building.

In spite of the fact that, there is some method such as Global Sustainable Tourism Council (GSTC), which is most, related to the sustainable tourism, not building. The GSTC method is the minimum tourism business standards that sustainable tourism should follow (GSTC, 2016; Strambach & Surmeier, 2013). LEED is a reliable and comprehensive method with overlapping sustainable indicators, which makes it an internationally popular method. Because the LEED method has covered the most important aspects of environmental. Finally, the most commonly used indicators are presented across each certificate. The energy, water, and waste dimensions are the most commonly used criteria in various sustainable building certification programs.

A number of countries other than the US have also attempted to meet these criteria and certification by initiating Green Building Councils for their sustainable development program (Berardi, 2012). LEED guidelines are not exclusively designed for hospitality industry such as food industry (Cracknell & Abu-Hijleh, 2015), but the certification can be used to assess the sustainability of any property (MacNaughton et al., 2017).

Additionally, LEED does not oblige clients to utilize a particular strategy for acquisition of each credit; it offers points in light of measurable results, not the technique for point accomplishment (USGBC, 2017). Therefore, this system of assessment can compare projects based on the criteria such as environmental issues, ecological limitations, and guest demographics. LEED is a valid, reliable, and verifiable certification process which can be used for various purposes (MacNaughton et al., 2017) which has both promoters and critics. Avastthi (2013); Hamedani and Huber (2012) introduced provision of significant indicators that assess green modelling, and the offering of an international green program as the key advantages



of LEED, while disadvantages of the system are noted by (Hamedani & Huber, 2012; Hiser, 2011) :

- LEED cannot assess innovation in a building,
- LEED is a time-consuming operation,
- Efficiency and building conditions are not taken into account in LEED,
- Socio-cultural and economic dimensions of sustainable hotels are not accounted for in LEED.

### **4.3 Chapter Summary**

In this chapter, the measurement of sustainability, sustainable indicators, and types of indicators framework were discussed to compare several methods and approaches in terms of sustainability by identifying the. The main sustainability indicators were designed to improve the economy, the social environment, and the sustainability of various manmade constructions and building. The indicators used for measuring sustainability must have the traits of simplification, quantification, communication, and measurability and best help planners and architects when they incorporate the three principles of environmental, economic, and socio-cultural sustainability. With indicators meeting these expectations, they can design and provide user comfort by taking the climate and environment of a region into account. From the evaluation of assessment methods used around the world, common indicators of sustainability were identified and ideal characteristics were sorted out. The LEED certificate system was identified as being the most common and popular method used internationally. Other rating systems showed a different weighting of the three dimensions of sustainability reflecting the differences between regions, countries, and local conditions.

## **Chapter 5**

# **DEVELOPING AN EVALUATION MODEL FOR SUSTAINABLE HOTEL BUILDINGS**

The process of developing an evaluation model for sustainable hotel buildings began with gathering theoretical background information about sustainability, and sustainable development. It continued through identification of sustainability indicators and frameworks and sustainable tourism indicators to finally measure globally-applicable sustainability methods. All of this was performed in order to understand indicators of sustainability goals and aims satisfactorily enough to propose first a revised evaluation model that is flexible for use at the global scale, and secondly a localized evaluation model that is responsive to the local conditions and priorities of any selected region.

Several methods of sustainability measurement and various indicator frameworks were studied and evaluated to provide a foundation for the development of the global evaluation model. According to evaluation of the many methods, each green certification or sustainability measurement tool has its own peculiar function and are particularly devised to be used in specific regions under specific conditions and applied to any type of building. The primary concerns of these methods are environmental and ecological conditions and directly related issues in their immediate region.

The sustainability indicators employed in this study drew on the Leadership in Energy and Environmental Design (LEED) Green Building Rating System for the quantitative method of this research study. The LEED certificate was selected because it covered the most important environmental aspects and appears more common and popular in terms of measuring the environmental sustainability of a building. As a result, its commonly-used indicators for energy, water, and waste aspects were paired with socio-cultural aspects and other indicators extracted from other methods to cover the diversity of regional conditions.

Table 9 presents a comparison of the criteria and potential applications of ten sustainability assessment methods. Though there are a variety of indicators, there are relatively few related to socio-cultural and economic aspects of sustainable buildings and most of the methods focus on the environmental ones or the ones used for measuring the environmental performance of buildings. LEED is relied upon for involving the most indicators and being the most comprehensive method despite that it falls short in the socio-cultural aspects.

Table 9: Comparisons of Criteria among Sustainable Buildings Certification Programs (Developed By Author)

<b>CERTIFICATION PROGRAMS</b>										
<b>Indicators</b>	<b>LEED</b>	<b>CASBEE</b>	<b>BREEAM</b>	<b>GBCA</b>	<b>HQE</b>	<b>VERDE</b>	<b>BCA</b>	<b>HK-BEAM</b>	<b>SB Tool</b>	<b>GB Tool</b>
Transportation	√		√	√	-	-	-	√	-	√
Sustainable Sites	√	-	-	-	-	-	-	-	-	-
Water Efficiency	√	-	√	√	-	-	-	-	√	√
Energy and Atmosphere	√	√	√	√	-	-	√	√	√	√
Materials and Resources	√	√	√	√	√	-	√	-	√	√
Waste	√	-	√			-	-	-	-	-
Indoor Environmental Quality	√	√		√	-	-	√	√	-	√
Land Use and Ecology	√	-	√	√	-	-	--	√	√	√
Construction	√	-	-	-	√	√	√	-	√	√
Design & Operation Phase	√	-	-	-	√	√	√	-	√	-
Hygiene, Health, Comfort	-	-	-	-	-	-	-	√	√	-
Social Involvement & Communication	-	-	-	√	-	-	-	-	√	√

## **5.1 Sustainable Hotel Building Indicators (SHBI)**

To identify sustainable hotel building indicators, this study mixed the methods of qualitative and quantitative data collection and analysis. Different research instruments were applied to obtain the highest possible validity in the analysis of results such as interviews, observations, and documentation. Further, various studies on sustainable development and sustainable tourism indicators, indicator frameworks, and measurements of sustainability, as reported in the theoretical sections, were involved. The studies conducted on sustainable building indicators mostly addressed methods to define or estimate indicators for destinations, which have been recently developed. To develop reliable and valid indicators, a vital point to remember is that such indicators are specifically used according to the priorities of different regions.

In this study, socio-cultural and economic indicators of sustainable hotel buildings have to be taken into account for the total measurement of hotel building sustainability. By reviewing various national and international policy documents and research, this study attempted to specifically focus on environmental, economic, and socio-cultural indicators.

### **5.1.1 Environmental Indicators**

Environmental indicators are concerned with the environment and changes occurring due to climate change or human activity. According to the theoretical information and the sustainable measurements at the global scale, various indicators can measure the sustainability of building in term of environmental aspects:

- Location and Transportation
- Sustainable Sites
- Water Efficiency

- Energy and Atmosphere
- Loss of Non-Renewable Resources
- Materials and Resources
- Indoor Environmental Quality

In accordance with sustainable development goals, the objectives of the environmental indicators follow:

- Protect the vitality and diversity of the earth
- Protect life support systems
- Sustainably use renewable resources
- Minimize the use of non-renewable resources
- Reduce damage to the health of the environment and all living creatures from pollution.

### **5.1.2 Economic Indicator**

Economic indicators are related to the economic activities or statuses of a certain system. Economic indicators can reveal the current and future economic performance of a given project or building. There are limited methods that have considered the indicators of economic aspects in measuring the economic sustainability of buildings though they have very important roles in the improvement of buildings and the income of the community. The most important indicators of economic aspects according to theoretical research and the World Tourism Organization (UNWTO) are:

- Unemployment rate
- Employment, annual change rate
- Inflation rate
- Economic condition

- Construction rate

Following this list, the aims and objective of the economic indicators are:

- Promote national and intergenerational justice
- Avoid unequal exchange
- Do not deprive another group to enrich one group
- Real cost pricing
- Promote ethical supply and investment policies
- Support local economies
- Support equal distribution of costs and benefits

### **5.1.3 Socio-Cultural Indicator**

Socio-cultural indicators help measure the impact of a system on the social and cultural wellbeing of a community. They include social trends and conditions such as the tendency of young people to not engage in any employment or educational activities. There are very few sustainability measurement methods which cover this aspect for global application. Considering the global methods indicators and theoretical information in terms of sustainability and sustainable tourism, this study has identified the following indicators;

- Poverty rate
- Inequality rate
- Educational attainment
- Life expectancy
- Employment and unemployment rates
- Obesity rate
- Fertility rate

- Health expenditures
- Suicide rates
- Life satisfaction

From the list of indicators, the following aims and objective of socio-cultural indicators were conceived;

- Improve quality of life
- Support social justice among the people
- Participate in cultural and social cohesion
- Empower self-confidence and free reinforcement
- Encourage cooperation and participation in decision-making at all levels
- Provide opportunities for public empowerment and capacity buildings.





#### **5.1.4 The Functions and Processing of Indicators**

Development of an evaluation model for sustainable hotel buildings was based on the indicators, aims, and objectives of environmental, economic, and social-culture sustainability. By comparing the global scale methods and finding their common indicators for measuring the sustainability of buildings, this work was able focus on the goals and objectives of each indicator. Each of the existing global methods has its own goals and objective in terms of achieving building sustainability in a better way according to the conditions of its home country.

Table 10 shows the processes and functions of indicators and how this study derived them.



Table 10: Definition of Indicators and the Process (Developed by Author).

<b>Goal</b>	A broad statement that defines the ultimate condition desired	Maximize the diversion of all waste from disposal
		
<b>Objective</b>	A desired direction of change	Reduce the generation of solid waste at source
		
<b>Indicator</b>	A variable, which helps to measure a state or a progress towards an objective	Per capita disposal ( <i>kg/person/year</i> )
		
<b>Performance</b>	A desired level of performance	<i>200 kg/person/year</i>
		
<b>Tool</b>	A pertinent use of several indicators and performance targets in relation to sustainability measurement methods	LEED, BREEAM...etc.

Each indicator was assigned a desired level of performance for each part of the measurement related to the local conditions and specific uses according to the region. The tool(s) was used to determine if the performance objectives and goals are achieved. Therefore, to find the environmental, socio-cultural, and economic aspects for measuring building sustainability, the process dealt with sustainability indicators on an international, national, regional, and local scale.

Using the sustainability indicators, the first efforts developed a model on a global scale according to all dimensions, indicators, frameworks, and measurements of

sustainability. The second efforts utilized conditions of the selected case study to adapt the localized model according to the conditions of the case region. During the process of developing the evaluation models, a number of other issues were taken into account such as priorities of different regions on the economic, socio-cultural and environmental aspects.

Consequently, by building the relationship between hotel buildings and sustainability indicators, measurement of sustainability within an evaluation model for sustainable hotel buildings (EMSHB) included all three dimensions of sustainability: environmental, socio-cultural and economic. Figure 15 shows a very strong relationship between these dimensions and how the sustainability of hotel buildings can be affected by regional conditions. The relationships demonstrate why the sustainability indicators need to be evaluated conditionally and regionally. To be used in different regions and conditions, the evaluation model should be flexible in selecting indicators and setting the weight of each item.

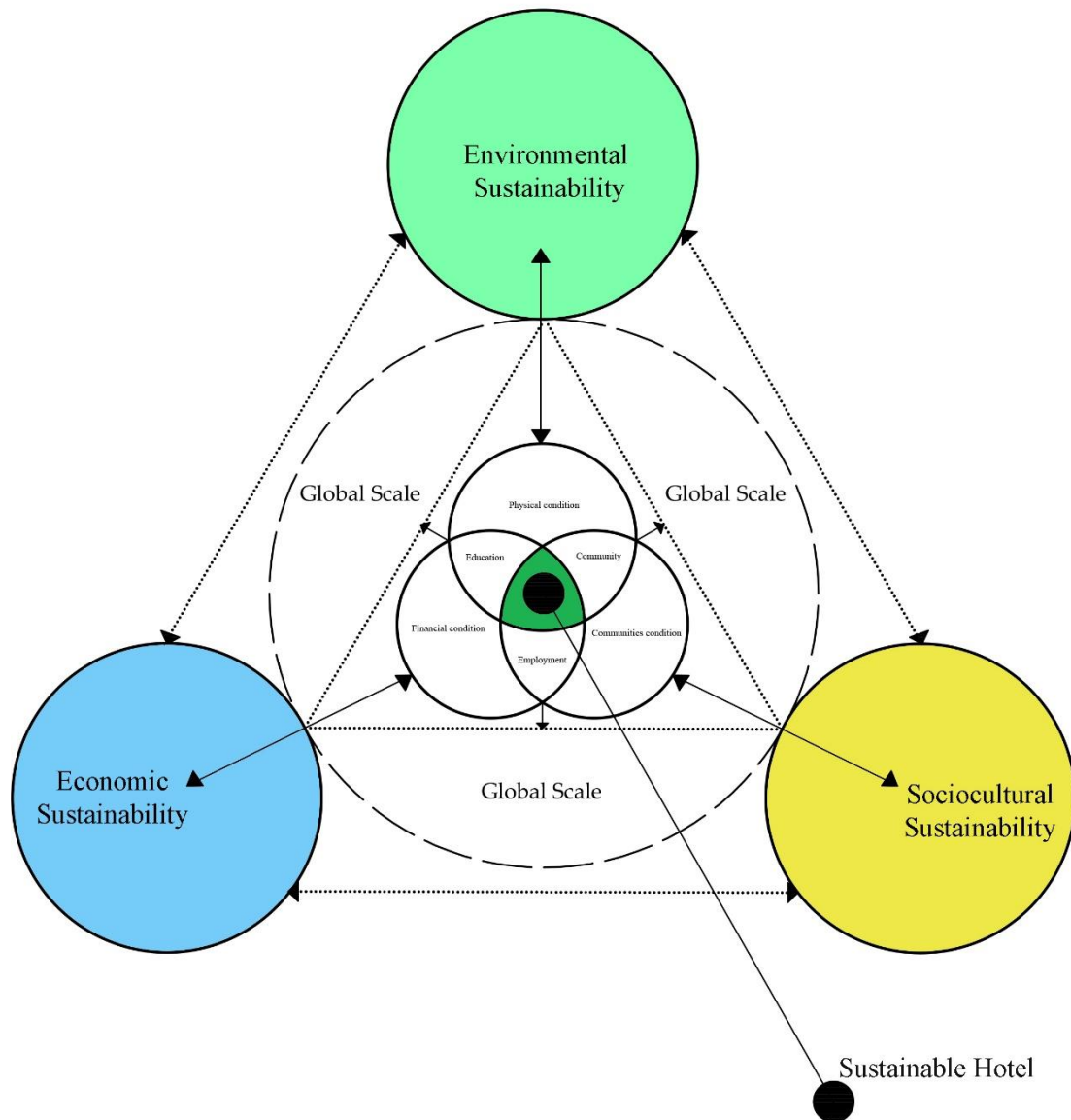


Figure 15: Global Evaluation Sustainable Hotel Building Model (Developed by Author).

## 5.2 An Evaluation Model for Sustainable Hotel Buildings (EMSHB)

By considering the relationship between sustainability and hotel buildings, this study engaged the inputs of environmental, economic and socio-cultural principles and obtained the outputs of environmental, economic, and socio-cultural sustainability indicators able to evaluate the sustainability of hotel buildings.

Development of the models involved four main interrelated steps (Figure 16):

- 1) The **first step** involved the potential outcome of the sustainability principle, indicators, and measurement. The investigation of the relationship between sustainability and hotel buildings, made possible by various previous studies, helped identify likely results of the environmental, economic, and social-cultural factors, and the aims and objectives of each dimension according to sustainable development goals.
- 2) The **second step** again dealt with the documentation of sustainability indicators, principles, and measurement on the international scale. From the documentation, the indicators of the economic, environmental, and socio-cultural aspects of sustainability were selected because of their measurability and accessibility. Further, some other factors of sustainability of hotel buildings were considered.
- 3) The **third step** concerned the results of comparing the sustainability indicators to hotel building outputs and postulated the relationship between hotel buildings and sustainability. Then having selected LEED certification as the source for newly defined indicators and finally localized the model according to the selected regions, the following model (Figure 17) shows the process of developing the evaluation model and Tables 11, 12, and 13 show the indicators in categories with their aims and objectives

The Process of Developing the Evaluation Model for Sustainable Hotel Building (EMSHB)

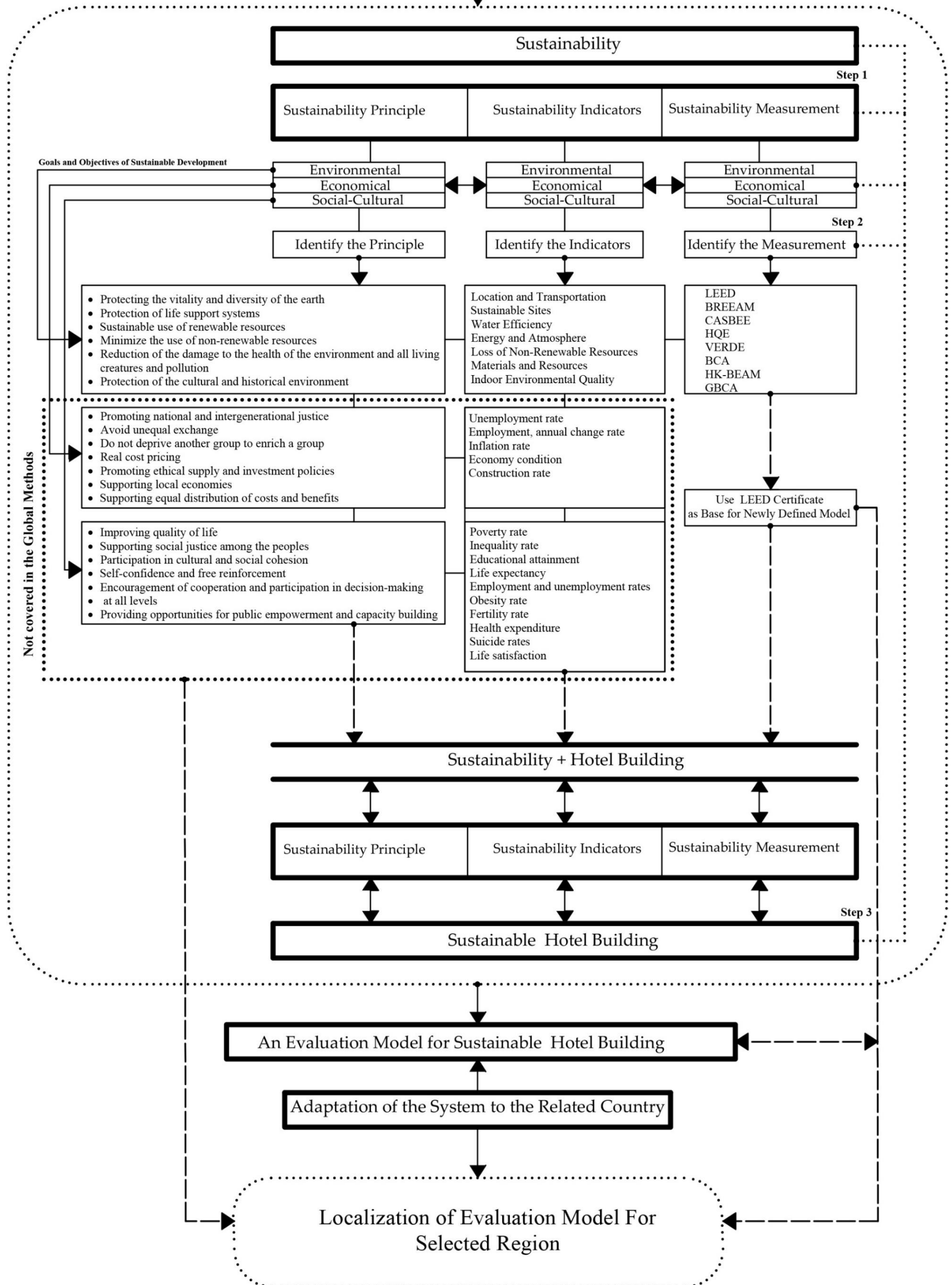


Figure 16: The Process of Developing the Evaluation Model for Sustainable Hotel Buildings (Developed By Author)

Table 11: Environmental Indicators in an Evaluation Model.

Environmental indicators	Aim	Global Methods	Objectives
Transportation and Location	<ul style="list-style-type: none"> <li>• Neighborhood Development Location</li> <li>• Sensitive Land Protection</li> <li>• High Priority Site</li> <li>• Surrounding Density and Diverse Uses</li> <li>• Access to Quality Transit</li> <li>• Bicycle Facilities</li> <li>• Reduced Parking Footprint</li> <li>• Green Vehicles</li> </ul>	LEED,BREEAM, CASBEE, LEED,BREEAM, CASBEE, LEED,BREEAM, CASBEE, LEED,BREEAM, CASBEE, LEED,BREEAM, GT,ST, CASBEE, LEED,BREEAM, CASBEE, LEED,BREEAM, CASBEE, LEED,BREEAM, GBCA,	To avoid development on inappropriate sites. To reduce vehicle distance traveled. To enhance livability and improve human health by encouraging daily physical activity.
Sustainable Sites	<ul style="list-style-type: none"> <li>• Construction Activity Pollution Prevention</li> <li>• Site Assessment</li> <li>• Site Development - Protect or Restore Habitat</li> <li>• Open Space</li> <li>• Rainwater Management</li> <li>• Heat Island Reduction</li> <li>• Light Pollution Reduction</li> </ul>	LEED, LEED, GT,ST LEED, LEED, VERDE LEED,BREEAM, CASBEE LEED, CASBEE LEED, GT,ST,	To reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust.
Water Efficiency	<ul style="list-style-type: none"> <li>• Outdoor Water Use Reduction</li> <li>• Indoor Water Use Reduction</li> <li>• Building-Level Water Metering</li> <li>• Cooling Tower Water Use</li> <li>• Water Metering</li> </ul>	LEED,BREEAM, CASBEE, HQE, BCA, HK-BEAM LEED,BREEAM, CASBEE, BCA LEED,BREEAM,	To reduce outdoor water consumption.
Energy and Atmosphere	<ul style="list-style-type: none"> <li>• Fundamental Commissioning and Verification</li> <li>• Minimum Energy Performance</li> <li>• Building-Level Energy Metering</li> <li>• Fundamental Refrigerant Management</li> <li>• Enhanced Commissioning</li> <li>• Optimize Energy Performance</li> <li>• Advanced Energy Metering</li> <li>• Demand Response</li> <li>• Renewable Energy Production</li> <li>• Enhanced Refrigerant Management</li> <li>• Green Power and Carbon Offsets</li> </ul>	LEED, LEED,BREEAM, CASBEE, HK-BEAM, GBCA LEED, HQE, VERDE, BCA, HK-BEAM, GBCA LEED, HK-BEAM LEED, GBCA LEED,BREEAM, GT,ST, BCA, HK-BEAM, GBCA LEED, LEED,BREEAM, GT,ST, LEED,BREEAM, CASBEE,	To support the design, construction, and eventual operation of a project that meets the owner’s project requirements for energy, water, indoor environmental quality, and durability
Materials and Resources	<ul style="list-style-type: none"> <li>• Storage and Collection of Recyclables</li> <li>• Construction and Demolition Waste Management Planning.</li> <li>• Building Life-Cycle Impact Reduction</li> <li>• Building Product Disclosure and Optimization- Environmental Product Declarations.</li> <li>• Building Product Disclosure and Optimization - Material Ingredients</li> <li>• Construction and Demolition Waste Management.</li> </ul>	LEED, GBCA LEED,BREEAM, HQE LEED, LEED,BREEAM, GT,ST, VERDE LEED, GBCA LEED, LEED, LEED, HQE, VERDE, GBCA	To reduce the waste that is generated by building occupants, hauled to, and disposed of in landfills.

Indoor Environmental Quality	<ul style="list-style-type: none"> <li>• Minimum Indoor Air Quality Index</li> <li>• Environmental Tobacco Smoke Control and Number of Contaminated Rooms</li> <li>• Enhanced Indoor Air Quality Strategies</li> <li>• Low-Emitting Materials</li> <li>• Construction Indoor Air Quality Management Plan</li> <li>• Indoor Air Quality Assessment</li> <li>• Thermal Comfort</li> <li>• Interior Lighting</li> <li>• Daylight</li> <li>• Quality Views</li> <li>• Acoustic Performance</li> <li>• Pollution Levels: Water, Air, Noise, Visual Pollution</li> <li>• Soil and Beach (Natural Site) Erosion</li> </ul>	<p>LEED,BREEAM, LEED,BREEAM, LEED LEED LEED LEED,BREEAM, HK-BEAM LEED LEED LEED LEED,BREEAM, LEED BREEAM, HK-BEAM BREEAM, HK-BEAM</p>	To contribute to the comfort and well-being of building occupants by establishing minimum standards for indoor air quality (IAQ).
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Table 12: Economic Indicators in an Evaluation Model.

Economic indicators	Aim	Global Methods	Objectives
Economic benefits of tourism for the host community and destination	<ul style="list-style-type: none"> <li>• Employment Opportunities</li> <li>• Unemployment Rate</li> <li>• Increase in Inflation and Higher the Values</li> <li>• Increase Amount of Import (Labor and Goods)</li> <li>• Seasonality of Production</li> <li>• The Ratio of Tourism Facilities in the Area</li> <li>• Number and Size of Recreational, Cultural and Spiritual Sites</li> <li>• Economic Conditions</li> <li>• Accelerated Community Growth</li> <li>• Community Investments</li> <li>• Seasonality of Tourism Activity</li> <li>• Destination Competitiveness</li> <li>• Cultural Investment</li> <li>• Percentage of Revenue Generated by Tourism in the Community</li> <li>• Local Population Working in the Tourism Sector</li> <li>• The Average Rate of Occupancy of Accommodations</li> <li>• Tourism Contribution to Local Economy</li> </ul>	<p>UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO GT,ST, HK-BEAM UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO</p>	This goal ensures not only a higher GDP for a successful economy; it also makes sure to promote sustained and sustainable development and to provide decent and long-term employment opportunities for all. To improve the economic situation of the country and locals.
Economic benefits of hotels for local people and tourist	<ul style="list-style-type: none"> <li>• Rent of Hotels Room</li> <li>• The Rate of Energy, Water Consumption</li> <li>• Rate of Investment</li> <li>• Budget of Construction</li> <li>• Economic Responsibility</li> <li>• Local Investment</li> </ul>	<p>UNWTO UNWTO UNWTO UNWTO UNWTO UNWTO</p>	

Table 13: Economic Indicators in an Evaluation Model.

Social-Culture indicators	Aim	Global Methods	Objectives
Socio-Cultural Effects of Tourism on Local Community	<ul style="list-style-type: none"> <li>Satisfaction of local from tourism development</li> </ul>	UNWTO, UN, GSTC	
Effects on the Level of Well-being in the Local Population	<ul style="list-style-type: none"> <li>Volume of tourists</li> <li>Level of satisfaction of the local population</li> <li>The average stay of tourists</li> <li>Percentage of return visits of tourists</li> <li>Total number of arrivals of tourists (annual average and in high season)</li> </ul>	UNWTO, GSTC UNWTO, GSTC UNWTO, GSTC UNWTO, GSTC UNWTO, GSTC	
Community Health and Local Public Safety	<ul style="list-style-type: none"> <li>The interaction between local and different cultures</li> <li>Improvement in local public services</li> <li>Increased standards of living</li> <li>Level of safety in the community</li> <li>Level of safety in the hotel buildings</li> <li>Wellbeing</li> </ul>	UNWTO UNWTO UNWTO UNWTO UNWTO BREEAM, HK-BEAM	This section is concerned with health and safety issues such as water- and air-borne diseases, food poisoning, and sufficiency of health facilities. To improve community health.
Effect on Local Population Structure	<ul style="list-style-type: none"> <li>Increased shopping facilities</li> <li>Increased leisure facilities.</li> <li>Enhanced sanitation facilities</li> <li>Increased number of lodging facilities (e.g., hotels, guest house)</li> </ul>	UNWTO, UNWTO, UNWTO, UNWTO, GSTC	To increase facilities
Education	<ul style="list-style-type: none"> <li>Skill of staff</li> <li>Skill of building</li> </ul>	UNWTO, GSTC UNWTO,	To provide high standard, free and equitable education and training for all people at every level in order to promote their future employability and life sustainability.
Employment	<ul style="list-style-type: none"> <li>Local employment</li> <li>Local ownership</li> <li>The ratio of tourism job creation to jobs in other industries</li> <li>The ratio of management to menial jobs</li> <li>Percentage of locals employed in the hotel industry at each level.</li> </ul>	UNWTO, UNWTO, UNWTO, GSTC UNWTO, GSTC UNWTO, GSTC	This issue is related to increasing the number of jobs created by hotels, the distribution of jobs in different geographic locations, the availability of employment in different seasons, and the employment of the local people in higher hotel positions.
Social Effects of hotels on local Community	<ul style="list-style-type: none"> <li>Level of tourists satisfaction from the hotels building</li> <li>Increased number of visitors in the historical area</li> <li>Increased number of lodging facilities (e.g., hotels, guest house)</li> </ul>	UNWTO UNWTO UNWTO	To improve the social quality of locals.
Socio-Cultural Exchange in Building Design and Community	<ul style="list-style-type: none"> <li>Impact of culture and society in the hotel design</li> <li>Increased number of events in the hotels</li> <li>Provision of local services in the hotel</li> </ul>	UNWTO UNWTO UNWTO	To improve quality of life for locals.



### 5.2.1 Weights of an Evaluation Model for Sustainable Hotel Buildings (EMSHB)

Working from the four categories of the applied rating system (LEED certification) and the fact that other rating systems use different weights for each category, the global evaluation model rating system was categorized according to the three dimensions of sustainability with equal weights (each dimension has 33.33% of 100%). For the localized evaluation model, the categories remain the same but the weights are changeable according to the conditions of the select region.

To serve this purpose, the normalization and collect parameters approach can be used for determine the weights for evaluating the level of sustainability of a selected building. The normalization and collect parameters approach deal with the priorities of the host community to find out the weights for each dimension. For example, each community deals with different conditions in the aspects of environmental, socio-cultural, and economic sustainability. Therefore, using available approaches of study (survey, observation, interview, questioner, et cetera), one can discover the problems that a locale faces, insert the priorities of that region into the normalization and collect parameters approach, determine the localized weights of categories, and ultimately better measure and positively influence the sustainability of hotel buildings in the host community (Table 14).

Table 14: A Weight of Each Sustainability Dimension According to the Priorities of Each Region.

Dimensions	Priorities of Selected Region			
	Weight (%)			
<b>Environmental</b>	33.33	40	30	30
<b>Economy</b>	33.33	30	40	30
<b>Social-cultural</b>	33.33	30	30	40

### **5.3 Chapter Summary**

Explanation of the process of developing an evaluation model for sustainable hotel buildings started from a discussion of sustainability indicators and their relation to the three principle dimensions of sustainability and the characteristics of sustainable hotel buildings. The discussion evolved to develop the goals, aims, and targets of sustainable development. Highlighting these relationships achieved the most important goals of sustainable development for this study. The list of global indicators and weighting of indicators was studied and the process of developing the global model was outlined. Illustrating how the global EMSHB can be used flexibly depending on regional conditions led into the application of the localized EMSHB on the select case as defined in Chapter 6.

## Chapter 6

# LOCALIZATION OF EVALUATION MODEL FOR NORTHERN CYPRUS CASE

### 6.1 Conditions of Northern Cyprus

Cyprus is the third largest island in the Mediterranean Sea with an area of 9,851 kilometers. It is located 60 kilometers south of the coast of Turkey and 322 kilometers away from Greece (Doratli et al., 2004). Northern Cyprus consists of six districts: Guzelyurt and Lefke in the west, Girne (a.k.a. Kyrenia) and the Karpaz Peninsula in the northeast, Gazimagusa (a.k.a. Famagusta) on the eastern coastline, and Lefkoşa (a.k.a. Nicosia) in the south. The six districts are further divided into 28 sub-sectors (Figure 17).

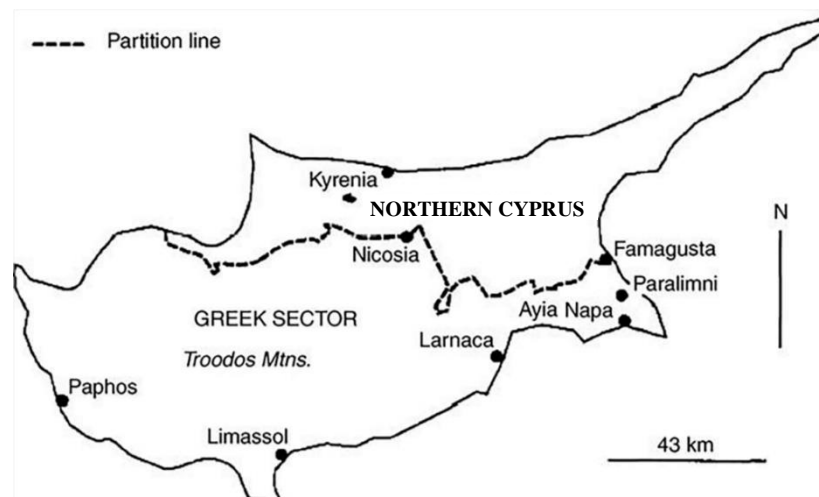


Figure 17: Map of Cyprus (Alipour et al., 2007).

### 6.1.1 Tourism in Northern Cyprus

The tourism industry has taken an alternate course since the 1974 Turkish intervention and partition of state (Godfrey, 1996; UNWTO, 2015b) into the self-declared state of Northern Cyprus and the Republic of Cyprus in the south of the island. This study focuses on the tourism industry and development in Northern Cyprus, the ethnic Turkish-Cypriot part. Before the conflict between the two sides, the northern part hosted the main tourist destinations for the whole island. After the conflict in 1974, community development and the tourism industry took different courses in the two states. The southern state has been flourishing while in the northern state has been declining. The Republic of Cyprus continued to develop its infrastructure and established new touristic destinations while Northern Cyprus mostly struggled to meet the basic needs of its residents. Yasarata, Altinay, Burns, and Okumus (2010) described the situation as:

Economically isolated, the Turkish Cypriot community has found itself in a backwater as far as trade and industry and employment are concerned and does not participate in the economic expansion of the country and the development of its resources. Many of the estimated 20,000 refugees and displaced persons in the Turkish Cypriot enclaves are unemployed, and their enforced idleness emphasizes the isolation of the community, whose economy is sustained by financial assistance and relief supplies from Turkey...about one-third of the Turkish Cypriot population is estimated to need some form of welfare relief.

Table 15: Tourism Industry in Northern Cyprus (2007-2017) (MTENC, 2017).

Years	Tourism demand from Turkey	Foreign tourism Demand (except for Turkey)	Net Tourism Revenues (Million \$)	The ratio of net tourism income to the trade balance – GPD (%)	Occupancy Rate of Hotel
2007	156,456	634,580	381,0	26,2	32,5
2008	317.509	103.613	383,7	24,0	33,3
2009	304.942	114.218	390,7	31,1	35,0
2010	336.240	108.343	405,8	26,9	36,4
2011	393.238	156.381	459,4	29,7	41,4
2012	459.529	183.651	571,9	36,1	44,1

2013	464.397	209.379	613,4	38,9	47,9
2014	529.908	224.881	679,4	41,2	47,6
2015	598.558	236.838	697,7	50,5	48,8
2016	631.933	249.723	714,4	50,5	48,6
2017	621.819	249.079	743,9	79	58,5

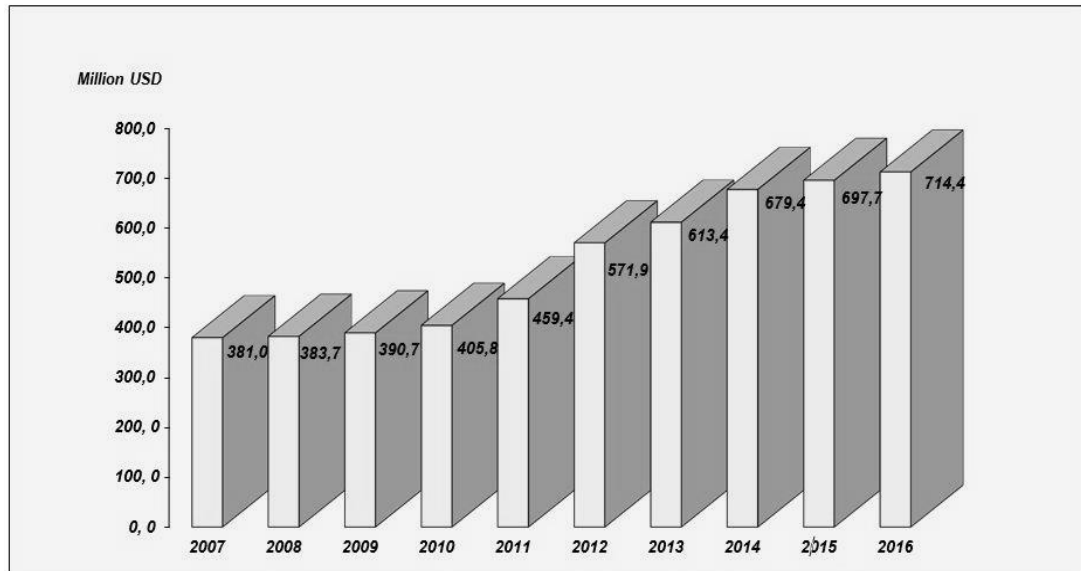


Figure 18: Net Tourism Income by Years (2007-2016) (MTENC, 2016).

The decline of the tourism industry in Northern Cyprus can be attributed to political and economic semi-isolation, lack of qualified human resources, lack of proper marketing, lack of direct flights, and varied patterns of tourist arrival (Altinay & Kashif, 2005). In general, the tourism industry in the northern side is not experiencing rapid development at the moment but there is a heavy debate on how to protect and preserve the environment and ecology of the region by the politicians and various campaigners as tourism increases.

### 6.1.2 Strategies and Policies of Tourism in Northern Cyprus

Since the Turkish intervention and partition in 1974, Northern Cyprus has relied on Turkey for development and growth of its tourism industry. The northern side did not have a clear plan or strategy to attract tourists despite its vast coastal resources, rich

unique products, various tourist attractions in Famagusta and Kyrenia, and its high total bed-capacity in various hotels and resorts (Erdlenbruch et al., 2003). Poor management of human, natural, and cultural resources alongside ineffective and inefficient policies and strategies in its tourism sector are somehow endemic in the region (Mousavi, 2013). The northern side has been far less successful compared to the southern side in attracting tourists and visitors even though they essentially have the same climate and natural attractions, are the same distance of travel for visitors, and occupy the same island.

Though tourism has not been as strong in the north as in the south, the tourism department in Northern Cyprus did adopt some strategies and policies over the years. Initially efforts to enhance the tourism industry and thereby community development, the government of Northern Cyprus founded the National Tourism Organization (NTO) in 1973. The foundation of the organization was in response to disapproval of north-side business owners and shopkeepers with regard to the fact that Turkish tourists and other visitors were buying their goods and products from the southern side. Northern Cyprus government officials set up a tourist guide for visitors and tourists in Turkish (Alipour & Kilic, 2005), and after some time, to compensate for the continued lack of efficiency in the tourism industry, the authorities in Northern Cyprus established Cyprus Turkish Tourism Enterprises (CTTE), a replacement for the NTO thought to be recommended by the government of Turkey. The organization has ever since been training locals in businesses management and to establish touristic accommodations to help the tourism industry development in Northern Cyprus. However, it seems that CTTE has not been able to accomplish its mission and its activities are still not as transparent as the NTO's were. The NTO's transparency may have been related to the fact that it was not in the political hierarchy of Northern

Cyprus and always acted either in affiliation with other ministries or under the name of different ministries (Alipour et al., 2007). Still, the Ministry of Tourism of Northern Cyprus lacks a specific master planning for tourism and development despite the master planning law passed by its Senate. A master plan with well-defined policies and strategies would help the organization reach its ultimate goals including achieving sustainable tourism and development. A number of objectives can be specified to this end:

- An increase in the capital brought by tourists to the island,
- An increase in the time tourists spend on the island,
- An increase of similar businesses,
- An increase in the number of seasonal tourists,
- An increase in the number of arrivals,
- An increase in the number of hotels with reasonable prices and costs,
- An effective and efficient public transportation, and
- An increase in employment of and salaries for local workers.

A planning approach is not successful enough by just increasing tourist arrivals and hotel accommodations (Inskeep, 1998), it also must address a number of other factors to build cooperation between entities and develop a sustainable tourism industry in Northern Cyprus (Mowforth & Munt, 2015). Some facilities and sectors of Northern Cyprus' tourism industry are in need of the following improvements:

**Promotion and marketing:** Altinay, Altinay, and Bicak (2002) identified two factors as the main impediments to promoting and marketing tourism in Northern Cyprus: the political-economic embargo imposed on the country and the lack of recognition of the state by the international community. Furthermore, Northern Cyprus ignored the first

principle of marketing: matching supply to demand. Since the 1990s, government authorities have not limited the number of hotels or their bed capacities, leading to an oversupply. High bed capacity led to an overall increase in the number of tourist arrival but a decrease in overall tourist receipts because competition for the tourists pushed prices down. The country's past poor experiences mean that the tourism industry has to come up with transparent marketing and promotional plans and strategies to establish effective ties with international communities and generate more income and revenue for the local economy (Ardekani, 2014).

**Transportation:** Internationally imposed sanctions have caused the tourism industry in Northern Cyprus to suffer various consequences such as the prevention of direct flights from countries other than Turkey; all international flights having to first land in Turkey before entering Northern Cyprus (Farmaki, Altinay, Botterill, & Hilke, 2015). Establishment and expansion of other transportation modes like railroads, marinas, buses, and bicycles would benefit the country. Transit between arrival points (seaports and airports) and hotels is another issue. Only some hotels offer a shuttle service or coordinate car hires. Public transportation and the provision of transportation facilities for tourists and travelers should be a main task of the tourism sector. For small islands such as Northern Cyprus, such improvements would be of great benefit to the island as a whole. Overall transportation issues have not been given proper attention by the government in its policies and strategies.



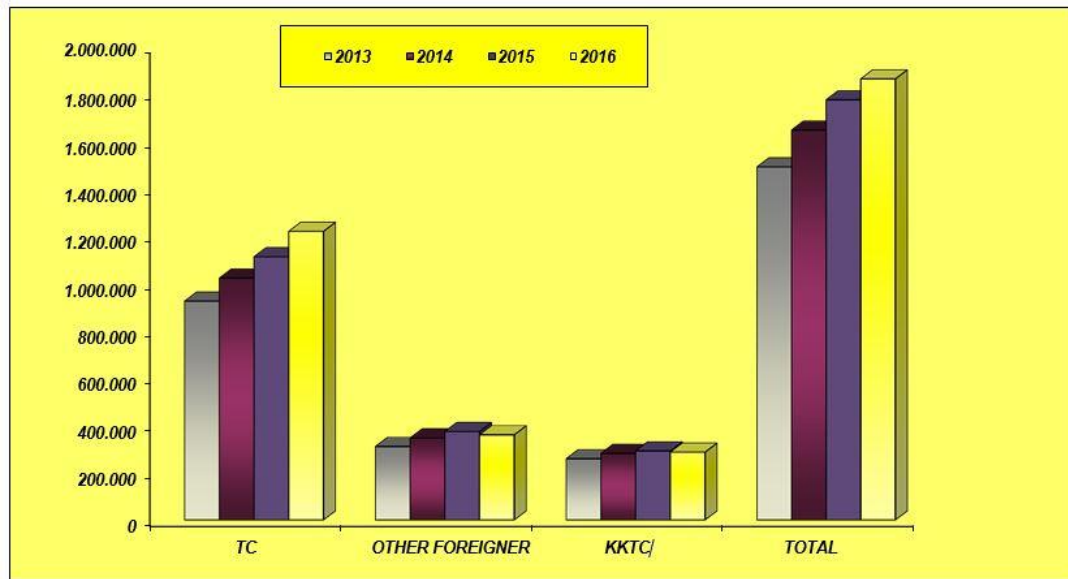


Figure 19: Number of Arrivals by Years (2007-2016) (Turkey, other foreigner and T.R.N.C.) Tourism and Environment Ministry of Northern Cyprus (2016).

**Accommodation:** In 2016, the Tourism and Environment Ministry of Northern Cyprus reported 138 lodgings available for tourist accommodation in Northern Cyprus with ratings ranging from 5-star to 1-star and variously classified. Of these 18 were five-star, 4 four-star, 10 three-star, 18 two-star, 18 one-star, one special class, five boutique hotels, 30 bungalows, five second-class holiday villages, two apartment hotels, and three were traditional houses (Appendix D). It also reported that 939,069 tourists visited North Cyprus between 2007 and 2016 (Table 17). Table 16 shows many different nationalities of these tourists, their average length of stay, the occupancy rate of hotels, while Figure 20 shows the number of bed-nights in tourist accommodation establishments. Table 14 reveals 5-star Hotels have the highest and 2-star hotels have the lowest number of beds. Most of these hotels are located in two coastal cities of Northern Cyprus: Kyrenia and Famagusta, and they are usually large in size with big casinos.

The report went on to state that there are many buildings in the historical and suburban areas of the cities that could be used for touristic purposes. By investing in this sector, the economy of the country may grow as more human resources can be employed in this sector reversing the poor trends in the economy and the unemployment suffered by local people in some areas.

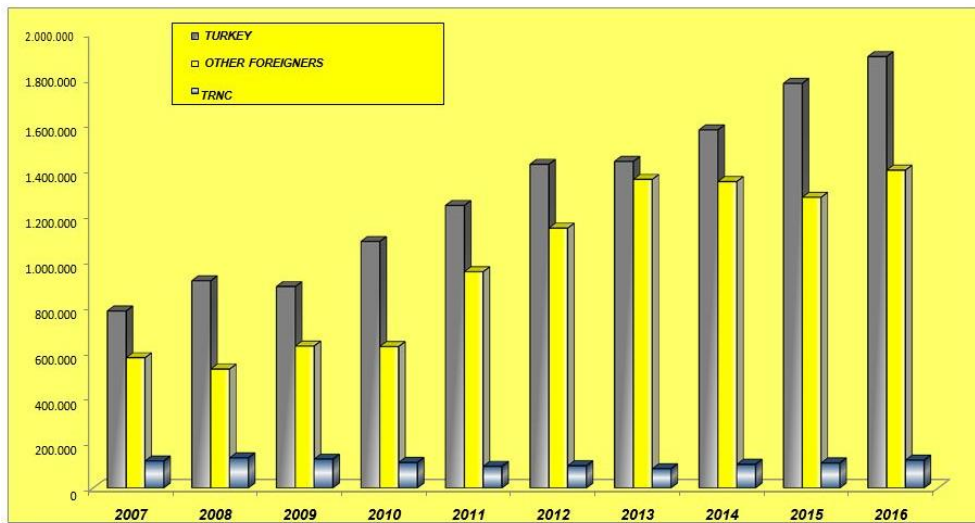




Figure 20: Number of Bed Nights in Tourist Accommodation Establishments by years (2007-2016) Tourism and Environment Ministry of Northern Cyprus (2016).

Table 16: Number of Tourists, Bed Nights, The Average Length of Stay and Occupancy Rate in All Accommodation Establishments by Years 2007-2016 (Turkey, other foreigners and T.R.N.C.) Tourism and Environment Ministry of Northern Cyprus (2016).

Years	Number Of Tourists				Bed nights				Av. Length Of Stay				% Occupancy Rate			
	Turkey	other Foreigner	T.R.N.C	Total	Turkey	other Foreigner	T.R.N.C	Total	Turkey	other Foreigner	T.R.N.C	Total	Turkey	other Foreigner	T.R.N.C	Total
2007	268.710	107.900	53.498	430.108	790.221	575.879	120.999	1.487.099	2,9	5,3	2,3	3,5	17,1	12,5	2,6	32,2
2008	320.270	105.082	57.624	482.976	921.362	526.037	132.653	1.580.052	2,9	5,0	2,3	3,3	19,2	11,0	2,8	33,0
2009	306.947	116.171	57.396	480.514	893.128	626.864	129.817	1.649.809	2,9	5,4	2,3	3,4	18,6	13,1	2,7	34,4
2010	339.404	110.687	57.252	507.343	1.093.680	625.976	117.912	1.837.568	3,2	5,7	2,1	3,6	21,4	12,2	2,3	35,9
2011	401.729	158.027	51.268	611.024	1.267.527	954.455	102.977	2.324.959	3,2	6,0	2,0	3,8	22,3	16,8	1,8	40,9
2012	468.656	184.895	50.250	703.801	1.452.451	1.146.121	105.824	2.704.396	3,1	6,2	2,1	3,8	23,4	18,4	1,7	43,5
2013	474.682	210.426	45.393	730.501	1.470.734	1.360.160	91.638	2.922.532	3,1	6,5	2,0	4,0	23,8	22,0	1,5	47,3
2014	539.921	226.636	54.919	821.476	1.605.041	1.352.188	111.540	3.068.769	3,0	6,0	2,0	3,7	24,6	20,8	1,7	47,1
2015	598.558	236.838	56.531	891.927	1.811.489	1.281.608	116.475	3.209.572	3,0	5,4	2,1	3,6	27,3	19,3	1,8	48,4
2016	631.933	249.723	57.413	939.069	1.927.776	1.399.582	127.765	3.455.124	3,1	5,6	2,2	3,7	27,0	19,5	1,8	48,3

Table 17: Number of Beds by Years and Hotel Categories (2007-2016) Tourism and Environment Ministry of Northern Cyprus (2016)

Number of beds by years and hotel categories (2007-2016)											
Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total beds
5-Star	6.274	6.53	6.712	7.712	9.302	9.58	9.58	10.318	11.218	12.16	 89.386
4-Star	1.536	1.536	1.644	1.644	1.704	1.704	1.346	1.346	1.346	1.738	15.544
3-Star	2.183	2.225	2.045	1.959	2.211	2.211	1.893	1.798	2.26	2.414	21.199
2-Star	979	1.183	1.361	1.435	1.588	1.588	992	1.368	1.368	1.303	1982.194
1-Star	785	573	581	581	583	718	636	663	713	605	 6438
Special Class Hotel	34	34	34	34	34	34	34	34	34	34	340
Boutique Hotel	42	42	42	138	214	418	450	486	486	486	2804
Second-Class Holiday Village	1.005	1.005	1.005	1.045	1.045	1.045	928	862	598	624	3018.15
Tourist Bungalow	1.706	1.892	1.851	1.885	1.885	1.891	1.461	1.661	1.747	1.55	17.529
Apartment Hotel	416	396	396	396	456	456	60	96	116	116	2904
Traditional House	24	24	34	34	34	34	96	96	96	96	568
Holiday Homes	0	0	0	0	0	0	0	102	108	108	318
Tourist Guesthouse	0	0	0	84	110	188	196	218	303	277	1376
Unclassified Hotels	848	0	0	0	0	0	1.094	228	0	32	1109.094
<b>Total</b>											<b>21001.096</b>

### **6.1.3 Local Conditions of Northern Cyprus in Terms of Environmental, Economic, and Socio-cultural Issues**

The island of Cyprus has important historical, political, and economic ties with Turkey and Greece. Small island countries, as is Northern Cyprus, have certain common environmental, economic, and especially socio-cultural problems. Individually and combined, the problems have significant roles in quality of life for the local community.

#### **Environmental Aspect**

Since the 1970s, especially after the introduction of environmental phenomenon as an important issue around the world, environmental aspects have found their place in the political agenda of Northern Cyprus. According to Yasarata et al. (2010), the environment was introduced as a distinct subject in Northern Cyprus through a five-year Development Plan (TFYDP). Several governmental organizations included environmental policies in their agenda and initiated various schemes to protect the environment. These led to a relatively intact ecological environment on the northern side of the island, a good sign that Northern Cyprus is capable of instituting the protections. The state can benefit a lot from these great natural resources and from a sustainable tourism industry. The protection and preservation of the natural and built environments is an essential issue that needs to be taken into account in the country's tourism plans and policies.

Small islands are heavily dependent on their natural environment; they cannot afford its depreciation by tourism or other means. In the late 1960s and early 1970s, the whole island of Cyprus experienced an environmental catastrophe when developers built

numerous high-rise buildings and concrete hotels on sandy beaches all around the island (Yasarata et al., 2010). As well, hotel buildings may be one of the biggest culprits, using more energy and water and generating more waste and pollution than other building type. The island learned the hard way about the need for development controls and plans to protect their water and energy sources from overuse, their environs from waste and pollution, and their quality of life from harm;

- **Water:** In Northern Cyprus, high demand for water by touristic establishments and development efforts is exacerbated by the shortage of fresh water. The government needs to manage the supply of water to the tourism sector.
- **Waste:** Solid waste disposal is a serious issue facing Northern Cyprus as the region experiences a boom in construction, land development, and occupation. The government has to come up with innovative and effective measures to tackle this problem before it gets out of control. Increasing the number of sewage processing facilities and employing additional garbage management procedures are two places to begin. Furthermore, advanced efforts are needed to address the serious threat of waste and garbage left by seafarers which becomes a greater issue as more and more ships and boats come to or pass near the island.
- **Pollution:** Water and land pollution caused by the dumping of hotel and resort wastes and sewage into the sea, air-borne particulate matter caused by construction and development activities, and other air pollution caused by fumes from chemicals or energy usage are all issues facing the environment and human health.

- **Energy:** The energy consumption of the tourism sector in Northern Cyprus, according to the Electricity Authority (2016), varies throughout the year as follows: the highest rates belong to the July, August, January, and December and the lowest rates to April, May, October and November. According to the same source, the energy consumption by residential areas is 36% while in the tourism sector the rate is 13 percent (Figure 21). To accurately tackle the environmental and economic problems in the energy sector, we need to measure the amount of energy consumed per bed on a daily, monthly, and yearly basis in different hotels to be able to have a better understanding of energy and money loss in these areas.

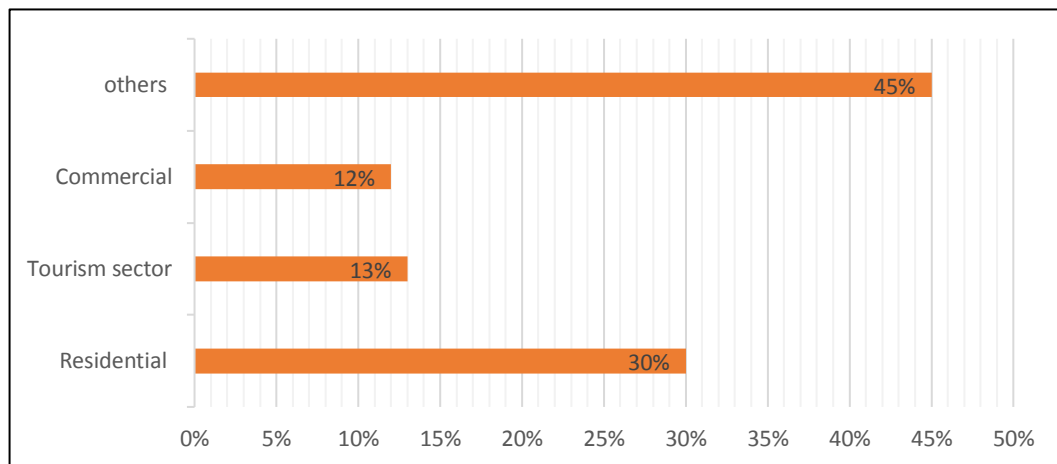


Figure 21: Energy Consumption of Northern Cyprus (Electricity Authority, 2017).

### **Socio-Cultural Aspect**

In the socio-cultural dimension, tourism directly or indirectly impacts such aspects of the host communities as the relations and interactions between people of the host community and between them and visitors. The local education and employment opportunities could have an important role in the socio-cultural dimension. Education, for instance, raises awareness of how tourists and travelers affect the socio-cultural

conditions of locals. Okonkwo's 2014 study determined the level of education Cypriot people's to be 96.05% (Figure 22) and a year later, TRNC's Ministry of Education (2015) measured the rate of education at 97.6%, an increase they noted to grow alongside knowledge of tourism on the island.

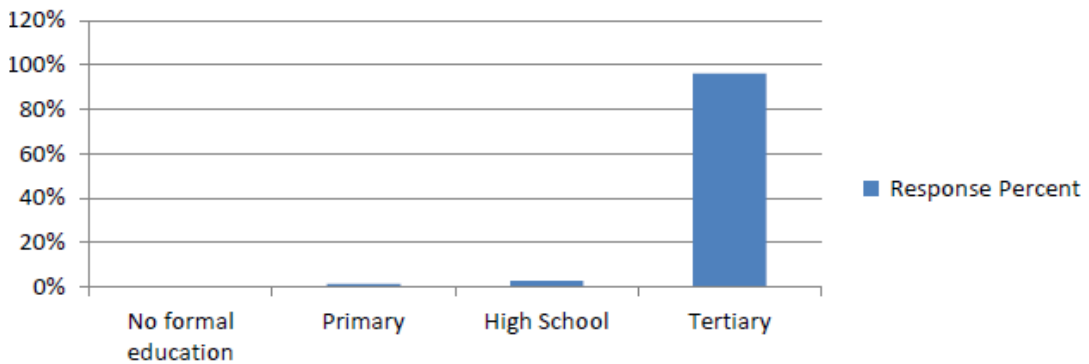


Figure 22: Percentage Distribution of Level of Education in Northern Cyprus (Okonkwo, 2014).

Further, due to the international and economic sanctions imposed on the northern side of the island, the pace of tourism development has been slow (interview with directors of KITSAB and KITOB, 2015). This lack of development has also influenced the employment of graduates to the extent that most of the graduates either find work in alternate sectors or migrate to other countries such as Turkey (Alipour & Vughaingmeh, 2009) (Table 18). In this regard, Barkey and Gordon (2001), saw that “the exodus of many of the most talented Turkish Cypriots has accelerated, and according to the best estimates, nearly half of Northern Cyprus’ population is made up of mainland settlers”.



Table 18: Number of Employees in the Tourism Sector of Northern Cyprus, Tourism and Environment Ministry of Northern Cyprus (2016)

Type of Establishment	Number of Establishments	Number of Employees
Tourist Accommodation	134	7.985
Other Accommodation	14	61
Tourism & Travel	154	440
Casinos	30	6.975
Total	333	12.719

Overall, many local Cypriots have graduated from universities in various disciplines and fields yet experience a lack of employment opportunities. Though potentially well aware of the issues surrounding tourism, Cypriots are not generally in positions where they can initiate needed change. To meet this need, the government can create new and diverse employment opportunities for local communities by helping family businesses grow and investing in small businesses that service the island's tourism sector.

### **Economic Aspect**

As indicated above, the socio-cultural dimension is closely intertwined with the economic dimension. The service sectors (public, tourism, and education) constitute a majority Northern Cyprus' economy granting a small proportion of the economy to the agricultural and small manufacturing sectors. Of these, the tourism industry is the most developing and profitable economic service sector in Northern Cyprus. However, due to its political isolation, and dependence on Turkey both economically and militarily, the economy of the island is constantly fluctuating. The majority of export and import takes place via Turkey, just as international flights must stopover in Turkey. Such financial limitations, together with environmental and social problems, have severely impacted the economy of Northern Cyprus in various ways such as high rates of construction, high energy use and high hotel room rates. As in the other dimensions, it

is the local government's responsibility to discover and implement solutions that positively influence all three dimensions to the benefit of local communities.

## **6.2 Localized Model for Northern Cyprus**

Northern Cyprus has not adopted any assessment methodologies to measure the sustainability of its buildings according to research conducted as part of this study. The local conditions of Northern Cyprus, not only the environmental aspects, can have a significant role in the sustainability of buildings and the tourism sector but also the socio-cultural and economic aspects have the very important role of enhancing quality of life in the local community. Therefore, development of an evaluation model for sustainable hotel buildings in Northern Cyprus considers the environmental, economic, and socio-cultural aspects, localizing the global model for the specific region. Despite the need, there is scarce research on hotel buildings, strategies, planning for the tourism sector, and local conditions in Northern Cyprus. Therefore, current research for a localized model began by interviewing various individuals from different departments in the tourism sector and learning the most problematic issues of socio-cultural and economic nature and the most needed information about the hotel industry. From global measurement methods and these interviews respectively, some common indicators of sustainable hotel buildings and the missing socio-cultural and economic indicators based on local conditions and priorities were combined to form a local evaluation model for the selected region. The complete methodology of the research was a process for developing the method based on interviews, LEED certification standards, and theoretical background.

### **6.2.1 Face-to-Face Interviews**

To accomplish the main objective, the qualitative technique of interviewing was utilized to gain input from hotel owners, managers, and other staff members of hotels.

Later interviews of staff members in various government departments, including tourism and the Environmental Ministry of Northern Cyprus (2016), yielded content characterizing tourists and existing states of the hotels through the lenses of environmental, economic, and socio-cultural viewpoints. A total of 18 participants were interviewed for the study (Table 19). After informing the research participants of the purpose of the research and providing definitions of sustainability and sustainable development (Appendix A, B, C), the interview questions asked the participants whether they agree or disagree with some statements.

Table 19: The Outline of Respondents.

<b>Respondent's code</b>	<b>Respondent's membership</b>	<b>Location/site</b>	<b>Respondent's gender</b>
<b>R#1.</b>	Architect	Ministry of tourism	M
<b>R#2.</b>	Architect	Ministry of tourism	F
<b>R#3.</b>	Civil engineer	Ministry of tourism	M
<b>R#4.</b>	General manager	Hotel	M
<b>R#5.</b>	Director of Sales & Marketing	Hotel	M
<b>R#6.</b>	Director of Finance	Hotel	M
<b>R#7.</b>	General manager	Hotel	M
<b>R#8.</b>	Front Office Manager	Hotel	M
<b>R#9.</b>	Human resource manager	Hotel	M
<b>R#10.</b>	Ownership	Hotel	F
<b>R#11.</b>	Revenue Manager	Hotel	M
<b>R#12.</b>	Director of Engineering	Hotel	F
<b>R#13.</b>	Stuff	Hotel	M
<b>R#14.</b>	Stuff	Hotel	M
<b>R#15.</b>	Stuff	Hotel	M
<b>R#16.</b>	Staff	Ministry of tourism	F
<b>R#17.</b>	Staff	Ministry of tourism	F
<b>R#18.</b>	General manager	Ministry of tourism	F

In the end, after the analysis of both the qualitative and quantitative data, an evaluation model for sustainable hotel buildings (EMSHB) was developed which took into account the localized model of sustainability for hotel buildings. For the small island state of Northern Cyprus, socio-cultural awareness of local communities was raised above protection of the environment and sustainability issues. In this regard, hotels can play a major role by getting involved in charity activities and other efforts to improve quality of life in host communities and even engage at the international scale as part of the conditions of their green certificate.

Consistent with the findings from the interview with staff members, managers, directors, and the Ministry of Tourism and Environment, there are no sustainable hotel buildings on the island and it experiences a slow market. The solution to this situation is the development of the localized model for measuring the sustainability of hotel buildings. From this effort, it is believed that tourism development will grow in the future; so, there is a need to make more investment in this direction now, mainly to help the tourism sector and the local community achieve more in terms of sustainability. Furthermore, since sustainable building design is the key to sustainable development, it can help the national economy, the natural environment, and the socio-cultural values of high quality of life, comfort, security, health, et cetera. Figure 23 shows the results of the interviews with the responses to the tourism sector and also shows that most respondents agreed with the inclusion of socio-cultural aspects when determining the sustainability of hotels in their local communities. Most of the respondents had a positive opinion of the socio-cultural impacts of sustainable hotels, especially towards employment of local community members by fostering local investment and local business development, which are the most affective goals in terms of socio-cultural sustainability.

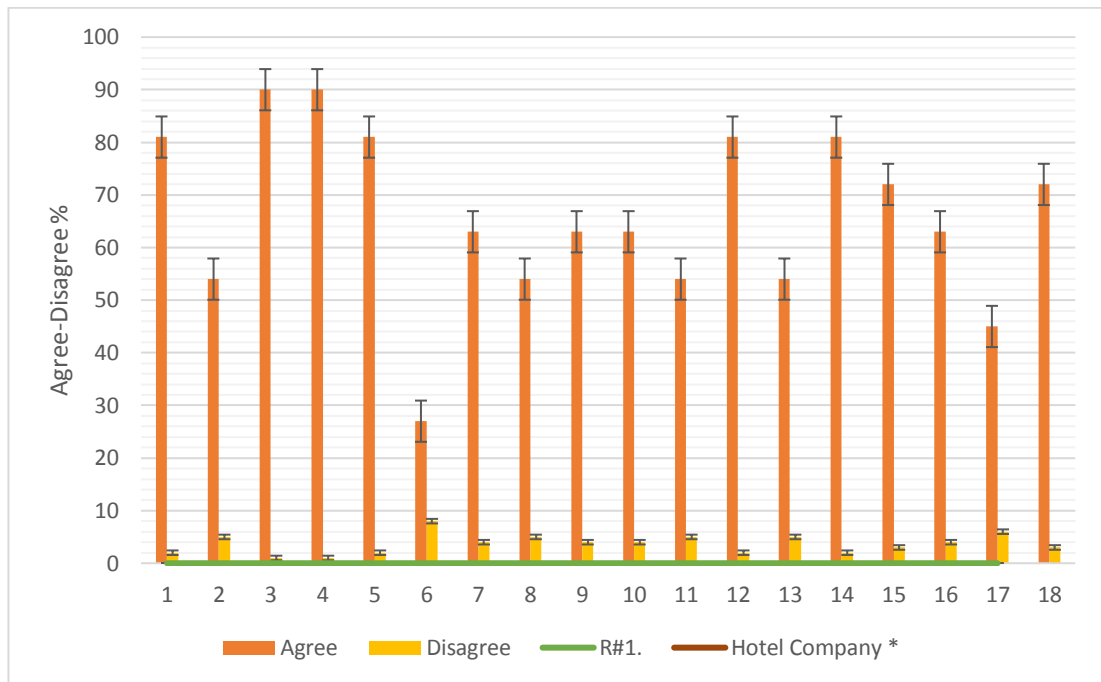


Figure 23: Interview Results among of Responses.

Ultimately, for the selection of suitable indicators for the development of the localized model, the process involved 11 steps (Figure 24);

- a) Identifying the needs of the local community and categorizing them into local community goals.
- b) Setting the objectives for each goal by identifying the goals of a specific local area or community and ensuring that these objectives will meet the identified goals.
- c) Identifying the causal factors of each objective by considering the specific conditions of the specified community.
- d) Formation and development of indicators through identification of the contributing factors.
- e) Listing the initial indicators.

- f) Assessment of the indicators: evaluating whether a certain indicator selected for a certain region or area is suitable or applicable.
- g) Finalizing the list of applicable indicators for a specific community.
- h) Identifying the objectives of the selected indicators.
- i) Choosing a method for evaluating the indicators.
- j) Using multi-dimensional analysis methods (of the site, land, architectural aspects, and technical aspects as well as social and economic aspects) to analyze the environmental, and socio-economic aspects of the case study.
- k) Evaluating the chosen indicators and measuring the level of sustainability in the given case study.

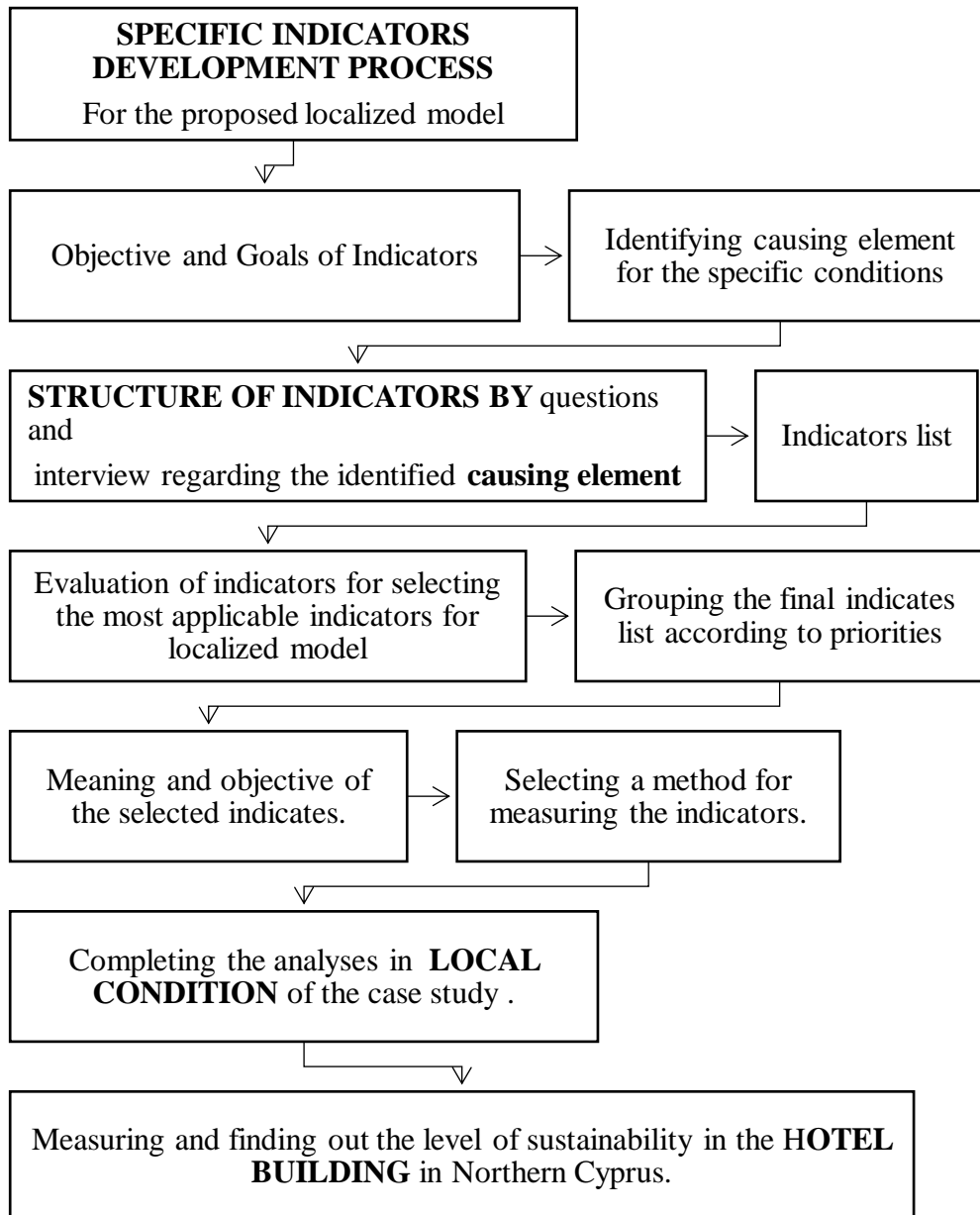


Figure 24: Indicator Development Process for a Selected Case Study for Development of The Model Adopted From (Hoşkara, 2006).

Eventually, based on the interviews conducted with the stakeholders, some of the indicators turned out to be more significant than other indicators. One of the most significant indicators was identified as the economic benefits of hotels for local people and tourists. The island has been faced with numerous economic challenges including lack of local investment; lack of local facilities and production; and lack of economic security in the local community.

Another significant indicator was identified as employment and education. Socio-cultural issues like unequal capital distribution and endangered social values are also challenges of the local community. These are known to influence employment patterns including lack of or limited job opportunities, employability of local community members, and support of local entrepreneurs; education patterns of community members; and the viability of local business including lack of or limited local ownership or local partnerships. The newly defined and categorized indicators are presented in Table 20.

Therefore, the localized model aims to measure sustainability performance of hotels considering their environmental impacts on the physical environment, local economic conditions, and especially socio-cultural aspects of Northern Cyprus. The sustainability of hotels, whether large or small, is both affected by and affecting local environmental, economic, and socio-cultural factors. However, the degree or extent of influence can vary from hotel to hotel. These aspects are closely interrelated and affect the sustainability of hotels in various complimentary and contradictory ways.

Figure 25 shows the relationship of the dimensions of sustainability, how they can directly affect each other; how the result can be affected by local community, and this process can continue from the hotel scale to the city scale and onward to the country and finally to the global scale. To initiate this evolution, improvement of community quality can be very important.



Table 20: New Defined Indicators According to Condition and Priorities of Northern Cyprus.

<b>Newly defined indicators</b>	
<b>Economic benefits of hotels for local people and tourists</b>	<b>Social Effects of hotels on the local community</b>
Employment opportunities The ratio of tourism facilities in the area Number and size of recreational cultural and spiritual sites Rent of hotels room The rate of energy consumption The rate of water consumption Rate Investment Budget of Construction Economic responsibility Local investment The average rate of occupancy of accommodations	Increased number of visitors Increased number of lodging facilities (e.g., hotels, guest houses) Level of tourists satisfaction in the hotel building Increased of local shopping facilities Total number of arrivals of tourists Increased leisure facilities.
<b>Employment</b>	<b>Community Health and Local Public Safety</b>
Local employment Local ownership The ratio of management to menial jobs The ratio of tourism job creation to jobs in other industries	Level of safety in the local community Level of safety in the hotel buildings Improvement in local public services The interaction between local and different cultures Increased standards of living
<b>Education</b>	<b>Socio-Cultural Exchange in building design and community</b>
Knowledge of staff Local workforce Environmental education	Impact of culture and society in the hotel design Increased number of events in the hotels Provide local services in the hotel Impact of the hotel on the urban pattern

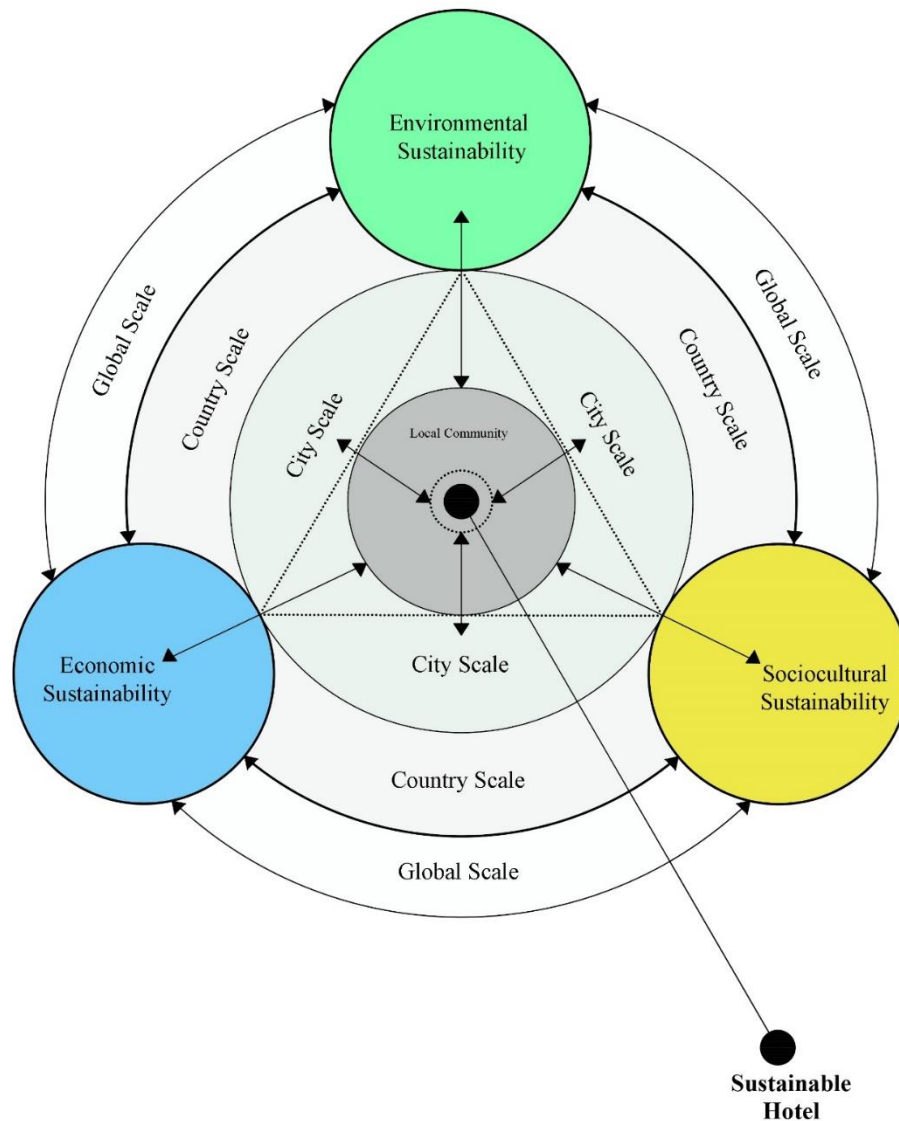


Figure 25: Local Evaluation Sustainable Hotel Building Model (Developed by Author).

Each indicator has its own goals and objectives helping to reach building sustainability. The following goals and objectives are to be considered in defining the local conditions of the selected region for sustainable hotel building indicators. Also, the aims and objectives of global methods already have been developed according to the needs and priorities of this study and the different regions since LEED certification was used as a base. So, the aims and objectives of this certificate have been considered as well as sustainable development and sustainable tourism goals and objectives (Table 21, 22, 23).

Table 21: Sustainable Hotel Building Environmental Indicators Goals and Objectives.

Environmental Indicators	Goals and Objectives
Transportation and Location	<ul style="list-style-type: none"> <li>•<b>Sensitive Land Protection:</b> To avoid the development of environmentally sensitive lands and reduce the environmental impact from the location of a building on a site.</li> <li>•<b>High Priority Site:</b> To encourage project location in areas with development constraints and promote the health of the surrounding area.</li> <li>•<b>Surrounding Density and Diverse Uses:</b> To conserve land and protect farmland and wildlife habitat by encouraging development in areas with existing infrastructure.</li> <li>•<b>Access to Quality Transit:</b> To encourage development in locations shown to have multimodal transportation choices or otherwise reduced motor vehicle use, thereby reducing greenhouse gas emissions, air pollution, and other environmental and public health harms associated with motor vehicle use.</li> <li>•<b>Reduced Parking Footprint:</b> To minimize the environmental harms associated with parking facilities, including automobile dependence, land consumption, and rainwater runoff.</li> <li>•<b>Green Vehicles:</b> To reduce pollution by promoting alternatives to conventional- fueled automobiles.</li> </ul>
Sustainable Sites	<ul style="list-style-type: none"> <li>•<b>Site Assessment:</b> To assess site conditions before design to evaluate sustainable options and inform related decisions about site design.</li> <li>•<b>Site Development - Protect or Restore Habitat:</b> To conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.</li> <li>•<b>Open Space:</b> To create exterior open space that encourages interaction with the environment, social interaction, passive recreation, and physical activities.</li> <li>•<b>Rainwater Management:</b> To reduce runoff volume and improve water quality by replicating the natural hydrology and water balance of the site, based on historical conditions and undeveloped ecosystems in the region.</li> <li>•<b>Heat Island Reduction:</b> To minimize effects on microclimates and human and wildlife habitats by reducing heat islands.</li> <li>•<b>Light Pollution Reduction:</b> To increase night sky access, improve night-time visibility, and reduce the consequences of development for wildlife and people.</li> </ul>
Water Efficiency and Sewage	<ul style="list-style-type: none"> <li>•<b>Outdoor Water Use Reduction:</b> To reduce outdoor water consumption</li> <li>•<b>Indoor Water Use Reduction:</b> To reduce indoor water consumption.</li> <li>•<b>Cooling Tower Water Use:</b> To conserve water used for cooling tower makeup while controlling microbes, corrosion, and scale in the condenser water system.</li> <li>•<b>Water consumption:</b> To support water management and identify opportunities for additional water savings by tracking water consumption.</li> </ul>
Energy and Atmosphere	<ul style="list-style-type: none"> <li>•<b>Enhanced Commissioning:</b> To support the design, construction, and eventual operation of a project that meets the owner’s project requirements for energy, water, indoor environmental quality, and durability.</li> <li>•<b>Optimize Energy Performance:</b> To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.</li> <li>•<b>Renewable Energy Production:</b> To reduce the environmental and economic harms associated with fossil fuel energy by increasing self-supply of renewable energy.</li> <li>•<b>Enhanced Refrigerant Management:</b> To reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to climate change.</li> <li>•<b>Green Power and Carbon Offsets:</b> To encourage the reduction of greenhouse gas emissions through the use of grid-source, renewable energy technologies and carbon mitigation projects.</li> </ul>

Environment Indicators	Goals and Objectives
Materials and Loss of Resources	<ul style="list-style-type: none"> <li>•<b>Building Life-Cycle Impact Reduction:</b> To encourage adaptive reuse and optimize the environmental performance of products and materials.</li> <li>•<b>Building Product Disclosure and Optimization - Environmental Product Declarations:</b> To encourage the use of products and materials for which lifecycle information is available and that have environmentally-, socially-, and economically-preferable lifecycle affects.</li> <li>•<b>Building Product Disclosure and Optimization - Sourcing of Raw Materials:</b> To encourage the use of products and materials for which life cycle information is available and that have environmentally-, socially-, and economically-preferable lifecycle affects.</li> <li>•<b>Building Product Disclosure and Optimization - Material Ingredients:</b> To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.</li> <li>•<b>Construction Management:</b> To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.</li> </ul>
Quality of Indoor Environment	<ul style="list-style-type: none"> <li>•<b>Enhanced Indoor Air Quality Strategies:</b> To promote occupants' comfort, well-being, and productivity by improving indoor air quality.</li> <li>•<b>Low-Emitting Materials:</b> To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.</li> <li>•<b>Construction Indoor Air Quality Management Plan:</b> To promote the well-being of construction workers and building occupants by minimizing indoor air quality problems associated with construction and renovation.</li> <li>•<b>Indoor Air Quality Assessment:</b> To establish better quality indoor air in the building after construction and during occupancy.</li> <li>•<b>Thermal Comfort:</b> To promote occupants' productivity, comfort, and well-being by providing quality thermal comfort.</li> <li>•<b>Interior Lighting:</b> To promote occupants' productivity, comfort, and well-being by providing high-quality lighting.</li> <li>•<b>Daylight:</b> To connect building occupants with the outdoors, reinforce circadian rhythms, and reduce the use of electrical lighting by introducing daylight into the space.</li> <li>•<b>Quality Views:</b> To give building occupants a connection to the natural outdoor environment by providing quality views.</li> <li>•<b>Acoustic Performance:</b> To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.</li> </ul>

Table 22: Sustainable Hotel Buildings Environmental Indicators Goals and Objectives.

Economic Indicators	Goals and Objectives
Economic benefits of hotels for local people and tourist	<ul style="list-style-type: none"> <li>▪To increase the local community investment</li> <li>▪To increase the economic responsibility</li> <li>▪To decrease the rate of energy and water consumption</li> <li>▪To decrease the budget of construction for locals</li> </ul>

Table 23: Sustainable Hotel Buildings Environmental Indicators Goals and Objectives.

Social & Cultural Indicators	Goals and Objectives
Employment	<ul style="list-style-type: none"> <li>▪To foster community involvement</li> <li>▪To create job opportunities to increase the family income</li> <li>▪To increase use of facilities by the community</li> <li>▪Income generation to support community projects and enterprise</li> <li>▪Higher multiplier, more reliable, more accountable , greater stability</li> <li>▪More entrepreneurship, greater creativity, greater social wellbeing</li> <li>▪Employment of more local women and young people in the tourism industry in an effort to empower the community members.</li> </ul>
Education	<ul style="list-style-type: none"> <li>▪To educate and train of all the personnel by following the policies and obliging the personnel to help preserve and protect the environment.</li> <li>▪To raise the awareness of the personnel or other community members through the distribution of eco-leaflets.</li> <li>▪To encourage the active participation of guests in different schemes.</li> <li>▪To Share the schemes with other stakeholders such as hotel owners, policy makers and researchers.</li> </ul>
The Socio-Cultural Of Hotel On Local Community	<ul style="list-style-type: none"> <li>▪<b>Handicrafts:</b> These objects usually generate income and economic benefits for the local community; however, sometimes it is the tastes of the tourists which determine the shape or form of such objects which should be seriously taken into account.</li> <li>▪<b>Customs:</b> The traditions and customs can be misrepresented by the tourists as they are usually extracted from their original environment and are displayed for tourists.</li> <li>▪<b>Art:</b> Includes issues such as sculpture, music, and concerts which can also lose their originality upon displaying it to the tourists to receive their acceptance.</li> <li>▪<b>History:</b> Tourists can play an important role in the preservation and dissemination of historical knowledge and can generate revenues accordingly.</li> <li>▪<b>Work done by the community members:</b> Work such as artefact making, canoeing, et cetera attract tourists and generate income for community members.</li> </ul>
Community Health and Local Public Safety	<ul style="list-style-type: none"> <li>▪To improve the community health.</li> <li>▪To Provide training and foster inter-agency collaboration among public safety officials on current major threats to the local community.</li> <li>▪Strengthen interagency collaboration between local and regional response agencies.</li> </ul>
Socio-Cultural Exchange in building design and community	<ul style="list-style-type: none"> <li>•The use of local patterns and traditions in the construction of hotel facilities and establishment adds a distinctive appearance to such structures.</li> <li>•Providing local goods and services in the hotels can also help exchange socio-cultural aspects of the region.</li> <li>•Foreign exchange leakages: The foreign currency exchange that tourists do can have a significant impact on the economy of the host country and contributes to the balance of payments.</li> </ul>

### **6.2.2 Weights of Localized Model**

The various rating systems differ from each other, in part, because some assign specific weights to their indicators or their categories. Although based on the applied rating system of LEED certification that has four categories, the global evaluation model rating system is going to have three categories – the three dimensions of sustainability – with equal weights. Each dimension has 33.33% of 100% and the weights of the categories in the localized model are going to be adjustable based on the priorities of local conditions. The selected region has suffered in all three dimensions of sustainability but it suffers especially in the socio-cultural dimension, which has a very significant role in developing the country in terms of sustainability. Though there is not sufficient written information and documentation to quantify the weight of these issues, the weights for the localized model were able to be set based on expert interviews and surveys that were distributed among key professionals in Northern Cyprus hotel buildings and the Ministry of Tourism. Eighteen respondents each from civil engineers, architects, and quantity surveyors were visited and interviewed, so, that the response rate was 100%. The respondents were shown the aspect labels when ranking the domains as well as a detailed description of each aspect when ranking those aspects in the domains. Besides the main topics named above, respondents were asked about their own experiences in the sustainable hotel building and their awareness of the existing sustainable certification systems. Ultimately, based on the collected responses, the priority indicators were determined to be:

- Employment of local community and local entrepreneurs;
- Education of local community;
- Local investment;
- Local business ownership;

- Local facilities and production;
- Economic security of local community; and
- Health and wellbeing.

Within this context, the selected area is losing its social-culture due to outside effects (for example export, import, political isolate, worker etc.) so, it would be appropriate to increase the weight of the socio-cultural aspect in order to resolve the problems. Therefore, according to theoretical background information in the fourth chapter, there were different weights, which can be applied to the proposed method.

Consequently, the localized model can be applied using weights consistent with the priorities of the selected region and its environmental, economic and socio-cultural aspects. Due to evaluating and comparing the percentages of the localized model to the local priorities of the selected country, the distribution of points are 30 percent for 41 environmental items, 30 percent for 11 economic items, and 40 percent for 22 socio-cultural items. For a building to obtain the certificate, it needs to meet a minimum level of 100 credits for the different technical requirements. An additional 10 percent can be added for innovation credit. Because of minimum and maximum points, which was developed based on LEED, application of the localized model is the same with four categories. Application of the LEED certification system and the localized model occurred separately to compare how each application would rate the building with and without considering the existing conditions of Northern Cyprus and the existing situation of the selected hotel. To apply the model to test and evaluate the hotel, this study went through the following phases:

1. Review of literature

2. Selection of the case via collected data, surveys, and analysis techniques
3. Evaluation and testing of the data.

Once the localized model was established, it was tested on the Salamis Bay Conti Resort Hotel in Northern Cyprus as a case for this study.

### **6.3 Measurement of Hotel Buildings According to LEED Certification and the Localized Model**

To assess the sustainability of hotel buildings with the localized model, Salamis Bay Conti Resort Hotel was selected as a case study. The reason for this selection was to test the localized model on a building that may be able accomplish the objectives of sustainability and improve a hotel's environmental, economic, and socio-cultural impacts. Salamis Bay Conti Resort Hotel (Salamis Bay Hotel) is a five-star hotel with a 1000-bed capacity and a total area of 65,000 m<sup>2</sup>. It is located 8 kilometers from Famagusta in Yeni Boğaziçi-Gazimağusa of Northern Cyprus and 45 kilometers from Ercan International Airport. In terms of transportation, it is difficult to reach this hotel easily because it is located outside the city and there is no public transportation that reaches it (Table 24 and Figures 26, 27).

Table 24: Features of Salamis Bay Conti Resort Hotel Building in Northern Cyprus

<b>Features of the hotel</b>
General Description
Name & type of hotel : Salamis Bay (5*)
Year of construction: before 1974
Location : Famagusta, Cyprus
<b>Features of the building</b>
Geographical area:Yeni Boğaziçi
Capacity Bed Capacity: 850 (1000)*
Nationality of Ownership: Turkish (TC)
Total area: 65,000 m <sup>2</sup>





Figure 26: Salamis Bay Conti Resort Hotel View I (<http:1>).



Figure 27: Salamis Bay Conti Resort Hotel View II (<http:1>).

The hotel building's evaluation was conducted by observation, interviews with different individuals in different departments (managers, directors, staff members, technical section, et cetera), and a collection of documents and photos. Information was sorted chronologically from the construction and operation dates of the hotel.

**Energy and Water Efficiency:** In considering the limited natural resources and environmental problems of the host island, apparently the Salamis Bay Hotel had not undergone an integrated design process and had not followed any protocol to advance the goals of energy and water saving. Instead, it seemed to have focused mainly on the excellent indoor environment, feel, and good quality service. The hotel was built on the seaside with a very large beach and is surrounded by many different trees to make for a healthy environment for visitors. However, the beach experiences many environmental problems such as damage and destruction over long periods. For some energy efficiency, all rooms were designed with window shades to diminish the warmth picked up from the late spring sun, yet permit the winter sun to enter and warm the rooms.

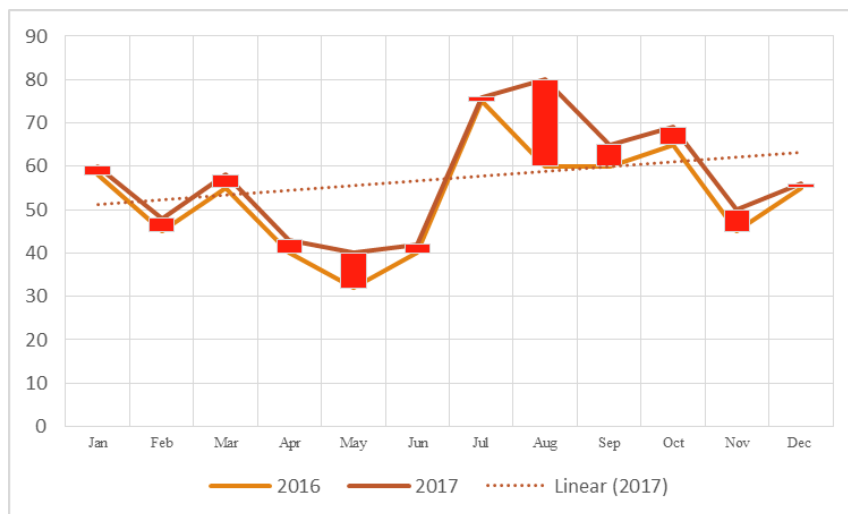


Figure 28: Ratio of Visitors from 2016 to 2017.

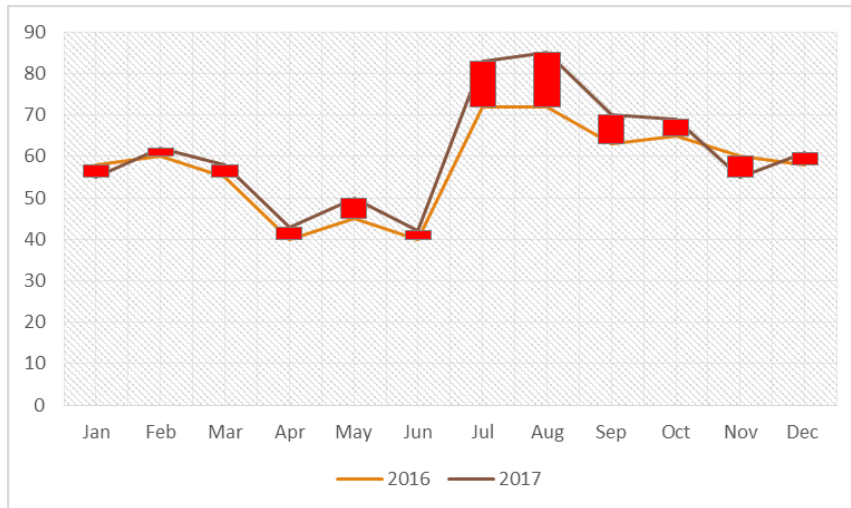


Figure 29: Monthly Ratio of Bed Capacity from 2016 to 2017.

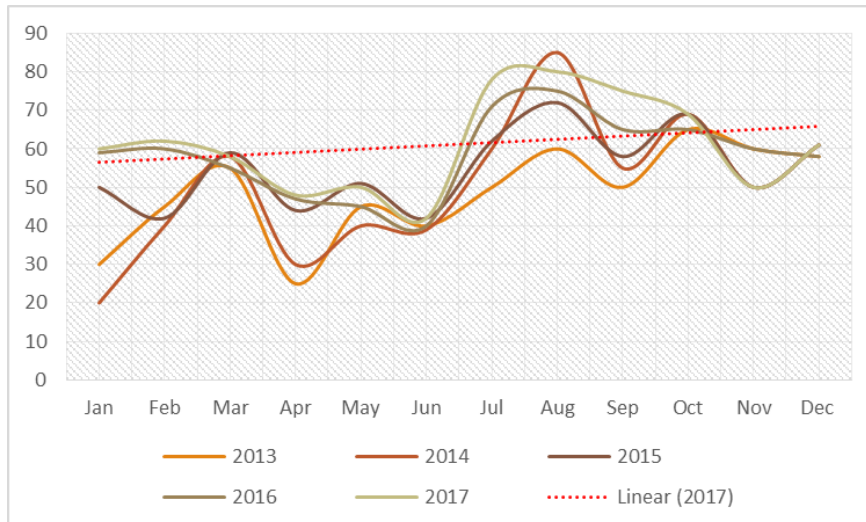


Figure 30: Monthly Water Ratio from 2013 to 2017.

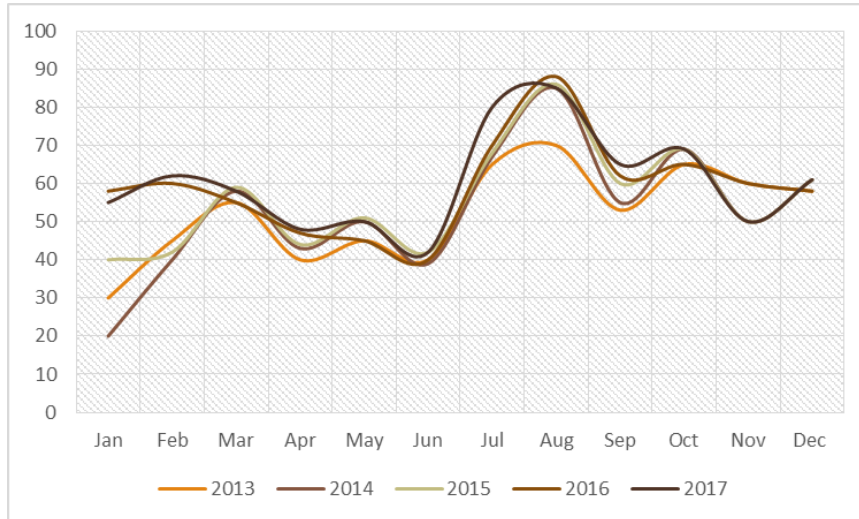


Figure 31: Monthly Energy Ratio from 2013 to 2017.

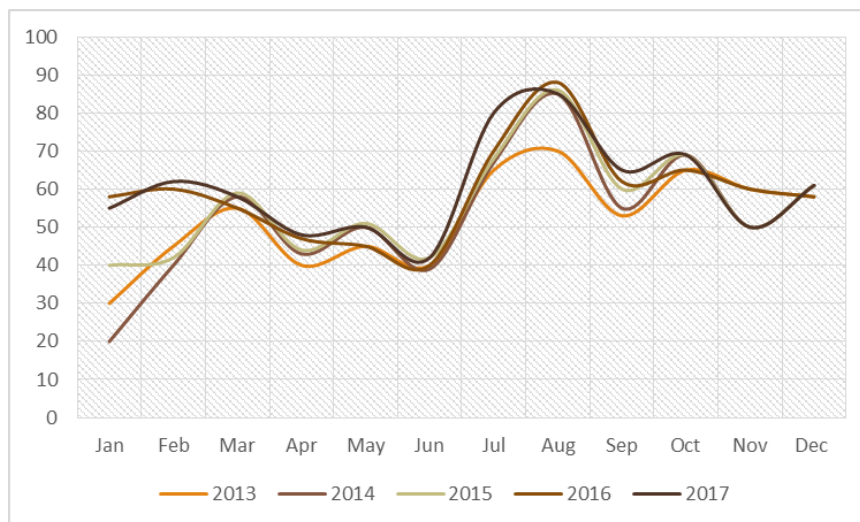


Figure 32: Monthly Water Ratio from 2013 to 2017.

First, the LEED system was applied to test the level of the hotel building's sustainability. Second, the hotel was evaluated with a localized model to compare the outcomes of these two methods and determine the better result in terms of sustainability. Then this study evaluated the existing situation of the hotel in different parts and seasons utilizing both the LEED system and the localized model to see how the hotel functions in the real world. Assessing seasonal functionality was possible

since the interviews and evidence revealed that the hotel was full of visitors during both summer and winter (Figure 28). After evaluation as an independent building, the hotel was found capable of working properly as a more sustainable hotel (Table 25). Yet, it is not currently conforming to the priorities of the selected region and cannot cope with and improve the economy standard. The weaknesses of this hotel must be addressed in accordance with the sustainable development goals and targets:

- Local employment should increase,
- Employment opportunities and career mobility should take place and the family income should be raised,
- The ownership of the hotel should be shared with local partners or should attract and involve the local people at least with their small investment in order to improve their incomes,
- The facilities of the hotel should be improved in ways that give more support to local people, and increase the marketing of local products such as local workshops, local food products, and local restaurants, bars, snack bars, cafés, et cetera,
- It should also decrease the rate of water and energy consumption so that it can decrease the price of a room in order to attract more visitors,
- Increase community integration and collaboration,
- Increase the education and skill of workers,
- Increase the economic responsibility in line with the standard economy of selected country.

In addition, when the LEED system was applied to the hotel, the results showed Salamis Bay Hotel would receive a “Gold certificate” with more points to be more

sustainable in terms of environmental aspects as an independent building (Table 26, Figure 33, 34). However, when the localized model was applied, which covered the socio-cultural aspects of sustainability alongside the environmental and economic aspects for the overall country, the study realized that the results showed lower levels of sustainability. Because when the localized model considered the local conditions and priorities of a selected country it found that the local community had not benefited much socio-culturally or economically from the prosperity of the hotel building. Via the localized model, Salamis Bay Hotel achieved lower sustainability in terms of local socio-cultural dimensions. This study tried to test the localized model in a way that would work for Northern Cyprus' tourism hotels according to local priorities and needs and could lead to hotel sustainability according to the local economic and social aspects.

The results obtained from measuring the sustainability of the hotel using the localized model (Table 26 and 27, Figure 35, 36) revealed that the hotel would receive a "Silver" certificate as a sustainable hotel with 50.55 points as "Satisfied", 40.51 points "Average", and 19.87 as "Poor". Thus, this hotel needs to improve their sustainability in terms of all the items especially socio-cultural aspects to be qualified as more sustainable.

Table 25: Evaluation the Existing Situation of Salamis Bay Conti Resort Hotel.

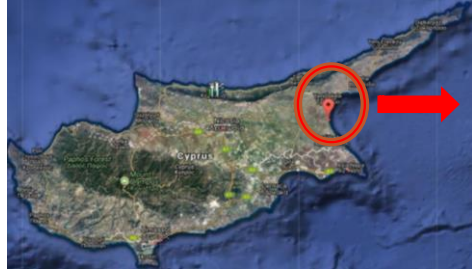


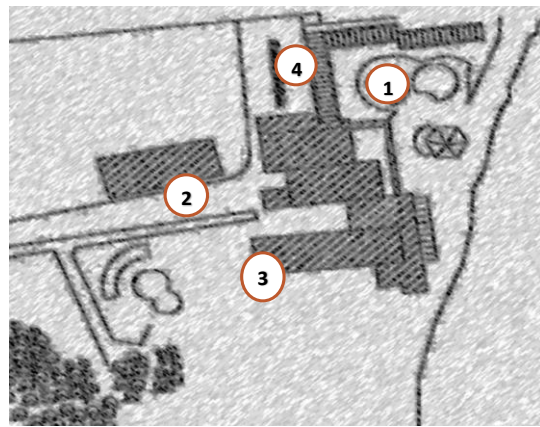

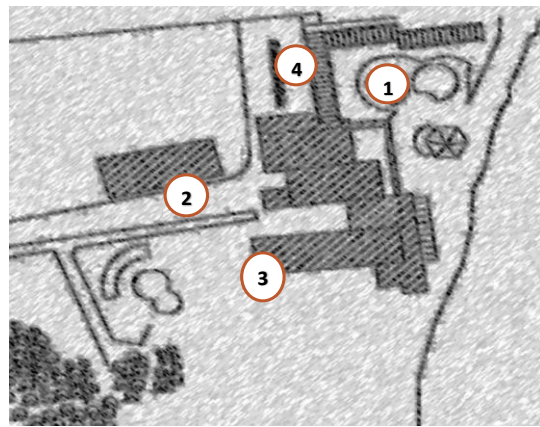

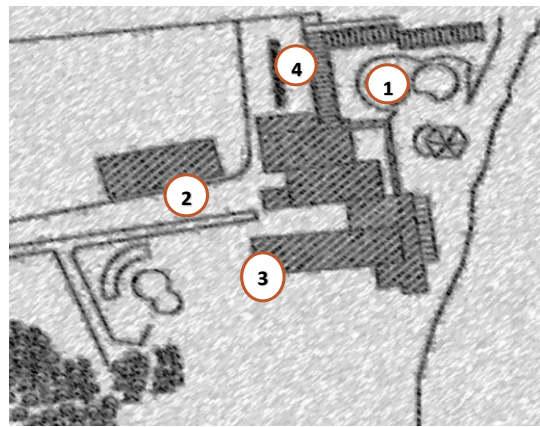

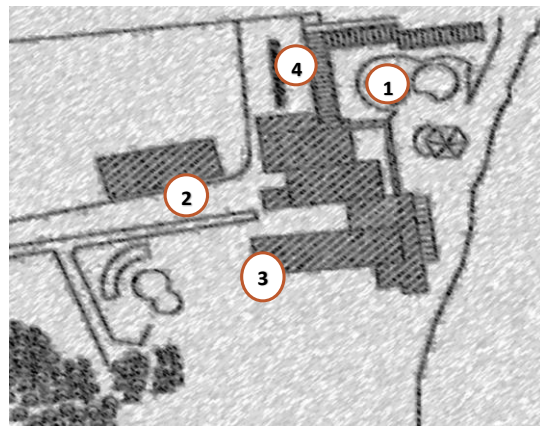

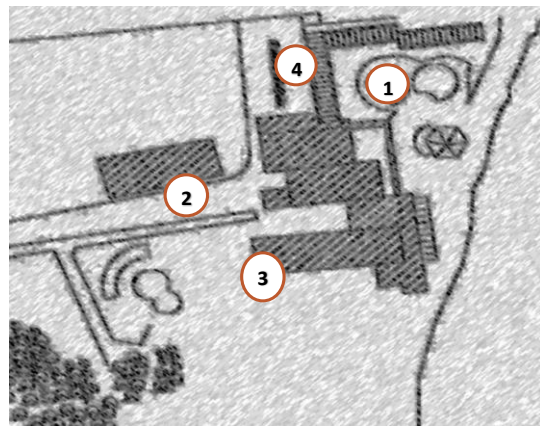

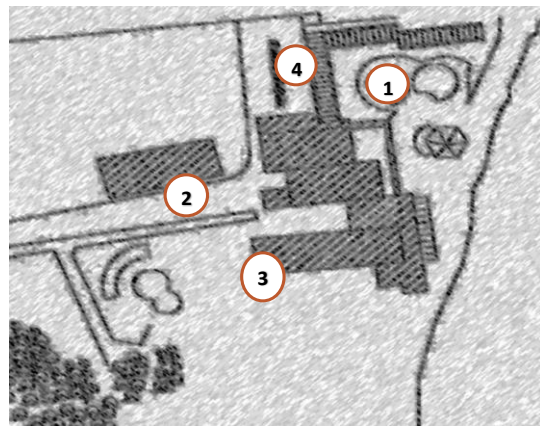

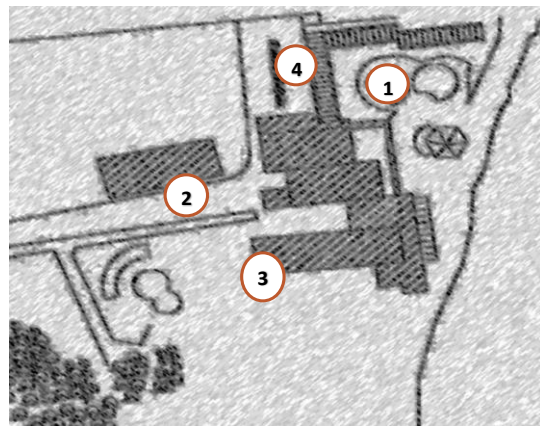
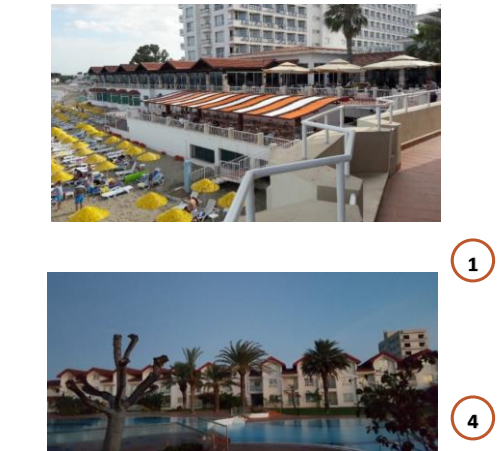

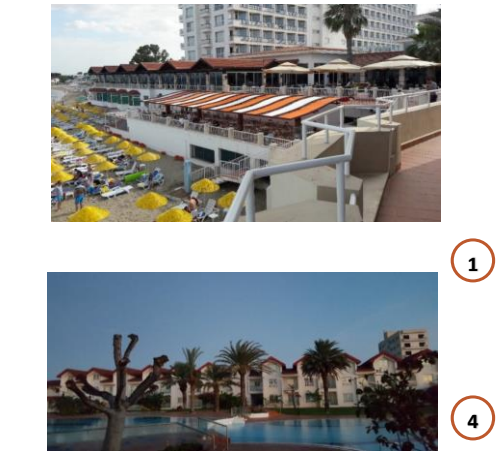

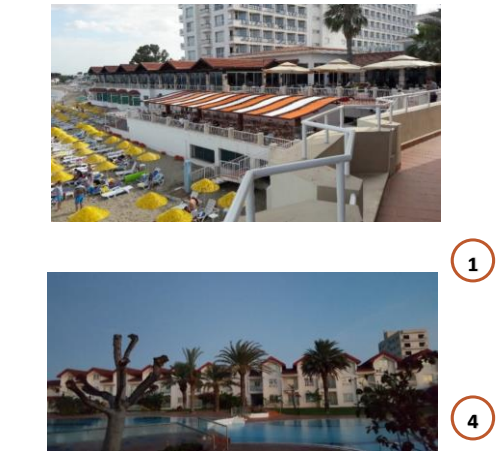

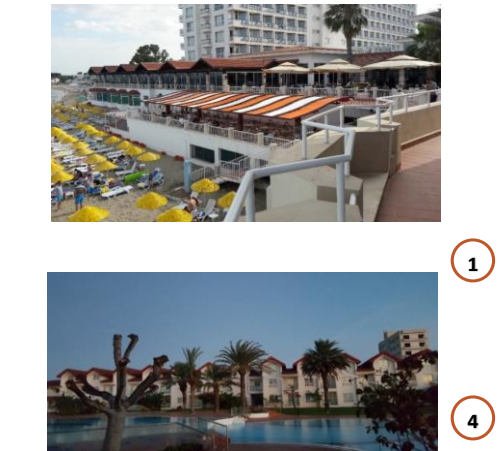

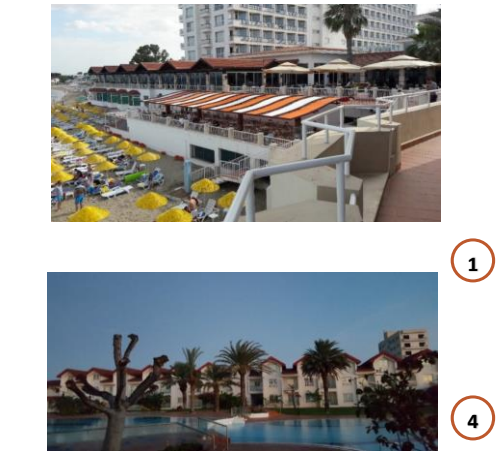

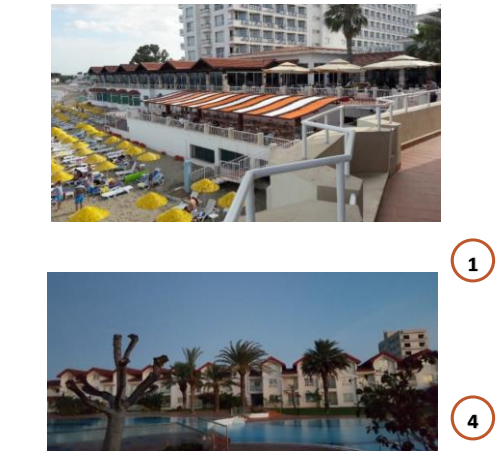

Analyzing the Existing Conditions of Salamis Bay Conti Resort Hotel		Assessment Criteria	Credia	Check List	Evaluation			
					Satisfied	Average	Poor	
<p><b>Salamis Bay Conti Resort Hotel location in Northern Cyorus</b></p> <p>Map's</p> 		<p><b>Salamis Bay Conti Resort Hotel Site Plan</b></p> 		<p><b>Environmental</b></p>	<p>1.0 Transportation and Location</p> <ul style="list-style-type: none"> <li>0.73 Sensitive Land Protection</li> <li>0.73 High Priority Site</li> <li>0.73 Surrounding Density and Diverse Uses</li> <li>0.73 Access to Quality Transit</li> <li>0.73 Reduced Parking Footprint</li> <li>0.73 Green Vehicles</li> </ul>			
					<p>2.0 Sustainable Sites</p> <ul style="list-style-type: none"> <li>0.73 Site Assessment</li> <li>0.73 Site Development - Protect or Restore Habitat</li> <li>0.73 Open Space</li> <li>0.73 Rainwater Management</li> <li>0.73 Heat Island Reduction</li> <li>0.73 Light Pollution Reduction</li> </ul>			
					<p>3.0 Water Efficiency</p> <ul style="list-style-type: none"> <li>0.73 Outdoor Water Use Reduction</li> <li>0.73 Indoor Water Use Reduction</li> <li>0.73 Cooling Tower Water Use</li> <li>0.73 Water Metering / Water consumption</li> </ul>			
					<p>4.0 Energy and Atmosphere</p> <ul style="list-style-type: none"> <li>0.73 Enhanced Commissioning</li> <li>0.73 Optimize Energy Performance</li> <li>0.73 Advanced Energy Metering</li> <li>0.73 Demand Response</li> <li>0.73 Renewable Energy Production</li> <li>0.73 Enhanced Refrigerant Management</li> <li>0.73 Green Power and Carbon Offsets</li> </ul>			
					<p>5.0 Materials and Loss of Renewable Resources</p> <ul style="list-style-type: none"> <li>0.73 Building Life-Cycle Impact Reduction</li> <li>0.73 Building Product Disclosure and Optimization</li> <li>0.73 Building Product Disclosure and Optimization</li> <li>0.73 Building Product Disclosure and Optimization</li> <li>0.73 Construction and Demolition Waste Management</li> </ul>			
					<p>6.0 Quality of Indoor Environment</p> <ul style="list-style-type: none"> <li>0.73 Construction Indoor Air Quality Management Plan</li> <li>0.73 Indoor Air Quality Assessment</li> <li>0.73 Thermal Comfort</li> <li>0.73 Interior Lighting</li> <li>0.73 Daylight</li> <li>0.73 Quality Views</li> <li>0.73 Acoustic Performance</li> </ul>			
					<p>7.0 Environmental Planning</p> <ul style="list-style-type: none"> <li>0.73 Percentage of urban communities/coastal communities serviced with sewage</li> <li>0.73 Re-introduction of local plant species in hotel gardens</li> </ul>			
					<p>8.0 Land Use</p> <ul style="list-style-type: none"> <li>0.73 Ratio of incompatible uses</li> <li>0.73 Rate of Use local construction materials and techniques in new tourism development</li> <li>0.73 Contaminated land</li> </ul>			
					<p>9.0 Economic benefits of hotels for local people and tourist</p> <ul style="list-style-type: none"> <li>2.7 Operation Economy</li> <li>2.7 Construction Economy</li> <li>2.7 Employment opportunities</li> <li>2.7 Ratio of hotel facilities in the area</li> <li>2.7 Rent of hotels room</li> <li>2.7 Rate of energy consumption</li> <li>2.7 Rate of water consumption</li> <li>2.7 Local investment</li> <li>2.7 Average rate of occupancy of accommodations</li> <li>2.7 Budget of construction</li> <li>2.7 Economic responsibility</li> </ul>			
					<p>10. Employment</p> <ul style="list-style-type: none"> <li>1.8 Percentage of locals employed in hotel industry at each level.</li> <li>1.8 Local ownership</li> <li>1.8 Ratio of management to menial jobs</li> <li>1.8 Ratio of tourism job creation to jobs in other industries</li> </ul>			
					<p>11. Education</p> <ul style="list-style-type: none"> <li>1.8 Knowledge of staff</li> <li>1.8 Local workforce</li> <li>1.8 Environmental education</li> </ul>			
					<p>12. Socio-Cultural Effects Of Hotel On Local Community</p> <ul style="list-style-type: none"> <li>1.8 Level of tourists satisfaction from the hotels building</li> <li>1.8 Increased number of visitors</li> <li>1.8 Increased number of lodging facilities (e.g., hotels, guest house)</li> <li>1.8 Increased of local shopping facilities</li> <li>1.8 Total number of arrivals of tourists</li> <li>1.8 Satisfaction of local from tourism development</li> </ul>			
					<p>13. Community Health and Local PUBLIC Safety</p> <ul style="list-style-type: none"> <li>1.8 Level of safety in the local community</li> <li>1.8 Level of safety in the hotel buildings</li> <li>1.8 Improvement in local public services</li> <li>1.8 Interaction between local and different cultures</li> <li>1.8 Increased standards of living</li> </ul>			
					<p>14. Community Health and Local PUBLIC Safety</p> <ul style="list-style-type: none"> <li>1.8 Impact of culture and society in the hotel design</li> <li>1.8 Increased number of events in the hotels</li> <li>1.8 Impact of the hotel to the urban pattern</li> <li>1.8 Provide local services in the hotel</li> </ul>			

Table 26: Measurement of Salamis Bay Conti Resort Hotel According to LEED Certificate



LEED v4 for BD+C: Hospitality

Y ? N

			<b>Integrative Process</b>	<b>1</b>
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<b>12</b>	<b>4</b>	<b>0</b>	<b>Transportation and Location</b>	<b>16</b>
1			Credit Sensitive Land Protection	1
1	1		Credit High Priority Site	2
4	1		Credit Surrounding Density and Diverse Uses	5
3	2		Credit Access to Quality Transit	5
1			Credit Reduced Parking Footprint	1
2			Credit Green Vehicles	2

<b>8</b>	<b>2</b>	<b>0</b>	<b>Sustainable Sites</b>	<b>10</b>
1			Credit Site Assessment	1
1	1		Credit Site Development - Protect or Restore Habitat	2
1			Credit Open Space	1
3			Credit Rainwater Management	3
1			Credit Heat Island Reduction	1
1	1		Credit Light Pollution Reduction	2

<b>6</b>	<b>4</b>	<b>1</b>	<b>Water Efficiency and Sewage</b>	<b>11</b>
1	1		Credit Outdoor Water Use Reduction	2
3	2	1	Credit Indoor Water Use Reduction	6
1	1		Credit Cooling Tower Water Use	2
1			Credit Water Metering / Water consumption (per tourist per bed, or per night)	1

<b>21</b>	<b>9</b>	<b>3</b>	<b>Energy and Atmosphere</b>	<b>33</b>
3	2	1	Credit Enhanced Commissioning	6
12	4	2	Credit Optimize Energy Performance	18
2			Credit Advanced Energy Metering	2
1			Credit Demand Response	1
2	1		Credit Renewable Energy Production	3
1			Credit Enhanced Refrigerant Management	1
1	1		Credit Green Power and Carbon Offsets	2

<b>7</b>	<b>3</b>	<b>3</b>	<b>Materials and Loss of Renewable Resources</b>	<b>13</b>
3		2	Credit Building Life-Cycle Impact Reduction	5
1	1		Credit Building Product Disclosure and Optimization - Environmental Product	2
1		1	Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1	1		Credit Building Product Disclosure and Optimization - Material Ingredients	2
1	1		Credit Construction and Demolition Waste Management	2

<b>11</b>	<b>4</b>	<b>2</b>	<b>Quality of Indoor Environment</b>	<b>16</b>
2			Prereq Enhanced Indoor Air Quality Strategies	2
2		1	Prereq Low-Emitting Materials	3
1			Credit Construction Indoor Air Quality Management Plan	1
1		1	Credit Indoor Air Quality Assessment	2
1			Credit Thermal Comfort	1
1	1		Credit Interior Lighting	2
1	1		Credit Daylight	2
1	1		Credit Quality Views	2
1	1		Credit Acoustic Performance	1

<b>4</b>	<b>2</b>	<b>0</b>	<b>Innovation</b>	<b>6</b>
4	2		Credit Innovation	
			Credit LEED Accredited Professional	

<b>0</b>	<b>2</b>	<b>2</b>	<b>Regional Priority</b>	<b>4</b>
	2	2	Credit	
			Credit	
			Credit	
			Credit	
			Credit	

<b>69</b>	<b>30</b>	<b>11</b>	<b>TOTALS</b>	<b>Possible Points: 110</b>
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Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110



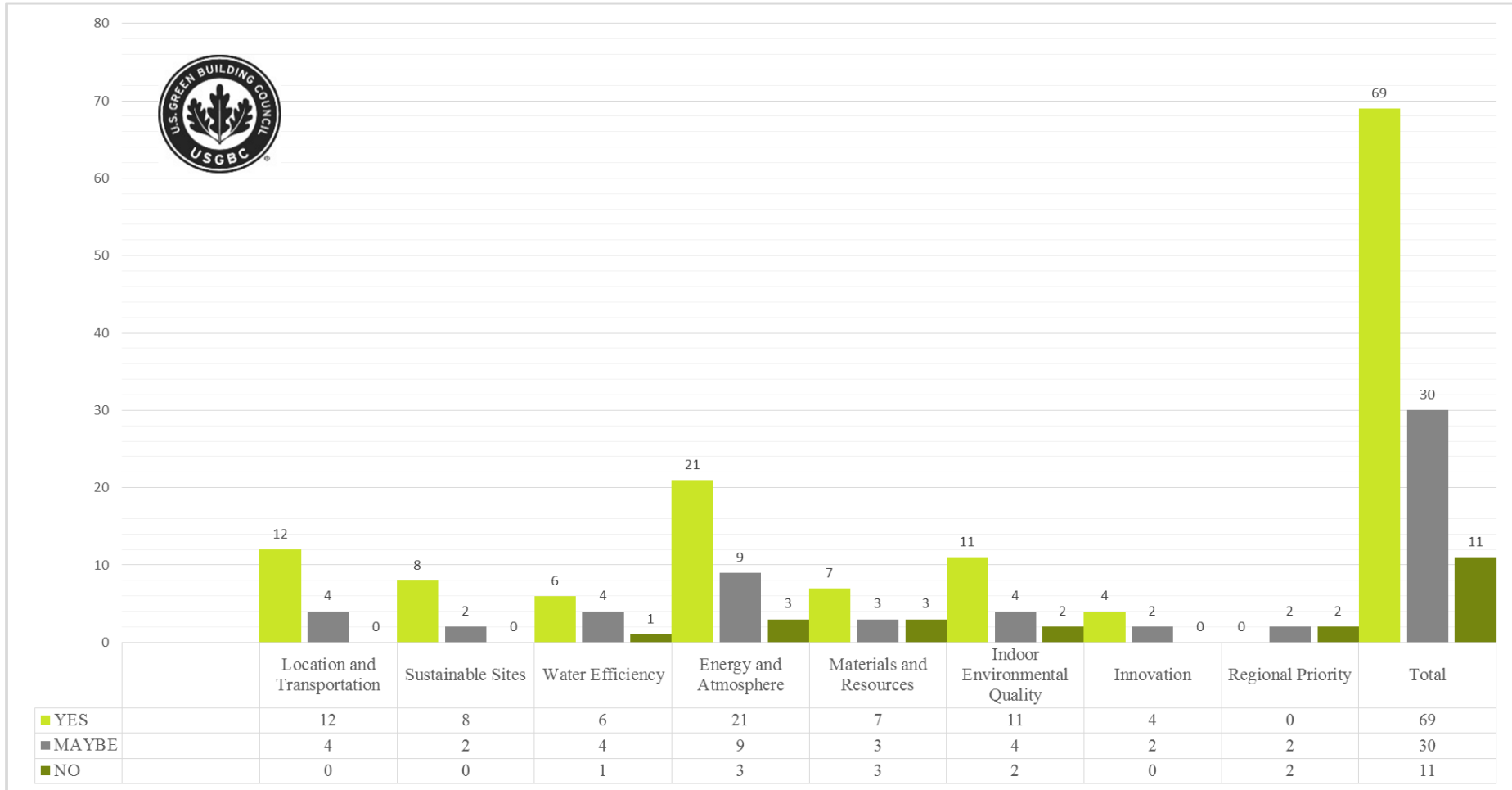


Figure 33: Distribution of LEED Points by Category.

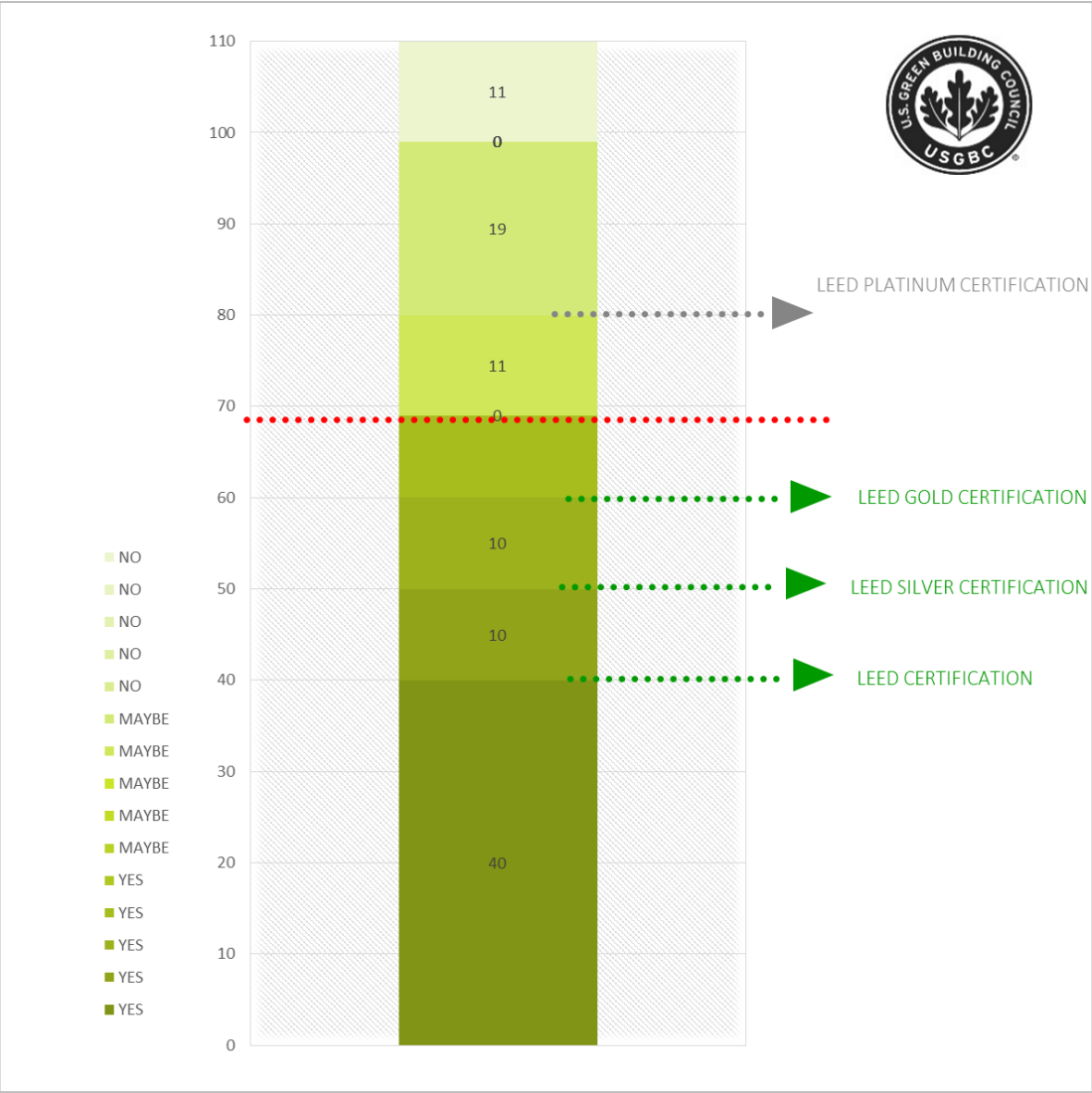


Figure 34: LEED Points and Certificate Level.

Table 27: Measurement of Salamis Bay Conti Resort Hotel According to the Localized Model



Local- An Evaluation Model for Sustainable Hotel Building

Satisfied Average Poor

			<b>Environmental indicators</b>	<b>30 %</b>	<b>41 items</b>	<b>Point</b>
--	--	--	---------------------------------	-------------	-----------------	--------------

<b>4.2</b>	<b>0</b>	<b>0</b>	<b>Transportation and Location</b>			<b>4.2</b>
0.7			Credit	Sensitive Land Protection		0.7
0.7			Credit	High Priority Site		0.7
0.7			Credit	Surrounding Density and Diverse Uses		0.7
0.7			Credit	Access to Quality Transit		0.7
0.7			Credit	Reduced Parking Footprint		0.7
0.7			Credit	Green Vehicles		0.7

<b>2.92</b>	<b>1.46</b>	<b>0</b>	<b>Sustainable Sites</b>			<b>4.35</b>
Y			Prereq	Construction Activity Pollution Prevention		Required
	0.73		Credit	Site Assessment		0.7
0.73			Credit	Site Development - Protect or Restore Habitat		0.73
0.73			Credit	Open Space		0.73
	0.73		Credit	Rainwater Management		0.73
0.73			Credit	Heat Island Reduction		0.73
0.73			Credit	Light Pollution Reduction		0.73

<b>2.19</b>	<b>0.73</b>	<b>0</b>	<b>Water Efficiency and Sewage</b>			<b>2.92</b>
Y			Prereq	Outdoor Water Use Reduction		Required
Y			Prereq	Indoor Water Use Reduction		Required
Y			Prereq	Building-Level Water Metering		Required
	0.73		Credit	Outdoor Water Use Reduction		0.73
0.73			Credit	Indoor Water Use Reduction		0.73
0.73			Credit	Cooling Tower Water Use		0.73
0.73			Credit	Water Metering / Water consumption (per tourist per bed, or per night)		0.73

<b>5.15</b>	<b>0</b>	<b>0</b>	<b>Energy and Atmosphere</b>			<b>5.08</b>
0.73			Credit	Enhanced Commissioning		0.73
0.73			Credit	Optimize Energy Performance		0.73
0.73			Credit	Advanced Energy Metering		0.73
0.73			Credit	Demand Response		0.73
0.73			Credit	Renewable Energy Production		0.73
0.7			Credit	Green Power and Carbon Offsets		0.7

<b>2.19</b>	<b>0.73</b>	<b>0.73</b>	<b>Materials and Loss of Renewable Resources</b>			<b>3.65</b>
Y			Prereq	Storage and Collection of Recyclables		Required
Y			Prereq	Construction and Demolition Waste Management Planning		Required
	0.73		Credit	Building Life-Cycle Impact Reduction		0.73
0.73			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations		0.73
0.73			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials		0.73
0.73			Credit	Building Product Disclosure and Optimization - Material Ingredients		0.73
		0.73	Credit	Construction Management		0.73

<b>4.2</b>	<b>2.1</b>	<b>0</b>	<b>Indoor Environment Quality</b>			<b>6.3</b>
Y			Prereq	Minimum Indoor Air Quality Performance		Required
Y			Prereq	Environmental Tobacco Smoke Control		Required
0.7			Credit	Enhanced Indoor Air Quality Strategies		0.7
0.7			Credit	Low-Emitting Materials		0.7
	0.7		Credit	Construction Indoor Air Quality Management Plan		0.7
0.7			Credit	Indoor Air Quality Assessment		0.7
0.7			Credit	Thermal Comfort		0.7
	0.7		Credit	Interior Lighting		0.7
0.7			Credit	Daylight		0.7
0.7			Credit	Quality Views		0.7
	0.7		Credit	Acoustic Performance		0.7

<b>1.4</b>	<b>0</b>	<b>0</b>	<b>Environmental Planning</b>			<b>1.4</b>
Y			Prereq	Adoption of national-level codes of practice for tourism operators and tourists		Required
Y			Prereq	Sustainable tourism strategy, protected areas strategy		Required
0.7			Credit	Percentage of urban communities/coastal communities serviced with sewage		0.7
0.7			Credit	Re-introduction of local plant species in hotel gardens		0.7

<b>1.4</b>	<b>0</b>	<b>0.7</b>	<b>Land Use and Ecology</b>			<b>2.1</b>
0.7			Credit	Ratio of incompatible uses		0.7
0.7			Credit	Rate of Use local construction materials and techniques in new tourism development		0.7
		0.7	Credit	Contaminated land		0.7

<b>23.7</b>	<b>5.02</b>	<b>1.43</b>	<b>Possible Points:</b>			<b>30</b>
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Table 28: Measurement of Salamis Bay Conti Resort Hotel According to the Localized Model



**Local- An Evaluation Model for Sustainable Hotel Building**

Satisfied Average Poor

			<b>Economic indicators 30 %</b>	<b>11 items</b>	<b>Point</b>
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11.1	14.5	4.4	<b>Economic benefits of hotels for local people and tourist</b>		30
2	0.7		Credit	Operation Economy	2.7
0.7	2		Credit	Construction Economy	2.7
1	1	1	Credit	Employment opportunities	3
2	0.7		Credit	Ratio of hotel facilities in the area	2.7
	2	0.7	Credit	Rent of hotels room	2.7
0.7	2		Credit	Rate of energy consumption	2.7
0.7	2		Credit	Rate of , water consumption	2.7
	2.7		Credit	Budget of constuction	2.7
2	0.7		Credit	Economic responsibility	2.7
		2.7	Credit	Local investment	2.7
2	0.7		Credit	Average rate of occupancy of accommodations	2.7
11.1	14.5	4.4	Possible Points: <b>30</b>		

			<b>Social and Culture indicators 40 %</b>	<b>22 items</b>	<b>Point</b>
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0	3.62	3.71	<b>Employment</b>		7.33
		1.81	Credit	Percentage of locals employed in hotel industry at each level.	1.81
		1.9	Credit	Local ownership	1.9
	1.81		Credit	Ratio of management to menial jobs	1.81
	1.81		Credit	Ratio of tourism job creation to jobs in other industries	1.81

1.81	3.71	0	<b>Education</b>		5.52
1.81			Credit	Knowledge of staff	1.81
	1.9		Credit	Local workforce	1.9
	1.81		Credit	Environmental education	1.81

5.43	3.62	1.81	<b>Socio-Cultural Effects Of Hotel On Local Community</b>		10.86
1.81			Credit	Level of tourists satisfaction from the hotels building	1.81
	1.81		Credit	Increased number of visitors	1.81
1.81			Credit	Increased number of lodging facilities (e.g., hotels, guest house)	1.81
		1.81	Credit	Increased of local shopping facilities	1.81
1.81			Credit	Total number of arrivals of tourists	1.81
	1.81		Credit	Satisfaction of local from tourism development	1.81

1.81	2.9	3.62	<b>Community Health and Local Puplic Safety</b>		9.05
	1.81		Credit	Level of safety in the local community	1.81
1.81			Credit	Level of safety in the hotel buildings	1.81
		1.81	Credit	Improvement in local Public services	1.81
	1.81		Credit	Interaction between local and different cultures	1.81
		1.81	Credit	Increased standards of living	1.81

1.81	3.62	2.9	<b>Socio-Cultural Exchange in building design and community</b>		7.24
	1.81		Credit	Impact of culture and society in the hotel design	1.81
1.81			Credit	Increased number of events in the hotels	1.81
	1.81		Credit	Impact of the hotel to the urban pattern	1.81
		1.81	Credit	Provide local services in the hotel	1.81

5	1	0	<b>Innovation</b>		6
3			Credit	Innovation	
2	1		Credit	SHBEM Accredited Professional	

0	2	2	<b>Regional Priority</b>		4
	2	2	Credit	Regional Priority: Specific Credit	
			Credit	Regional Priority: Specific Credit	
			Credit	Regional Priority: Specific Credit	
			Credit	Regional Priority: Specific Credit	

<b>10.9</b>	<b>17.5</b>	<b>12.04</b>	Possible Points:		<b>40</b>
<b>50.6</b>	<b>40</b>	<b>19.87</b>	<b>110.47</b>		<b>100</b>

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

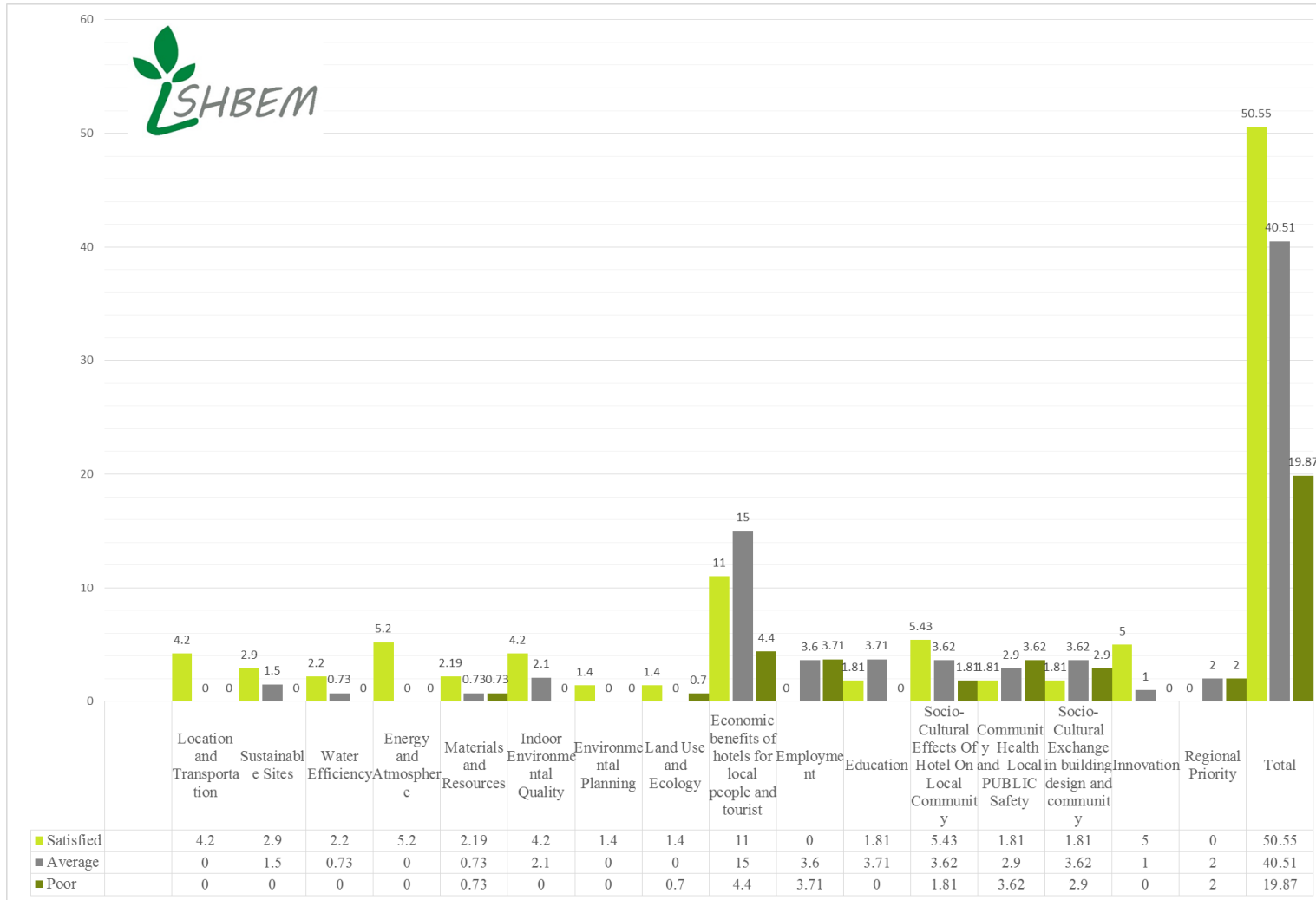


Figure 35: Distribution of Localized Model Points by Category.



Figure 36: Localized Model Points and Certificate Level.

## 6.4 Chapter Summary

Review of related literature on tourism development, types of tourism, tourism policy and strategy, and the local conditions of Northern Cyprus has found that the tourism sector is one of the main contributors to Northern Cyprus' economy. Also, the mixed-method approach was adopted in this study to accomplish the process of the localized model. The selected hotel was tested with the developed LEED model and the results showed that the hotel, an independent building, could be more sustainable in terms of environmental sustainability but when the social and cultural indicators (those not covered in the LEED method) were applied from the localized model, the results

indicated that the hotel would not be sustainable. These findings revealed that the localized model could work over all the country for considering the existing conditions.

## **Chapter 7**

### **CONCLUSION**

#### **7.1 Findings of this Research**

One of the most important issues in today's world is sustainability. The growth and development of our societies, in general, has had a great influence, sometimes negatively and sometimes positively, on our natural environment as well as on social and cultural aspects of daily life. Over the past few decades, hoteliers have focused on the importance of sustainability in the tourism sector, as it relates to the development and operation of the hotel, including environmental, social, and economic impacts. Sustainable hotels have been working to increase the efficacy of buildings and their sites through more efficient use of energy, water, and materials while also decreasing their impact on human health and the environment for the entire lifecycle of a building. Besides environmental issues, economic, and socio-cultural benefits can result from a sustainable hotel building. Moreover, a hotel that upholds the priorities and tends to the specific conditions of its host region may be deemed more sustainable than one that only measures up to globally-applicable sustainability standards. Some of the less-frequently considered goals and benefits of sustainable hotel buildings include:

- Decreased operational costs;
- Improved efficiency of occupants;
- Increased value of assets and profits;
- Optimized life-cycle and economic performance;
- Increased health and comfort of travelers;



- Reduced pressure on local infrastructure; and
- Improved overall quality of life of locals.

To achieve these benefits, sustainable development goals, and more, hoteliers and their contractors need to deal with all dimensions of sustainability, considering the priorities and local conditions of each region. Relatedly, tourism is becoming one of the most valuable sectors for growing the economy of underdeveloped countries, especially those that are small and isolated like Northern Cyprus on a small island.

Having sustainable hotels as part of a community's tourism sector is beneficial, unlike as this research has identified, the many hotels in the world which suffer from unsustainable design and eventually become a detriment to their host community. To act and react sustainably, there are many different green certificates and measurement applications for a building, which can evaluate its level of sustainability and guide design. Unfortunately, most of these tools do not cover all the dimensions of sustainability – namely they skip over social and cultural aspects. Choosing the right tool to measure and instill sustainable approaches for a hotel, its tourism sector, and its broader community is a first step toward comprehensive sustainability. This research, using the selected area as the case of study, found that Northern Cyprus has not adopted any assessment tool to measure the level of sustainability of its buildings. So, the community continues to suffer from socio-cultural problems as well as economic and environmental ills associated with unsustainable practices. Consequently, this thesis developed an evaluation model for sustainable hotel buildings (EMSHB) which can be localized and must work flexibly for different communities and regions according to their local conditions and priorities.

The model was built on theoretical information and background research for the purpose of sustainability, sustainable development, sustainable building, sustainable construction, sustainable tourism, hotel building, and measurement of sustainability, especially in hotel buildings. In the process of the thesis, various sustainable green buildings certificates and measurement of sustainability globally such as LEED certification, BREEAM, HQE, VERDE, BCA, HK-BEAM, and GBCA methods were analyzed. It has utilized a wealth of information to propose a method for measuring the level of sustainability of hotel buildings around the world and then localized the model according to the existing condition of the studied region.

In order to start applying the localized model for sustainability measurement of hotel building in different regions and countries, the model first defines a set of indicators based on environmental, economic, and socio-cultural conditions specific to the selected area. Following the model's development procedure, the first step was to determine the indicators for the global scale model and the second step was to localize the model according to the region-specific conditions and priorities. For step two, understanding the function of the model in different regions and countries depended on comparison of the various existing methods and research to develop a localized model for Northern Cyprus. Conforming to the selected context, specific indicators can have positive effect on the tourism sector and hotel buildings in terms of the sustainability dimensions.

Developing local sustainability via hotel design is most effective when specific sustainability indicators for hotel buildings are applied. Comparison of different methods of sustainability measurement on a global scale found that a large number of

methods which did consider the environmental aspect of sustainability principles, were designed and proposed for specific regions or countries. A number of the multi-criterion sustainability models failed to address the externalities, potential risks, and the long-term effects of unsustainable practices, and suffer from lack of explicitness and transparency. Furthermore, most of the analyzed models did not take into account the economic and socio-cultural dimensions of sustainable development, which make them unsuitable for the measurement of hotel building sustainability. As outcomes of carefully designed evaluation models, sustainably designed and built hotels have the capacity to positively influence all the local economic, environmental, and socio-cultural dimensions. But when the economic and socio-cultural dimensions are left out of a sustainability evaluation model, the model becomes open to criticism.

The sustainability measurement methods, which are based on only one aspect of sustainability, have been criticized for their limited scope, focusing on only one aspect cannot provide a comprehensive approach to the various dimensions of sustainability. For being most widely used, globally applicable, and most comprehensively addressing the multiple dimensions of sustainability, the LEED certification process was selected from among the other global methods as a basis for developing a new model. Despite selection, the LEED certification system does not cover the social-cultural dimension as well as other global methods. Therefore, based on the selected context conditions, this study found additional indicators (Chapter 6) which can evaluate the sustainability of socio-cultural and economic aspects of hotel buildings. The socio-cultural and economic results of the additional indicators create many different opportunities in terms of employment, education, local investment, et cetera.

This research highlighted the missing socio-cultural indicators in LEED and other methods and inserted new indicators in order to localize the model to meet Northern Cyprus' conditions. The proposed model for the hotels in Northern Cyprus considers the environmental, economic, and socio-cultural aspects of sustainability to aid the hotel industry in grappling with the numerous contextual problems, but mostly focused on priorities of the selected region;

- Limited natural resources
- Lack of employment opportunities for the local community
- High cost of energy
- High costs of investment and construction
- Lack of expertise and professionalism in the construction and hotel sectors
- Lack of economic responsibility.

Also, with the localized model, hoteliers seeking sustainability can bring about various positive changes in the local community by fostering increased social interaction between the local people and the foreign workers and tourists and by increasing local ownership of hotels through the creation of family-run businesses. Such a movement toward sustainability in the hotel industry has the potential to strike a balance in the economy of the country by decreasing the gap between it and richer nations. The findings of this study indicate that in the near future, hotels in Northern Cyprus could play a bigger role in the tourism industry and its development. Therefore, this study suggests allocating more investment and resources into a sustainable approach to tourism-sector growth since such investment can boost the economy of the local people and local communities and sustain it long-term.

Based on the findings of this study and according to the aim and goals of sustainable development and policy development, sustainable hotels can bring advantages to the regional life and local community by:

- Developing new and family-owned businesses,
- Increasing employment opportunities,
- Constructing new facilities and infrastructure,
- Developing the local economy, and
- Enhancing the quality of life for the local people and community.

As an example of the efficacy of the localized model, one hotel was evaluated and results compared to test the proposed model. According to the LEED standards, Salamis Bay Conti Resort Hotel in Northern Cyprus appears as an independent building that can work properly and sustainably during the summer and as a more sustainable hotel building in the winter. On the other hand, when the hotel was evaluated by localized model, the results changed and the hotel would be considered a less-sustainable building because of lacking in social-cultural and economic aspects. By improving the sustainability of hotels in Northern Cyprus, the tourism industry and the economy will improve, attracting more tourists to the island, and reducing impacts environmentally, economically, socially, and culturally. However, sustainability is not possible without a detailed, optimized plan and design approach.

Besides using the localized model for assessments of existing hotels, it can be used for evaluation in early stages of design, in new construction, and in designing renovations of hotels in Northern Cyprus. It can also contribute to the tourism sector and help to achieve sustainable development goals and policy development such as:

- Local employment in the tourism sector,
- Varied opportunities for employment of educated local people in the tourism sector (such as local investment, business ownership, et cetera),
- Education and skill of workers,
- Income of families,
- Local marketing (such as local workshops, local food production, and local restaurant, bars, snack bars, cafés),
- Local and social activities and events in the tourism sector,
- Community integration and collaboration,
- Economic responsibility in line with the standard economy of the selected country,
- Economic operation and construction,
- Economic rate of water and energy consumption in terms of environmental aspects, and
- Improved transportation facilities.

Finally, there are some recommendations for the localized model to work properly in Northern Cyprus' conditions. As a guideline to decision makers and the government, this model should be improved according to the existing conditions of the country and the hotel building under review. Some strategies to follow for achievement of the localized model certificate are:

- Ownership should be Turkish Cypriot or the owner should have a Turkish Cypriot partnership.
- Define a percentage of local people to work in the hotel following the regulation and role of a region.

- A hotel offering a discount to guests for their reduction in metered energy or water use can build more sustainability credit.
- Using or providing public transit for guest transportation helps the country in term of with job creation, income distribution, and decreased air pollution.
- Offerings of foods, goods, services, and facilities from local producers to hotel guests build socio-cultural awareness, reduces transportation expenses, and further supports the local economy.

## **7.2 Future Research**

Although the study took account of the various dimensions and aspects, it had some limitations. A number of other intervening factors could have had influence and should be studied. Despite the identification of various indicators and criteria, the degree or extent to which each indicator has an impact as well as their acceptable levels of existence should also be considered in the future studies. Later research can also adopt a case study approach by doing a discourse analysis on numerous forms of data such as articles, theses, and other relevant published materials. This approach is most likely to provide a better picture of the sustainability of hotels in the context of the study. For future application of this model in other studies, its reliability, validity, and applied viability should be taken into account. The model can also be adapted and used in other contexts to assess sustainability by reviewing local principles of sustainable development and considering contextual conditions.

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## **APPENDICES**

## Appendix A: Interview questions from Salamis Bay Conti Resort

### Hotel Part I

NO	General Description
1	Name & type of hotel (*)
2	Year of construction
3	Location
PART A : Features of the building	
Geographical area	
Climate conditions	
Hotel size and facilities	
Hotel star rating	
Capacity	
Other guest facilities	
PART B : Environment (Natural resource)	
Type of energy used (coal, LPG, natural gas, heavy oil, light wood chips or pellets etc.)	
Type of use (lighting, water heating, etc.)	
Unit (KWh, m3, etc.)	
The amount of yearly consumption of energy (electric, water, gas, etc.)	
The amount of per bed consumption of energy (electric, water, gas, etc.)	
Land use and ecology	
PART C : Economical	
Price of each bed	
Installed capacity	
The amount of monthly consumption of energy (electric, water, gas, etc.)	
The amount of yearly consumption of energy (electric, water, gas, etc.)	
PART D : Social	
Number of total workers	
Number of local workers	
Nationality of tourist	
Nationality of Ownership	

## **Appendix B: Interview questions from Salamis Bay Conti Resort**

### **Hotel Part II**

#### **Energy Efficiency**

1. Is energy efficient lighting in place in your property? Circle areas where they are in place: lobby; hallways; exit signs; public restrooms; offices; meeting rooms; outdoor areas; guestrooms. Comments:
2. Are occupancy sensors or timers used to control lighting in intermittent-use areas? Circle areas where they are used: meeting rooms; storage areas; public bathrooms; staff bathrooms. Comments:
3. Are programmable, thermostats with motion detectors used to control HVAC in guestrooms? Comments:

#### **Solid Waste Minimization**

1. Are refillable amenity dispensers used rather than individual bottles for bathroom amenities? Comments:
2. Has an active recycling program been established for front and back of house areas? Circle areas where it is in place: lobby; near vending machines; elevator landings; conference rooms; kitchen; front desk; front office; staff facilities; guestrooms. Circle all materials included in program: aluminum; plastic; steel; glass; cardboard; mixed paper; hangers; toner cartridges; food waste; batteries. Comments:
3. Has packaging been reduced by the following? Circle all that apply utilizing reusable versus disposable goods; purchasing food, beverages,

and supplies in bulk where possible; requiring vendors to take back pallets and crates. Comments:

### **CERES Air and Water Quality**

1. Is your hotel utilizing environmentally responsible cleaners (MSDS Health Hazard Rating 1 or less) throughout the property? Comments: 4b) Is air filtration in place /available for guestrooms? Comments:
2. Have low VOC (Volatile Organic Compound) materials been used on property? Circle low VOC products used: paint; adhesives; carpeting; air freshener. Comments:

### **Water Conservation**

1. Does your property offer a linen reuse option to multiple night guests? Circle: towels; sheets. Comments:
2. Does your property use water-conserving fixtures? Circle those that are used: 1.5 gallons per minute (gpm) faucet aerators; 2.5 gpm showerheads; 1.6 gallons per flush toilets. Comments:
3. Does the housekeeping and engineering department have an active system to detect and repair leaking toilets, faucets and showerheads? Comments:  
Environmental Purchasing
4. Does your property use paper products bleached without chlorine and made with the following minimum post-consumer recycled content? Circle all that apply: office paper 30%; glossy printed material 10%; bath tissue 50%; facial tissue 20%; napkins and paper towels 60%. Comments:
5. Does your property give preference to products, which are environmentally responsible? Circle all that apply: low toxicity; organic or locally grown/made? Comments:

6. Does your property give preference to the selection of environmentally responsible service providers? Circle those in use: renewable energy; integrated pest management; alternative fuel vehicles.



## **Appendix C: Interview questions from different department in tourism sector**

### **Problem and Views of Problem**

**Q:**

How would you evaluate the environmental, social-cultural and economic impacts on the hotel industry and tourism sector?

**Q:**

How would you evaluate the environmental, social-cultural and economic impacts on the sustainable hotel?

**Q:**

How about impact of sustainable hotel on sustainable tourism of existing conditions of Northern Cyprus?

**Q:**

What are the problems that you have identified considering these impacts?  
Please indicate any positive or negative impacts on the hotel industry.

**Q:**

What are the problems that the local community has identified considering these impacts?



Manolya Hotel	G	1	***	Riverside Premium H.V.	G	174	II.Sınıf T.K.	Villa Carparis Pansiyon	Ġ	1	Turistik Pansiyon
Onar H.V.	G	1	***					Vouni King Guest House	G	3	Turistik Pansiyon
Park Palace Hotel	G	8	***					Yalın Guest House	Ġ	2	Turistik Pansiyon
Port View Hotel	GM	1	***	Ambelia Village	G	70	uristik				
Saray Hotel	L	1	***	Balcı Plaza	Ġ	36	uristik				
The Olive Tree Hotel	G	2	***	Bare Hill Bung.	G	56	uristik	Noyan Mediterranean T. es	Ġ	102	Turistik Konut
The Ship Hotel	G	1	***	Citrus Tree Gardens	G	58	uristik	Pausa Properties T. House	G	6	Turistik Konut
Topset Hotel	G	1	***	Club Alda	G	28	uristik				
				Club Alibey H.V.	G	42	Turistik				
Anadol Hotel	G	6	**	Club Simena	G	104	uristik				
City Royal Hotel	L	1	**	Elausa Bungalow	Ġ	34	uristik				
Club Malibu Hotel	Ġ	8	**	Fairmont Cyprus Holiday V.	G	36	uristik	Kyrenia Palace Guest	G	1	Sınıflandırılmayan
Derya Çelebi Garden	Ġ	7	**	Fian Bungalow's	G	24	uristik	Lintons Club	G	2	Kapalı Tesis
Dorana Hotel	G	6	**	Five Fingers Bungalows	G	20	uristik				
Exotic Hotel	Ġ	4	**	Flipper's Tatil Köyü	G	40	uristik				
Hotel Mavi Kaplıca	Ġ	6	**	High Life Holiday	G	42	uristik				
Kaplıca Otel & Bung.	Ġ	1	**	Kocareis Bungalov	G	60	uristik				
Kaşgar Court	G	6	**	La Siesta H.V.	Ġ	40	uristik				
Lapida Hotel	G	4	**	Long Beach Club	Ġ	102	uristik				
Life Hotel	G	1	**	Merit Cyprus Gardens	Ġ	132	uristik				
Mountain View Hotel	G	9	**	Moon Rose T.K.	G	64	uristik				
Pine Bay Club	G	3	**	Riviera Beach Bung.&	G	104	uristik				
Portofino Hotel	GM	1	**	Rose Gardens	G	88	uristik				
G: GÖRNE GM: GAZİMAĞUSA Ġ: ĠSKELE L: LEFKOĞA GY: GÜZELYURT											