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A visitor-centric Approach to Socially Sustainable Museums: The Egyptian Geological Museum

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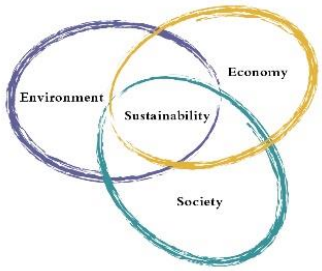

A visitor-centric Approach to Socially Sustainable Museums: The Egyptian Geological Museum

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Abstract

The greatest threat that museums are facing in different parts of the world, including Egypt, is that museums no longer have the capacity to sustain themselves and their activities. Therefore, museums are in need to change the way they function to become more sustainable. New models for museums seek to give power to its visitors. A Visitor-centric approach in museums ultimately focuses on providing a product and a service which is compatible with the needs and expectations of visitors. This research represents an initial step in analyzing the relationship between customer-satisfaction and the quality of the education service on one hand and the concept of social sustainability on the other. These are three areas through which museums are expected to achieve the intended development. The study aims to evaluate visitors' experience, which study also proposes a definition and measurement scale for social sustainability of the museum, and examines the relationship between visitors' experience and the level of social sustainability. The proposed framework was empirically tested on the Egyptian Geological museum. Semi-structured interviews were conducted with the museum's management team and staff that helped in constructing a perspective about the museum, gaining information about the museum's vision, mission, services, visitor numbers and demographics. A survey questionnaire was developed and administered to respondents among three hundred of the Egyptian Geological museum visitors. The survey was composed of three instruments: 1) the Servqual instrument, which measures the level of satisfaction of museum visitors with the quality of the service, including their experiences and perceptions; 2) the knowledge instrument, which assess the change a visitor knowledge; 3) and the subjective visitor perceptions of the social sustainability of the museum.

The study findings carry important implications for the museum's management, with specific actionable recommendations in key areas such as: strategic marketing, communication and service. Findings revealed that better the service quality as perceived by the customer, the greater the customer satisfaction with the core service. Findings showed that the better the quality of educational service as perceived by customers, the greater the museums social sustainability.

On the scientific level, the study is a preliminary attempt to deepen understanding and measurement of an important construct in the sustainability field, namely social sustainability. The study points the way toward a promising approach for fostering the sustainable development of museums by providing a conceptual framework that integrates the services marketing and sustainability literature. Finally, the study alludes to important policy implications that may inform government decisions regarding national museums.

Keywords: Service quality, Perceived Quality of Service, Customer Satisfaction with the Core Service, Educational Service, Museums Social Sustainability, Museums Experience, Museums Sustainable Development.

Chapter 1

Introduction

1.1. An Overview

"Few museums, outside nationals and any other rock starts of the tourist world, can continue to exist in their present form" (Black, 2012, p.1). Museums are in serious need for development to ensure their viability. They have been in a need for development in order to sustain their work and pass knowledge, culture and history through generations. The development in the function of museums and the change in customers' expectation and perceptions have posed huge threats to museums around the world, and have presented great opportunities as well (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994). The greatest threat is that museums do not sustain themselves. This would mean a great loss in culture and identity which could result in a cultural gaps between generations. On the other hand, working on current deficiencies is not only a way to survive present difficulties but it could result in extremely promising futures for museums and their audiences. A new model for a museum which is expected to survive the new challenging environment is the one that gives power to its visitors. Within such model, the experience as well as other activities provided by a museum are designed to primarily seek community participation and are means through which a two-dimensional relationship between a museum and its visitors is developed (Hooper-Greenhill, 1994). A Visitor-centric approach in museums ultimately focuses on providing a product and a service that are compatible with the needs and expectations of visitors. The targeted outcome of adopting a visitor-centric approach is a quality experience and a well thought educational service, which are expected to result in a satisfactory experience and a more socially sustainable museum.

1.2. Study Objectives

The purpose of the study is to present a comprehensive measurement model for assessing a museum visitor's experience through assessing customer-satisfaction with services and the effectiveness of the learning experience as well as evaluating the level of social sustainability. In addition, the study model aims to define and operationalize the construct of social sustainability in museums. The model was empirically tested on the Egyptian Geological museum.

1.3. Study Classification

This study includes model development and testing. The proposed model links between visitor's experience, which includes customer-satisfaction with services and the effectiveness of the learning experience, and the level of social sustainability of the organization. The model was empirically tested on the Egyptian Geological museum in order to evaluate the museum's current status with regard to provided services and to assess its social sustainability. Data collection included: 1) Interviews with the museum management team and staff, 2) self-reported surveys filled by museums visitors.

1.4. Research Questions

1.4.1 Major Research Questions (MjRQ)

MjRQ1: What are the expectations of the museum visitors regarding the quality of the museum's services?

MjRQ2: To what extent are visitors expectations met?

MjRQ3: To what extent do the visitor perceptions of service quality influence visitor satisfaction with the museum experience?

MjRQ4: To what extent does the museum tour add to the visitor knowledge?

MjRQ5: How do contextual factors such as the visitor's motivation, prior interest and control over the visit affect the extent of knowledge acquired from the visit?

MjRQ6: What is the meaning of social sustainability for museums?

MjRQ7: To what extent does the visitor experience determine the museum's social sustainability?

1.4.2. Minor Research Questions (MinRQ)

MinRQ1: To what extent does the perceived quality of services affect customer satisfaction?

MinRQ2: Does visitor's perceptions vary according visitor's group type?

MinRQ3: Does visitor's perceptions vary according visitor's age group?

MinRQ4: Does the level of visitors' satisfaction vary according to visitor's group type?

MinRQ5: Does the level of visitors' satisfaction vary according to visitor's age group?

MinRQ6: Is there a relation between acquired knowledge and visitor's prior motivation to make a visit?

MinRQ8: Is there a relation between acquired knowledge and visitor's prior interests?

MinRQ9: To what extent does visitors control over visit affects change in knowledge?

MinRQ10: Does acquired knowledge vary according to visitor's group type?

MinRQ11: Does acquired knowledge vary according to visitor's group type?

MinRQ12: Does the perceived quality of the educational service vary according to visitor's age group?

MinRQ13: Does the perceived quality of the educational service vary according to visitor's group type?

1.5. Research Assumptions

- Participants did objectively answer the survey questions by explaining to them the objective of the survey.
- The surveyed sample represents the visitors of the Egyptian Geological.

1.6. The Theoretical Framework

The purpose of the theoretical framework is threefold: to evaluate visitors' experience, which includes the level of visitors' satisfaction with core services and the learning experience; to measure the level of social sustainability of the museum; and to examine the relationship between visitors' experience and the level of social sustainability currently achieved by the museum. The model is presented in three constructs; the three constructs are satisfaction, learning and social sustainability. The Servqual instrument is used to operationalize the construct of satisfaction, and the social sustainability instrument is used to operationalize the construct of social sustainability. Both models are operationalized from the subjective experience of the museum visitor, while the knowledge instrument is used to operationalize the construct of learning.

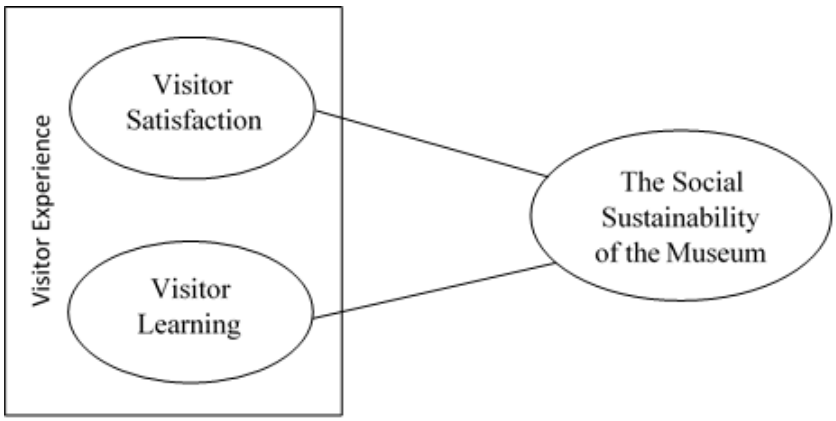

Figure 1. 1: The Conceptual Model. Visitor Experience and Social Sustainability of the Museum. Source: author.

1.7. Research Methodology

1.7.1. Overall Design Strategy

The design of the study was divided into four phases: 1) Semi structured interviews with museum's general manager, executive manager and first line staff were conducted to gather information about the museum's services and activities; 2) A survey questionnaire was developed based on the construct of satisfaction, the construct of learning and the construct of social sustainability; 3) Study sample was specified; and 4) Data was collected using the developed surveys.

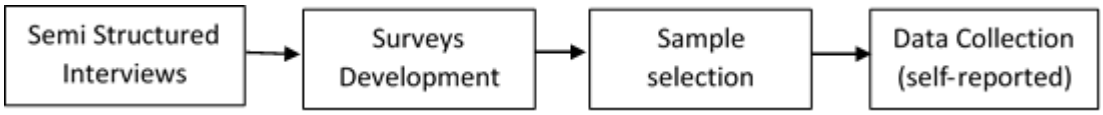

Figure 1. 2: Overall Design Strategy. Source: author

1.7.2. Study Population

The research model was empirically tested on the Egyptian Geological museum. The method for selecting participants for the study was designed to be unbiased and representative of the museum visitors. For a representative sample size of the museum visitors, around 300 visitors were approached and a total of 289 responses were valid for analysis.

1.8. Research Limitations

- The sample is restricted to visitors of the Egyptian Geological Museum.
- One of the instruments used to assess the educational experience in the museum, the knowledge instrument, could have had higher reliability if other measurement tool were incorporated during the data collection process, such as observation, tracking and mind maps. However, this would have complicated the data collection process.

- The reliability of the Servqual instrument high, while the reliability of the knowledge instrument is moderate, due to the aforementioned limitation of data collection tools. The reliability for social sustainability instrument is moderate. This construct should be developed.

1.9. Study contribution

This study offers two main contributions to museums sustainability literature: a comprehensive framework for museums evaluation, which includes assessment of expectations, for service quality from the subjective experience of the visitor, the effectiveness of the educational service, and assessment for museum social sustainability.

This methodology could be used in future research studies that will test the proposed model in other museums in Egypt and the Middle East. Another contribution is the empirical work conducted in the Egyptian Geological museum through which the service quality, the effectiveness of the educational service as well as the level of social sustainability were evaluated, which will help in future developments for the museum. The study Findings will help managers to develop a new perspective on how to conduct a development approach that increase the level of social sustainability of museums and provide better services that meets the needs of the visitors.

The proposed study offers contributions to academia and business. From an academic standpoint, the recommended model represents a creative research design which is expected to provide a guide for future research studies. The study contributions to the nascent literature on social sustainability which is still in its early development. From a business standpoint, the proposed evaluation model is to be used by museum management unit for evaluation and development.

1.10. Thesis Structure

Chapter 1 is an introduction to the thesis research. It includes an overview of the research, research problem, research objective, the theoretical framework of the research, the research methodology and data analysis method. The theoretical framework section includes major and minor research questions, research limitation and assumptions. The research methodology section includes the adopted research method and sampling method.

Chapter 2 constitutes the literature which supports the research study and the developed research framework were. The chapter covers the current situation of difficulty which museums are in, its emergence and development during past decades. It also includes different approaches for development which were a doped previously for development purposes and it presents the study framework developed from the literature. It includes all theories, empirical work and studies which supports research problem, arguments and research methodology for museums development and sustainability.

Chapter 3 describes the research framework and methodology. The theoretical framework development was explained in details. Research method, research questions, research hypothesis, sampling method and data analysis method were explained thoroughly.

Chapter 4 presents the data analysis and the results of the study. It presents detailed descriptive and inferential analysis of the data collected.

Chapter 5 is the conclusion chapter. It includes research finding, discussion and research recommendations for the development of the Egyptian Geological museum. Also includes insights for future researchers.

Chapter: 2

Literature Review

2.1. Introduction

Museums have been in need for development in order to sustain their work and pass knowledge, culture and history through generations. Various development plans which support the sustainable development of museums were adopted by museums around the world. The most promising approaches that have resulted in a sustainable development were ones that were primarily based on changing the focus of the institution from looking inward to the collection to looking outwards to visitors, namely approaches which were visitor-centric (Hooper-Greenhill, 1994). The success of museums in following such approaches is to be measured using multiple tools and indicators adopted from different fields. This study focuses on a major indicator of a positive relation between museums and visitors, namely social sustainability of museums. Social sustainability is an indicator of how positive and sustainable the relationship between museums and their audience is and to what extent society supports the museum's existence and continuity. The scope of the study is limited to one facet of sustainability, namely social sustainability, as it was identified as a relevant starting point to a more comprehensive approach to exploring the sustainability of museums. The visitor-centric approach incorporates key tools to be considered in a museum for comprehensive development to take place, tools which are expected to positively affect the relationship with visitors, boost a museum's image and increase its social sustainability level. Marketing is one of the key tools recommended to be introduced in museums for their development. Advanced marketing concepts are to be adopted in museums; visitors' research, service evaluation, customized communication channels and publicity are some marketing concepts that are essential for the proposed model for development. The educational

strategy is the second tool in the development strategy. Museums need to research their current educational strategies and investigate how effective and advanced they currently are. The educational strategy should be rich and varied to suit visitors of different age groups, different educational and social backgrounds and cultures. The study aims to firstly research the Egyptian Geological museum level of social sustainability. Secondly, the study researches the museum to know about their expectations of the visit and their perceptions about the museum's services, an approach developed from the marketing literature (Nowacki, 2005; Tobelem, 1998). Thirdly, the study aims to evaluate the educational service and measure the change in visitors' knowledge after the visit, an such approach developed from the contextual model for learning in a free environment (J. H. Falk & Dierking, 2012; J. Falk & Storksdieck, 2005).

2.2. Museums and the Need for Development

In the twenty-first century many museums in different parts of the world are facing great difficulties to sustain a healthy flow of visitors and to develop new audiences (Black, 2012; J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Lang et al., 2006b; Marstine, 2006)."Few museums, outside nationals and any other rock starts of the tourist world, can continue to exist in their present form" (Black 2012; p.1). Museums are in serious need for development to ensure their viability. Factors that have contributed to the challenges museums are facing in sustaining themselves, trails for adaptation to changes and promising approaches for development are to be discussed in this chapter. This chapter reviews the factors that have a negative impact on museums functionality and survey the most prominent directions for adaptations for adaptation and development.

Several factors have contributed to the challenges museums have been facing during last decades. Two key factors are the change in museums' functions and the change in audience demographics during the past decades. The change in functions was primarily forced by the fact

that museums were no longer limited to researchers, upper socioeconomic classes and well-educated community, but museums have become for everyone (Black, 2012; J. H. Falk & Dierking, 2012). Visitors of significantly varied demographic characteristics targeting museums different reasons. As classified by John Falk, in the twenty-first century, there are seven categories that visitors fall in, namely, explorers, facilitators, professionals, experience seekers, rechargers, respectful pilgrims and affinity seeker (J. H. Falk & Dierking, 2012). What could be inferred from studying the seven visitors' categories is that visitors are no longer targeting museums only for learning about or researching collections or researching collections, but visiting museums has become a choice for satisfying various needs, such as leisure and social interaction.

Although the expansion in demographic profile of museum visitors peaked in developed countries relative to developing countries, the change is still noticeable in developing countries as well (J. H. Falk & Dierking, 2012; Lang et al., 2006b). UK is one of the countries that have experienced a significant increase in museum visitor numbers in the 1990s and 2000s. For example, between 2002 and 2003 there has been 36% increase in the number people in low-income groups who were visiting national museums in the UK. An increasing number of minorities and lower-income people are visiting museums.

The change in the life styles and culture in USA, UK and Australia and recently in developing countries has resulted in a real change of how people spend their free-time. "Work, consumption, learning, and leisure have become tightly interwoven" (Falk and Dierking 2012; p.38). "In the twenty-first century, leisure experience are increasingly about self-actualization and free-choice learning" (Falk and Dierking 2012; p.44). Individuals and visiting groups of families and friends aspire to have an interesting experience where they gain knowledge, enjoy

social interaction within their group and with other visiting groups and have a unique experience which happens to be limited to such cultural institutions, educational and leisure environments.

The cultural shift has affected how museums are currently perceived as institutions that could satisfy educational and leisure needs and this such change in perspective was the main stimulus for museums to develop their function. As stated by Falk & Dierking 2012, "The perception of a museum as an institution worthy of visiting represents a particular culturally developed vantage point" (p.32). Therefore, the change in museums' function has become inevitable. "Museums, in different parts of the world, are changing from being static storehouses for artifacts into active learning environments for people" (Hooper-Greenhill 1994; p.1). The old museum model was limited to collecting, preserving and displaying artifacts, while the new model is more challenging with the addition of a new dimension and responsibility to communicate knowledge to wider society, to people from different cultural, educational backgrounds and social levels who are seeking museums for education and leisure (Black, 2012; J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Lang et al., 2006b; Marstine, 2006).

The introduction of the information age in the early 90s has remarkably influenced the production and dissemination of knowledge, including the knowledge transmitted in museums. Museums had to change significantly in order to cope with this development. New ways of communicating with the audience have emerged and the need for interactive and engaging exhibitions was at the heart of the adaptation plans. The museum experience has been shifting from a visual passive experience to a physical active one (Hooper-Greenhill, 1994). In addition, museum audiences had higher expectations regarding the educational service. They are expecting a more personalized experience with clearly identified knowledge gains (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Lang et al., 2006b), to the extent that "when this rapid and explicit benefit is not available, museums are not popular" (Hooper-Greenhill 1994; p.8).

The rapid change in the leisure industry is yet another key factor which has contributed to the difficulty in sustaining museums (Black, 2012; J. H. Falk & Dierking, 2012). With a continuous increase in the number of leisure venues, including shopping malls, sports facilities and clubs, all competing for individuals' limited free time, visitors expectations become higher, and museums adoptability has become more challenging. While "…museums today are unquestionably seen as important leisure venues" (J. H. Falk & Dierking, 2012, p.41), it is evident that the more entertaining and rich the experience, the greater the museums ability to attract visitors from different educational backgrounds and social levels. Museums are becoming in competition with a huge number of venues which are rapidly growing and developing and growing which directly affects the form of service they provide.

Another significant constraint which affected museums worldwide is financing. Museums face great financial constraints following cuts in state funding. Since museums are governmental and not-for-profit organizations, it is both the government and the institution's responsibility to overcome such difficulty. The change in cultural policy in UK has helped museums to overcome financing issues (Lang, Reeve, & Woollard, 2006a). UK cultural policy puts museums as a priority in development by providing reasonable and sustainable funds to all museums in the country (Tobelem, 1998). In other countries where a general policy for development is not passed to save museums, museums must find other ways to generate supplementary funds to support their existence and continuity (Tobelem, 1998). Whether museums are supported with external funds or are experiencing cuts, museums are partially responsible to sustain themselves financially.

From strategic perspective it is clear that change in the visitors' demographics profile in museums, change in audience culture and needs, the introduction of knowledge age, changes in museums external environment and financial constraints on museums, all necessitated change in

museums functions. Indeed, those forces negatively affected the sustainability of museums. Adoption plans should be developed based of the intensity of the different forces, which are expected to vary between different countries and contexts. Museums are in need for development models that suit the multiple changes which occurred in the past three decades to enhance their viability.

The development in museums' function, the change in customers' expectation and economic problems have posed huge threats to museums, and have presented great opportunities as well. The greatest threat is that museums do not sustain themselves. This would mean a great loss in history, culture and identity which could result in cultural and historical gaps between generations. On the other hand, working on current deficiencies is not only a way to survive present difficulties, but it could result in an extremely promising future for museums and their audience (Black, 2012; J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Lang et al., 2006b; Marstine, 2006). Better models of museums which have an external focus and which have a constructive relationship with the public are needed (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Tobelem, 1998).

Since 1970, theorists in education, environmental physiology, sociology and marketing have proposed various approaches for the development of museums (Bitgood, 2002). Adaptation plans were developed by governments and museums in different parts of the world. Tobelem (1998) argue that museums have gone through several stages in order to adapt to outer forces of change. First the focus was internal because museum directors were only focusing on the collection with no regard to the visiting public. As a way of preliminary adaptation, more temporary exhibitions, educational services, research and more publications were offered, yet the focus was still internal to a great extent. It was evident to curators and museums professionals that they had to communicate their effort to the public, so they started using a push strategy,

which means they started to make people more aware of their existence and this was considered a third stage of museum adaptation. Despite these developments, Hooper (1994) still believe that those phases of development were not enough to support museums development.

One of the most promising and successful approaches calling for museums to alter their focus from looking inward to their collection to looking outward to their visitors, is the visitor-centric perspective (Hooper-Greenhill, 1994). The visitor-centric approach in museums is ultimately focusing on providing a product or a service that is compatible with the needs and expectations of visitors. The targeted outcome of adopting a visitor-centric approach is a quality service and a well thought educational service which is to be intelligently communicated to visitors. A business-like approach investigating visitors' needs is the first step in the proposed approach for the sustainable development of museums. By meeting visitor's expectations, visitors are more satisfied, encouraged to visit museums more than once and are more receptive to the knowledge provided within museums context. Through adopting a visitor-centric approach, museums are expected to have a greater power of attraction and make better contribution to community development and eventually a sustainable future.

2.3. Rise of Visitor-centric Approach: Institution Power Vs. Customer Power

The relationship between museums and their audience has undergone dramatic shifts during the past decades. In 1960, museums had old models which were primarily concerned with collecting, preserving and displaying of collections. Such models are one-dimensional in terms of relationship with visiting communities. Museum professionals did not work beyond collection display to make the collection more accessible to their visitors. For example, they didn't think of developing educational and communication strategies, therefore, the visitors were more like spectators to collections in display (Lang et al., 2006b; Tobelem, 1998). "Museum staff saw their public as a reflection of themselves." (Lang, Reeve, and Woollard 2006; p.5) Museum staff

expected that audience were knowledgeable enough to know about museum collections and that visitors did not need more than the minutes they spent looking at displays, while efforts beyond that were considered an individual's responsibility to educate oneself.

The first shift encountered was in the late twentieth century while more people were visiting museums; more audience with different educational backgrounds and social levels who were not necessarily knowledgeable about the displays were targeting museums. With the expansion in visitors' demographics in addition to other forces that were mentioned previously, museum professionals, especially educators, far-sighted curators and designers, started to realize that they had to make the collection accessible to the many diverse groups of visitors (Lang et al., 2006b). This type of thinking is still limited to some countries such as UK, USA and Australia (Hooper-Greenhill, 1994). Such approach resulted in a clear shift in the type of relationship museums have with their audience, as audience started to influence how the museum worked.

Postmodern museums 'post-museums' is a term that was given by theorist Eliean Hooper-Greenhill in 2004 to describe how museums ought to be in the twenty-first century (Marstine, 2006). The most reflective definition for the post-museum is a museum that "actively seeks to share power with the communities it serves," (Marstine 2006; p19). Hooper is arguing that the new model of museums, which is expected to survive the more challenging environment is the one that gives power to its visitors. Staff of post-museums are equally concerned with the educational and communication strategies and the collection; in other words, the collection is no longer their only and ultimate concern (Hooper-Greenhill, 1994). Post-modern museums approach was proposed as a model that balances museums internal needs and focuses with visitors' needs and aspirations which is expected to help the development and sustainability of museums.

When investigating the type of relationship a post-museum has with its visitors, it is simple to identify the two-dimensional relationship. "Instead of transmitting knowledge to an essentialized mass audience, the post-museum listens and responds sensitively as it encourages diverse groups to become active participants in museum discourse," (Marstine 2006; p.19). The experience as well as other activities provide by a museum is designed to primarily seek community participation; "volunteering, acting as trustees, attending events or providing information on the collections as experts and enthusiasts" are the means through which a two-dimensional relationship between a museum and its visitors is developed (Lang et al. 2006; p.5). Developing a two-way relationship with audience gives them the power to have their needs and aspirations communicated and taken care of and museums to share their power and not to work in isolation from targeted communities.

2.4. Museum Sustainability and the Role of Visitor Studies

2.4.1. Museums and the concept of Sustainable Development

The concept of sustainable development emerged in the 1960s, and it fundamentally emerged as a practical response against environmental degradation. Other aspects of sustainability were presented after that, namely economic and social sustainability (McKenzie, 2004). The general definition of sustainability agreed upon is "…meeting the needs of the present without compromising the ability of future generations to meet their own needs"(United Nation 1987; p.9). This definition mainly focuses on the concept of effective resource management. Another more informative definition is that sustainability "…recognizes the importance of efficient and ethical resource management in all forms, environmental resources, social capital and economical resources, especially those resources derived from the natural world" (Davies, Maurice, and Wilkinson 2009; p.13). Theoretically the triple bottom-line,

environmental, economic and social aspects are widely accepted to be the three areas which should be worked-out simultaneously to reach sustainable development.

Practically it was found that achieving sustainability does not necessarily mean equally and simultaneously working on the triple-bottom line. As stated by McKenzie, "The great stumbling block when defining sustainability is that the context in which the definition is applied is more important than its wording" (p.5). Practitioners of sustainability in different organizations are encouraged to use the general concept of sustainability as a guideline then determine the most pressing aspect to be primarily considered in the action plan. The approach for sustainable development is to be employed based on the context in which it is being employed.

In museums in a number of developed countries, the concept of sustainable development has been adopted since 2004 (Davies et al., 2009). Museum managers and decision makers in museums have been struggling to overcome difficulties which have been increasing as a result of several changes in visitors' numbers, demographics, education and the change in the leisure industry (Black, 2012; Davies et al., 2009; J. H. Falk & Dierking, 2012; Friedman, 2007; Hooper-Greenhill, 1994; Lang et al., 2006b; Marstine, 2006). Since the early 90s, elements of sustainable development were being investigated in museums as to come up with practical frameworks that are suitable and applicable in a museum context and which are expected to support museum sustainable development.

Investigating the triple-bottom line of sustainability was a basic approach to understanding how the concept is deployed in museums. Environmental sustainability requires a responsible performance toward the environment in the extraction of artifacts and their preservation, energy consumption and waste generation. Economical sustainability puts emphasis on sustaining museum by granting funds, good allocation and control of gained funds and other capital

resources. Social sustainability, which is concerned with community development as the main target of museums (Davies et al., 2009). This approach for sustainable development was proposed by the Museums Association (MA) in 2008. Gaining a general understanding of the triple-bottom line fields of sustainability in a museum context helps museums' professionals to have a holistic view of their situation which is considered a strong starting point for a promising development strategy.

Other approaches to sustainability in museums were proposed by practitioners in UK, USA and Australia. In Bristol, England in June 2001 a group of museum leaders came together to explore the challenge of sustainability for science museum. "The Bristol participants came to agree that there are actually three distinct but related aspects of sustainability in science museums, and the three are crucial," namely, financial, intellectual and social sustainability (Friedman 2007; p.4). As stated by Friedman, "Intellectual sustainability involves the institution immersion in the field it treats" (p.5). The extent to which the staff are updated with latest news, innovations and developments in the field they treat. Friedman (2007) Does not see economic sustainability as a pressing need as most museums because a governmental and not-for-profit institutions where economic sustainability is beyond the scope of work. Economic sustainability of the museum was seen to depend on general policy efforts to sustain a reasonable flow of income to museums.

Unfortunately, museums are considered behind in adopting the emerged concepts of sustainability despite the great potential which they hold as cultural and informal educational hubs. Most conventional museums are not engaged in sustainable development that if considered is expected to alter their situation to run more efficiently and effectively (Black, 2012; Davies et al., 2009; Hooper-Greenhill, 1994). Some countries have achieved some progress in developing systems of their museums to run more sustainably; UK, USA, as well as Australia are top

countries where one finds museums which have integrated sustainability in their organizations. Most efforts that took place to modify or achieve an advancement regarding the performance of the museums in developing countries were conducted through cultural development projects by the United Nations with the contribution of the international community of museums 'ICOM' to support museums to modify their working strategy (Boylan, 2004). Indeed, a stable future for any running museum should achieve the balance between all aspects which are identified to be the most important to achieve a sustainable development.

2.4.2. Museum Evaluation and Visitor Research for Museums Development

In 1970 museum professionals in the United States were the first to develop practical approaches for the post-museum concept. Museum professionals have adopted two strategies which they believe were the best to address and develop museums and their relationship with audience; museum evaluation and visitor-research are the main areas of research through which the post-museum concept is expected to rise. Evaluation is usually the type of research that took place for both short-term and long-term gains, such as developing a new exhibit, improvements for ongoing exhibit or receiving funds for near future developments. Visitor-research is an ongoing process which a museum employs to gain information about audience to know their taste, preferences, and frustrations with the target to develop a framework for long-term development (Hooper-Greenhill, 1994; Screven, 1990).

The most significant practice of evaluation took place in Britain. One of the pioneer museums that applied exhibit evaluation is the Natural History Museum (Hooper-Greenhill, 1994). In 1970 the Natural History Museum developed a long-term plan for the development of its permanent exhibition. The focus was given to the educational strategy which was used to better communicate the knowledge about the collection to visitors. "Exhibitions were to be designed so that the emphasis was on the concepts to be communicated rather than on objects per

se, and exhibitions were to be presented in such a way that both the intellectual and physical structures were made very plain to the exhibition visitors" (Hooper-Greenhill 1994; p.72). The evaluation process after initial development showed that too much criticism was given to the displays at that time, yet although not all visitors were knowledgeable about science displays, there was a general understanding of the exhibit. The evaluation process which started in 1970 by interviewing visitors, collecting surveys, observing visitors, and tracking studies with the target of making the museum environment more accessible and satisfying had significantly affected the development of forward exhibits to be more satisfactory (Hooper-Greenhill, 1994; Screven, 1990). The evaluation of museums turned out to be a very successful tool in their development.

The most significant work that has been done in the field of visitor-research was presented by Visitor Studies Association. The Association was established in 1991, although the work actually started 1986. The association started organizing an annual conference since 1988 and published a newsletter for visitor behavior from 1986 to 1997 and another for visitor studies from 1998 to present (Bitgood, 2002). The association's work emphasizes the importance of audience research and study for museums development. Visitor-research was proved to be a very promising tool in building a strong relationship with visitors. Both evaluation of museums and visitor-research are considered the most powerful tools for developing museums through investigating, documenting and developing a constructive relationship with visitors.

Munley presented a conceptual framework for both researching museums' audience and evaluating museums and galleries (Hooper-Greenhill, 1994). The framework suggests to gain useful information that is essential for development purposes. The first purpose of the research approach is to come up with a clear justification of the value of the institution, while the second purpose is to gather information about current visitors to support long-term planning. Both

purposes require marketing and demographic studies. The third purpose is to get assistance in the formulation of new exhibitions, and the fourth is to assess the effectiveness of existing exhibitions and programs; those reasons require evaluation work. The fifth purpose is to reach a general understanding of how the audience use museums, which requires on-going research. Munley's framework put emphasis on four areas that should be considered simultaneously in museum development. Audience demographics, marketing strategy, educational experience in the museum and museums evaluation are four intersected fields for the sustainable development of museums. Emergence and employment of those areas in museum are to be discussed in the next sections.

2.5. Audience Demographics: Who Is Visiting and Who Is Not Visiting, in the twenty-first century?

Firstly, there are some identified reasons which make an individual decide to visit a museum. Studies suggest that the decision to visit a museum is primarily dependent on the confluence of two main streams: "the individual's (group's) identity-related needs and past leisure behavior" (Falk and Dierking 2012; p.42). The identity-related need is a personal need that should be met such as the need to have an entertaining experience which the individual perceives as fulfilling, while the other stream is the personal belief in the means with which this need could possibly be met. Also making decisions about how to spend free-time, individuals generally consider the relative cost of time and money, and the benefits which will be gained through any leisure activity or which are expected to meet the individual's (group's) needs (J. H. Falk & Dierking, 2012). Identity-related needs, past leisure behavior and relative cost of time, money and benefits are the main elements which affect an individual's decision to make any leisure activity.

In the case of museums as a destination of leisure, studies suggest that the price factor is not a main determinant of who does or does not visit a museum (J. H. Falk & Dierking, 2012). This is due to the fact that worldwide a museum visit cost is not considered a limitation for many middle class individuals, who are identified as the most visiting community (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Lang et al., 2006b). However, working on the visit cost to make it less, or free as in the UK, could positively affect the number of visitors (J. H. Falk & Dierking, 2012). "For most people today, the major "cost" of a museum visit is not money but time" (Falk and Dierking 2012; p.42).

When people decide to visit museums or any other leisure destinations, they will think about the time it takes them to reach that destination and the time which they will spend there to determine the value for time and make the decision of whether to go or not to go. Indeed accessibility and convenience are main determinants of museums-visit leisure decision. This is a very general rule that is applied for all museums worldwide, for foreigners as well as local visitors.

Museums' visitors weigh the cost, basically the cost of time, against the value gained throughout the leisure activity. Values and benefits are self-referential concepts, which means that they differ from one person to another. How comfortable is the environment? How entertaining is the experience? How valuable is the knowledge expected to be gained throughout the visit? Is the environment of the museum a good place for social gatherings and interactions? Such values and benefits are considered a major determinant of the museums-visit leisure decision (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Lang et al., 2006b). The relative cost of time and benefits or values is one of the main elements which affects individual's decision to visit a museum.

The different value-reasons behind a museum visit is usually a combination of two or more reasons: social related reasons, recreational reasons, learning reasons and/or professional reasons. The separation between leisure and learning used to be easily identified in the twentieth century, but currently the separation is no-longer there. The activities that attract general society involves leisure an learning (J. H. Falk & Dierking, 2012). Nowadays even if people target museums for entertainment, learning is probably on their list of as a visit-motivation. On the other hand, individuals who target a museum to learn are expecting to have a good-time there and to meet other leisure related needs. Individual's expectations of a museum visit are based on each identity-related values and needs of how the visit should be like to be fulfilling. Identity-related needs are a key determinant of museum-visit leisure decision.

Secondly, investigating non-visitors phenomena is as important as investigating identity-related motivations of visitors, for the proposed approach of the development of museums. Much research conducted in different parts of the world through which the reasons of people not visiting museums is identified (J. H. Falk & Dierking, 2012). The phenomena of non-visitors were primarily attributed to ethnicity, such as the case in the United States; social class, such as the case in the UK; and socioeconomic terms in other world countries. The studies assume that demographics are the main reasons behind the non-visitors phenomena (J. H. Falk & Dierking, 2012). Falk is arguing that other reasons are expected to have an equal contribution to the phenomena.

In the early 1990s, Kelly conducted a study to investigate why African Americans were under represented as museum visitors at the United States. He started his study with a hypothesis that race or ethnicity was the main reason behind the phenomenon. The results of the study disqualified the main hypothesis of the study as the causative factor of the phenomenon. Other factors were found to be equally contributing to such phenomena. Attitudes related to how

African Americans spend free-time were the main reasons for not targeting museums, which act was attributed to personal and family history. The research results suggested that "African Americans who grew up in families that went to places like museums were significantly more likely as adults to visit museums" (Falk and Dierking 2012; p.54).

Furthermore, studies show that the same rule applies to education history. The 2008 U.S. National survey showed that the likelihood of a university graduate attending museums increases by 50 percent with someone who participated in art activities during grade school (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994). "The current realities of who does and does not visit museums is arguably best explained by starting with issues of leisure and personal history" (p.55) while other factors of socioeconomic and ethnicity have a little contribution to it (Falk and Dierking 2012). Falk's research reflects the fact that identity- related needs of entertainment and learning contribute to both visiting and non-visiting phenomena.

The previous analysis for visiting or non-visiting communities is directly related to what was discussed before with regard to the factors contributing to making a museum-visit decision. The desire to satisfy an individual's (group's) identity-related need, the perception of a museum as a destination where the need could possibly be met and the relative cost of time and benefits are the main causal factors that determine the decision to visit. Inferences about who is visiting museums and who is not supports argument about the very wide base of visitors' demographics, and that museums are visit by everyone, all individuals who see the museums as a destination to satisfy learning and leisure needs.

2.6. Museums and Strategic Marketing

2.6.1. The Introduction of Marketing in Museums

When the concept of a postmodern museum, a museum that "actively seeks to share power with the communities it serves," (Marstine 2006; p.19), emerged at the beginning of 21st

century, marketing was one of the important functions to be used in museums to achieve this ideal. In order to justify the introduction of marketing in museums, marketing has to be precisely defined. Marketing has encountered significant transformations during the past decades (Kotler & Andreasen, 1996). Traditionally, marketing was seen as the technique which a business employs to sell its products or services to visitors mainly by means of advertising. At those early stages until 1980s, the business itself was at the center of marketing operations aiming to push as many products or services as possible to a maximum number of consumers (Kotler & Andreasen, 1996; Tobelem, 1998). The transformation in marketing concepts brought the consumers to the center of its operations (Kotler & Andreasen, 1996; Tobelem, 1998). Analyzing consumers' needs, aspirations, characteristics and perceptions with an aim to create a product or a service that suits those needs and meets aspirations became at the heart of marketing processes. That is when marketing became attractive to the world of public service and non-profit institutions, including museums (Tobelem, 1998). Newly emerged marketing concepts were relevant to post-modern museums.

2.6.2. Strategic Marketing for Post Modern Museums

There are various reasons for the use of marketing in post-modern museums. Tobelem 1998 stated that the employment of marketing strategies in museums is justified with the existence of financial constraints that museums experience. Museums need to have contemporary communication channels such as direct marketing and publicity to better manage their services. Using marketing techniques is a promising approach during financial difficulties; through establishing better communication with visitors and using varied marketing channels that suit the target customer, marketing is seen as a technique to help in generating more revenues and better managing a business. Museums in USA, UK and Canada have increased their publicity budgets and have given greater interest in visitor studies. In the United States the marketing employment

in museums is more pressing as it is not only seen as a way to better communicate services but also considered an approach to overcome financial constraints through internal activities of fundraising and generating different sources of revenues (Tobelem, 1998).

Additionally, marketing provides a theoretical and practical tool for an analysis of the public which is crucial for the institution to help identify objectives and accomplish its mission (Kotler & Andreasen, 1996; Tobelem, 1998). While museums started to face a lot of complexity as a result of their growth, change in function and new demographics in their visitor's profile, market research helps museums to analyze the situation and better understand their position within the environment. Marketing is used as a tool for analysis and a means for action that allows museums to achieve their objectives; by listening closely and consistently to visitors' needs, undertaking research on customers' satisfaction, learning about visitors' preferences and perceptions on services and accordingly modifying services, museums are offering more satisfying experiences. For the sustainability of a development using market research, museums staff are to be trained to do this type of analysis consistently (Boylan, 2004; Hooper-Greenhill, 1994; Kotler & Andreasen, 1996; Tobelem, 1998).

One main factor which nominates marketing to be of crucial importance in museums is the competitive environment that museums have joined. Currently, museums compete with different leisure venues, which has made their work a lot more challenging. The rapid growth in leisure industry has affected museums significantly (Black, 2012; J. H. Falk & Dierking, 2012). Marketing is used as a tool which helps museums to build better connections with potential customers, by offering experiences that look attractive enough to be targeted by visitors over other leisure venues (Tobelem, 1998). Not only do museums compete against other leisure venues, but also there is an ongoing competition between different cultural institutions (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994; Tobelem, 1998). Museums need to justify their

worth to the public and be able to have better financing whether from the public sector or private donors.

Indeed, marketing incorporation in modern museums remarkably supports their development. Marketing is a promising tool to be used in museums to help them better connect with visiting and non-visiting public, overcome reduction in financing and highly competitive environment and help the institution to develop its management. Evidently, marketing use in modern museums is essential for their survival and success.

2.7. Museums and the Educational Strategy

Marketing could not be introduced in museums solely with no regard to the scholastic and educational mission of the museums. The educational strategy in post-modern museums is as important as developing a new marketing strategy. The educational mission of museums is another important factor which should be investigated thoroughly for the development of museums.

Museums are fundamentally educational venues that offer people an environment to add to the reservoir of knowledge (J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994). Entertainment, on the other hand, is provided within museums basically to facilitate the learning experience and make it as effective as possible. Therefore, one important aspect in museums sustainable development, in addition to researching the visitors to learn about their expectation and perception is evaluating the value that museums contribute to the community of educating the public.

Investigating the quality of educational service in museums is a complex issue. The complexity incarnates from the fact that the value gained through a museum visit is difficult to measure because it is an outcome of the whole process that took place inside a museum. It is

fundamentally the real change in visitors' knowledge and, from a broader perspective, it ought to include any new skill that was gained during the visit (Hooper-Greenhill, 1994).

2.7.1. Communicating Knowledge to Visitors

Basic elements should be present in a museum environment to successfully communicate available educational content to visitors (Bitgood, 2002; J. H. Falk & Dierking, 2012; Hooper-Greenhill, 1994). Hooper (1994) argues that some elements that are related to the educational material structure and others that are related to its content are what fundamentally affect the success of the educational message in terms of communication. Indeed, educational material provided to different types of visitors should suit their age and background; this means there should not be a fixed content that is communicated to all visitors. Another basic element in the way of communicating the material is that it should be communicated in small chunks where there are pauses during the visit that enable the visitor to rest, and there should be a logical order in sending information about the collection. Bitgood (2002) argued that elements related to different environmental factors, such as museum design, and social factors, such as front-line personnel, are also directly affecting the educational out-come. Friedman (2007) argued that elements which are significantly important in science museums are the extent to which provided educational material supports current scientific thinking. The last element is somehow related to the intellectual sustainability of the museum and to what extent museums staff are current in thinking.

John Falk (2005, 2012) provided one of the most comprehensive frameworks for all possible elements that are expected to affect the educational message in museums. The framework will be discussed thoroughly in chapter 3 (methodology), as it was adopted as a testing tool in the empirical work on the research. Falk's framework has been used in different free-learning environment including museums to help assess the educational experience in

museums. Falk categorized all elements affecting museums experience and educational service into three categories, namely the personal context, the sociocultural context and the physical context.

The personal context

"Each museum visitor's personal context is unique, incorporating a variety of experiences and knowledge" (Falk and Dierking 2012; p.27). Individuals might have experience and knowledge about museums in general and might be also have knowledge about the collection which the museum of destination presents. Therefore, personal context is one construct which affects the learning outcome from a museum visit (J. H. Falk & Dierking, 2012). Personal context also includes the preferable modes of learning which are affected by individual's age group, social and cultural level. Personal context shapes visitors experience and expectations from a museum visit.

The sociocultural context

Cultural and social back ground affects an individual's learning outcome and experience when visiting a museum. Based on the individual's level of development and the social level, their interaction within the environment differs. The intensity of social interaction within the museum is a basic determinant of how rich the experience and the learning outcome are(J. H. Falk & Dierking, 2012). The experience is highly affected by the social interaction that takes place during the visit, interaction within visitors of one group, with visitors form other groups or with museum staff turned out to be a significant contributor to the visit experience.

The physical context

Architecture, objects in display, lighting fixtures, ambience and other elements are what shape the physical context of a museum. Physical context has the most significant influence on visitors' experience (J. H. Falk & Dierking, 2012). How easy it is to orient yourself within the

space, how comfortable the experience is, how motivating the environment for learning and leisure activities. These are some of the elements which signify each museum environment and determine the successful it is. Also the museum environment contains a process of a non-formal education; the museum environment is saturated with competing stimuli, the multiple elements of the physical environment, which makes the environment a basic determinant of the educational experience nature.

Two main approaches are used in reaching a better communication strategy. Firstly is researching visitors to know more about their educational background and how they evaluate the learning experience. Also knowing visitors helps museum staff to identify the best way of communication that suits their interest, age, educational background and the purpose of the visit. Indeed, researching visitors help staff to develop their communication and educational strategy to better satisfy their customers. Secondly, continuous evaluation and development of the educational program content is essential for both satisfying different groups needs and for intellectual sustainability.

2.8. Case Study: The Egyptian Geological Museum

2.8.1. Background

The Egyptian Geological Museum is one of a kind in Egypt. It plays an essential role in introducing earth sciences to the public. It presents the geology of Egypt, its minerals, rocks, ore, stones and fossils (Soliman, 1999). The museum also helps the advancement of scientific research through collaboration with scientists from Egypt and abroad who work on the collections of vertebrate fossil and meteorites (Soliman, 1999). The Museum mainly introduces the history of the Egyptian land and nature, the evolution of different species, metals and stones classifications and historical use, as well as information of significant importance about the evolution of earth and human beings (Soliman, 1999). The museum includes geological

specimens extracted in Egypt hundreds to thousands of years ago and which were buried millions of years ago in its vast land, and other specimens from all parts of the world (El-Feki et al, 2006). The museum presents studies conducted on the protectorates and outstanding geological features in order to raise the public's environmental awareness. The museum was initially opened as a part of the Egyptian and Geological Survey Mining Authority in 1901. It was the first geological museum in the Arab world and the Middle East and the fourth in the world (El-Feki et al, 2006). The first establishment was located in the garden of the Ministry of Public Works in Cairo's downtown area, close to the Egyptian Museum. It was a specially established building that was designed to function effectively whether as a storage of extracted treasures or as a display, an educational and entertainment exhibit for the visiting community (El-Feki et al, 2006). The old museum building was opened for the public in 1904, and it remained as one of the remarkable cultural attractions in Cairo up to 1982. In 1982, the old building was brought down for the establishment of the underground metro station, and the Museum collection was carefully transferred to its present location near Maadi, at the suburb south of Cairo downown. The new place has a very limited area for display (Soliman, 1999). The new location was considered temporary; therefore, a considerable percentage of the collection was and still is in storage. A small percentage of the collection is on display. Fossil and rocks facilities and rocks cutting machines were relocated away from the museum, in the main Egyptian Geological survey building in Abbasia, although it is preferred to have such facilities as close as possible to the collections (El-Feki et al, 2006). The Museum was reopened for the public in 1985.

2.8.2. Collection and Displays

Historically, the Egyptian civilization has been dramatically affected by the availability of different natural materials such as metal and copper, the strength of the army and the weapons used by it were highly dependent of the availability of such materials. Also, different stones were

used in the making of jewelry and objects of fine art. Fortunately, Egyptians were pioneers in mining, extraction and the utilization of different materials, such as gold, metal and copper (Soliman, 1999). A huge collection of metals as well as stones are displayed in the museum: a collection that introduces the visitor to its importance and contribution in the history of ancient Egypt. Also, a large collection of famous minerals, ores and rocks is on display. The exhibit section includes an invaluable collection of meteorites collected from Egypt and from other places in the world. The meteorites collection includes "the famous Egyptian meteorite "Nekhlite" believed to be from Mars," (El-Feki et al, 2006). In addition, the geological history of Egypt as specified by its fauna and flora is displayed in the museum. The unique collection of the Fayoum vertebrate fossils are on display, as well as invertebrate fossil collection extracted from different locations in Egypt and from around the world (Soliman, 1999). The Museum's collection is displayed in three galleries, which used to be separated in the old museum building but now they are not due to the limited display area (El-Feki et al, 2006). The three galleries are as follows: I- Minerals & Rocks Gallery, the gallery that includes various specimens of minerals, rocks and meteorites; II-Invertebrate Fossil Gallery, the second gallery that is divided into three sections, which are the stratigraphic sequence (Geological column), Egyptian geology as represented by fossils, and systematic paleontology; and III-Vertebrate Fossil Gallery, that includes the world famous vertebrate fossil of Fayoum providence and some other Fossils discovered in different places of the world (Soliman, 1999).

2.8.3. Services and Activities

Facilities that are currently available in the museum includes a library specialized in geological sciences. The museum is served by a library with reference that goes back to 1778, in addition to up to date references and bibliographies (Soliman, 1999). "It hosts more than 10.000 text books, journals, periodicals, annals and maps," (Soliman, 1999). The library is open to the

public during museum's opening hours and is used by visitors and researchers. It includes a collection of rare books that are approached by researchers from around the world (Soliman, 1999). The museums have lecture rooms with a cinema screen that is used to play films about the history of the collections and also to give lectures to visiting researchers and students (El-Feki et al, 2006). The museum also includes laboratories where samples are prepared to be used by researchers and students for educational uses, and other samples to be taken away as gifts (El-Feki et al, 2006). The museum tours are conducted with support of geologists as a first line staff, who give a description of collections and a brief lecture on their history during the visit. Some facilities are missed after the relocation of the building. Facilities such as a cafeteria, a gift shop, a sitting area, an outdoor exhibition and a well prepared rest room are not available in the current museum's context.

Chapter 3

Theoretical Framework and Research Design

3.1. Introduction

Nowadays the quality of services provided by museums is a basic determinant of their sustainability. Assessing visitor experience helps museum management identify weaknesses and strengths in the quality of provided services and identify what type of development is needed for a museum to sustain a reasonable flow of visitors and to build a good relationship with them. This study presents a conceptual framework for evaluating visitor experience and examining how this relates to museum sustainability.

3.2. Study Theoretical Framework

The purpose of the theoretical framework is threefold: to evaluate visitors' experience, which includes the level of visitors' satisfaction with core services and the acquired knowledge; to measure the level of social sustainability of the museum; and to examine the relationship between visitors' experience and the level of social sustainability of the museum. The model is presented in three constructs; the three constructs are satisfaction, knowledge and social sustainability. The Servqual instrument is used to operationalize the visitor's satisfaction with service quality, and the social sustainability instrument is used to operationalize the construct of social sustainability. Both models are operationalized from the subjective experience of the museum visitor, while the knowledge instrument is used to operationalize visitor's change in knowledge using both objective and subjective assessments.

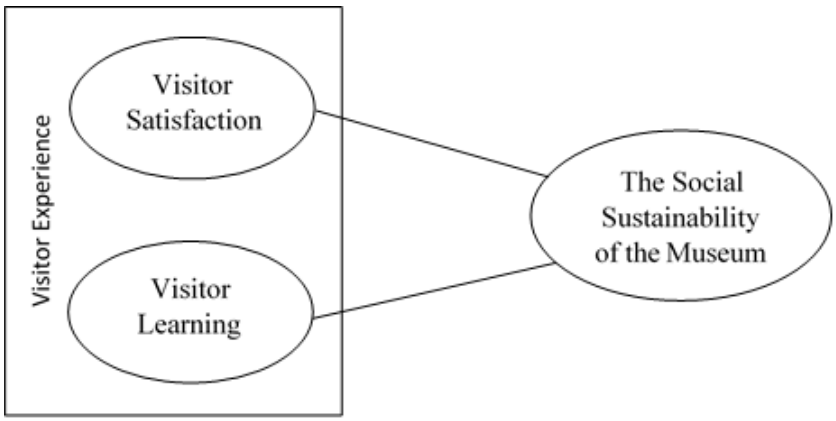

Figure 3. 1: The Conceptual Model. Visitor Experience and Social Sustainability of the Museum. Source: author.

3.3. Evaluating Visitor Experience

As discussed earlier in chapter 2 (Literature review), a museum visitor fundamentally makes a visit decision based on a desire to satisfy an individual's (group's) identity-related needs and based on his/her perception of a museum as a destination where such needs could be met (J. H. Falk & Dierking, 2012). Most museum visitors have their own subjective understanding of what could make their visit a satisfactory one. Whether a visitor's needs are primarily educational or leisure or both, a pre-assumed set of criteria, based on educational and cultural background, social level, past museums experience and current aspiration, is unconsciously used by each visitor to evaluate his/her visit (de Rojas & Camarero, 2008; Nowacki, 2005). Evaluating visitors' experience is intended to be as comprehensive as possible in order to result in a reliable research outcome which is expected to support a real development in the museum services. The evaluation model of visitor experience is composed of two measurement models, namely the satisfaction and knowledge. The Servqual instrument is used to operationalize visitor's satisfaction with service quality from the subjective experience of the museum visitor and to measure the visitor's expectations prior to the visit as well as visitor's perceptions after the visit. Such instrument is used to subjectively evaluate the visitor overall satisfaction with the

core service provided by the museum through measuring a visitor's perceptions of the level of service quality against visitor prior expectations (Nowacki, 2005). The knowledge instrument is used to operationalize the change in knowledge. Such instrument is used to evaluate the educational service provided by the museum based on the knowledge communicated to visitor and its effectiveness. The instrument uses both an objective and subjective evaluation of acquired knowledge and contextual learning factors.

3.3.1. Visitor's Satisfaction

In the twenty-first century, customer satisfaction was identified as one of the basic determinants of the success of businesses (de Rojas & Camarero, 2008; Kotler & Andreasen, 1996; Nowacki, 2005). As presented by the literature in chapter 2, the level of visitor's satisfaction is basically what affects a visitor's future decision for a revisit, which is one of the indicators of the success of a museum. Drivers of customer satisfaction have been widely debated (de Rojas & Camarero, 2008; Nowacki, 2005). Researching customer satisfaction based on a customer's prior expectations has gained popularity in marketing literature (de Rojas & Camarero, 2008; Nowacki, 2005), where the degree of satisfaction or dissatisfaction is identified through measuring a customer's prior expectations of how a museum experience should be against his/her perception of it. As stated by Parasuraman et al. (1988) that perceived service quality is "the degree and direction of discrepancy between the consumers' perceptions and expectations" (p. 17). Other recent trends in marketing literature argued that the level of satisfaction is not only about prior expectation, but also about emotions which a customer experiences during a visit (de Rojas & Camarero, 2008).

In this study, the Servequal instrument, which is a marketing research tool developed by Parasurmain, Zeithaml, and Berry (1985, 1988, and 1990) to measure service quality based on customers' prior expectation and perception, was used to measure service quality and the level

of customer's satisfaction in the museum. This instrument has been repeatedly used and is well validated in the marketing literature.

THE SERVQUAL INSTRUMENT

"Parasuraman et al. (1988) developed a five-dimensional scale for measuring service quality. The scale included: tangible features, reliability, responsiveness, assurance, and empathy" (Nowacki 2005; p.237). Furthermore an instrument for the measurement of service quality from a subjective customer perception was proposed. The Servqual instrument included a set of questions which accurately refer to each element of aforementioned scale.

Table 3. 1: The Servqual Scale for the Measurement of Service Quality. Source: (Nowacki, 2005).

Dimension	**Description**
Tangibles	Physical facilities, infrastructure, equipment appearance and personnel
Reliability	Ability to ensure reliable, proper service
Responsiveness	Willingness to help customers and provide prompt service
Assurance	Knowledge and courtesy of staff and their ability to inspire trust
Empathy	Care for the client, attention to individual clients, individualization of service

Figure 3. 2: The Cognitive Approach: Service quality/satisfaction relationship. Source: (de Rojas & Camarero, 2008).

The Servqual instrument was used to measure service quality from a subjective customer perception in various industries including tourism (Nowacki, 2005). The instrument includes a set of items where each item is rephrased into two statements, "one to measure expectations about services in general, and the other to measure perceptions about particular entities, of which the service quality was being assessed" (Nowacki 2005; p.238). The same questionnaire which was used by Nowacki to measure service quality in Rogalin palace, park and museum, was used in this study to measure the service quality in the Egyptian Geological museum, from a subjective customer perception.

The instrument used in this study included most of the elements suggested in a research paper by Nowacki (2005). Two elements were excluded for irrelevance to the current study's context. The first excluded element was catering evaluation due to the fact that the museum does not offer such service. However visitors where asked about the extent to which they prefer its availability as one of the items under visitor expectations. The other excluded element was evaluation of visitors' data entry system, which is also not used in the museum of study.

The survey questionnaire used included questions about the main elements in the museum that a visitor is expected to get exposed to during his/her visit, such as the museums accessibility, the main exhibition and the toilets. The survey questionnaire was divided into three sets of questions: 25 questions about a visitor's expectation for service elements to be asked before the visit, and another 24 questions to inquire about a visitor's perceptions of the same elements to be asked after the visit, in addition to five questions that measure visitor satisfaction with the visit. Instead of seven-point Likert's scale proposed by Parasuraman et al. (1988), a five-point Likert's scale accompanied each statement to make it easier for a participant to make his/her choices (Appendix A, questions 'A1-A27 & C1-C29').

3.3.2. Visitor's Knowledge

The educational product delivered by the Geological Museum is arguably considered the core element of the visitor's experience. The museum is positioning itself as the only provider of geology and natural science history in Egypt, as stated by museum staff management (Appendix B, '1'). In order to have a comprehensive analysis of the visitor's experience and to determine whether the experience makes an impact on the visitor that is somehow sustainable or not, the educational service should be intelligently assessed. Historically, a number of theoretical frameworks have been developed for understanding the nature of learning within a museum, two of which are socio-cultural models based on Vygotsky's work on learning and the contextual model of learning proposed by Falk and Dierking. These two theoretical models are considered the most prevalent socio-cultural models in analyzing learning experience in the twenty-first century (J. Falk & Storksdieck, 2005). Falk and Dierking's contextual learning theory has been adopted in museums in USA for the development of educational strategy. "The framework provided by the Contextual Model of Learning proved useful for understanding how complex combination of factors influenced visitor learning" (Dierking et al. 2005; p.744).

The contextual model of learning was used in this study for assessing learning within the free-choice learning setting of the Egyptian Geological museum.

THE KNOWLEDGE INSTRUMENT

As stated by Falk, "The key feature of this framework is the emphasis on context" (p.745). As discussed by the literature in chapter 2, the framework constitutes three contexts, namely the personal context, the sociocultural context and the physical context. "The personal context presents the sum total of personal genetic history that an individual carries with him/her to a learning situation" (Dierking et al. 2005; p.745). To illustrate, the personal context is dependent on a wide range of variables related to a visitor's background, prior knowledge, prior experience

with a museum, motivations for visiting a museum, the extent of choice during the visit of what is learnt and the individual's control over the visit (Dierking et al., 2005; J. H. Falk & Dierking, 2012). The personal context of each individual significantly affect the learning outcome of a visit. A social interaction is another context that represents a museum's experience. The social or the sociocultural context contributes to the quality of the educational outcome; it includes social variables such as interaction between visitors and between visitors and staff during the visit (Dierking et al., 2005; J. H. Falk & Dierking, 2012). In addition to those personal and socio-cultural variables, learning outcomes are highly affected by the physical environment. As museums are a free-choice learning environment, learning outcomes are highly dependent on the extent to which a visitor is able to navigate within an exhibition and his/her nature of interaction with contextual elements which defines a museum space (J. H. Falk & Dierking, 2012). The physical environment refers to architecture and structure aspects of the building, such as lighting, colors, and the building space, labels design and circulation which refers to visitors movement and interaction within the space (Bechtel & Churchman, 2002; Bitgood, 2002; Dierking et al., 2005; J. H. Falk & Dierking, 2012).

Falk identified a framework consisting of twelve parameters that are most instrumental to learning within museums. The first five of these parameters refer to the personal context: visit motivation, prior knowledge, prior experience, prior interest and choice & control. And two parameters refer to the sociocultural context: within group social mediation and mediation by others outside the immediate social group. The remaining five parameters refer to the physical context: advance organizers, orientation to the physical space, physical environment, exposure to exhibit and programs and subsequent events outside the museum (Falk, & Storksdieck, 2005, Bechtel et al., 2002).

The aforementioned factors have an impact on the learning experience within the museum environment. However, the significance of each factor varies from museum to another as well as from one visitor to another (J. Falk & Storksdieck, 2005). In this study seven factors were taken into consideration to measure the change in a visitor's knowledge and to investigate his/her learning experience (Appendix A, questions 'B1-B10 & D1-D10). The variable were selected based on the research scale and nature, two of the excluded variables were social group mediation, a variable within the sociocultural context, and Orientation to the physical space defined as a visitor's movement pattern and crowdedness of physical environment, a variable within the physical context. As suggested by Falk and Dierking, to collect data for measuring such variables, each individual/visitor is to be tracked during his/her visit and followed closely enough by a qualified researcher who documents observations for evaluation. In regards to tracking visitors, it was not a suitable tool of data collection, due to the scale of the research, the cost of the research, the time constraint and the target sample size. The third excluded variable was subsequent events, a variable within the physical context. As the museum under study does not offer events outside its perimeter and the learning experience is only limited to the visit, thus, this variable is not applicable in the case of the study.

Table 3. 2: Contextual Factors affecting Acquired Knowledge. Source: (J. Falk & Storksdieck, 2005).

The Personal	**The Sociocultural**	**The Physical Context**
▪ The visit motivation and expectations ▪ Prior Knowledge ▪ Prior Experience ▪ Prior Interest ▪ Choice and Control	▪ Mediation by others outside the immediate social group	▪ Advance organizers ▪ Exposure to exhibit & programs

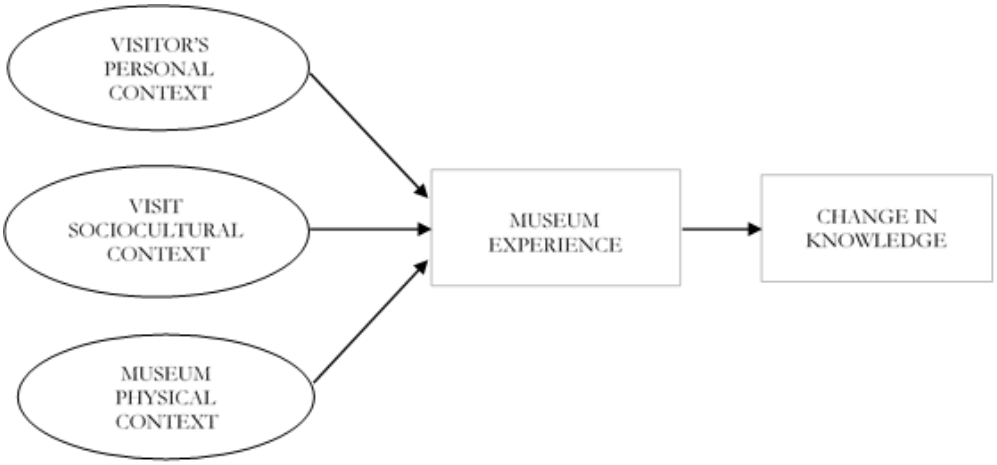

Figure 3. 3: Contextual Factors Affecting Acquired Knowledge.
Source: (J. Falk & Storksdieck, 2005).

3.4. The Construct of Social Sustainability

The framework aims to investigate the level of social sustainability in the museum and to which extent it is affected by the visitor's experience. In the proposed framework, social sustainability is considered a dependent variable, while knowledge and satisfaction are independent variables. The development of social sustainability construct was challenging due to the fact that little has been done in terms of social sustainability measurement. According to Mckenzie, Mckenzie, and Series, most of the work in the field of social sustainability is still theoretical to a great extent (2004). However, a promising measurement tool for sustainability was developed by Chris Butters. The tool was presented as a value map which was applied on several projects to measure the level of their sustainability. The value map is a holistic instrument tool used to investigate and measure the three pillars of sustainability, namely social, economic and environmental sustainability. As stated by Butters, "Assessment, using the value map, can be done both in a detailed way and a simplified way" (p. 36). The map consists of twenty-four parameters; each eight parameters are used to measure one aspect of sustainable development; social, economic and environmental sustainability.

SOCIAL SUSTAINABILITY INSTRUMENT

As presented by the literature review in chapter 2, a set of variables were used for the operationalization of the construct of social sustainability and each variable varies based on the nature and the context in which the research is to be conducted (Butters, 2004; Mckenzie et al., 2004). The instrument for measuring social sustainability was adopted from Butters (2004) and further developed by the researcher based on an in depth interview with an expert in the field of sustainable development. Three parameters were adopted from Butters work; namely museums involvement, community support and identity, while one factor that reflect the social sustainability of an organization were suggested by an expert in the field of sustainable development, which was credibility. Two of the parameters excluded from Butter's measurement are aesthetics and variety and accessibility. Those parameters were found to be more relevant for inclusion in the service quality measurement. The other excluded parameters: Sociability and socio-diversity were not well defined in the literature.

Table 3. 3: The Measurement of Social Sustainability. Source: (Butters, 2004).

Butter's Scale	Description
Socio-diversity	Socio-economic mix, social diversity
Accessibility	Inclusivity for all groups, accessibility to persons with disabilities and the elderly
Identity	Sense of place, belonging, history and culture
Security	Transparency, supportiveness, visibility, low crime
Variety	Experiential and sensory richness
Involvement	Participation, connection, shared responsibility
Sociability	Spatial hierarchy
Aesthetics	Artistic, psychological and spiritual stimulation and pleasure

A set of questions were developed for each parameter; each set is expected to precisely reflect the concept behind each parameter. For example, on the parameter of Involvement, questions measuring the extent to which visitors are able to communicate a suggestion or a

complaint and how satisfying is such experience were included (Appendix A, questions 'E12, E13 & E14).

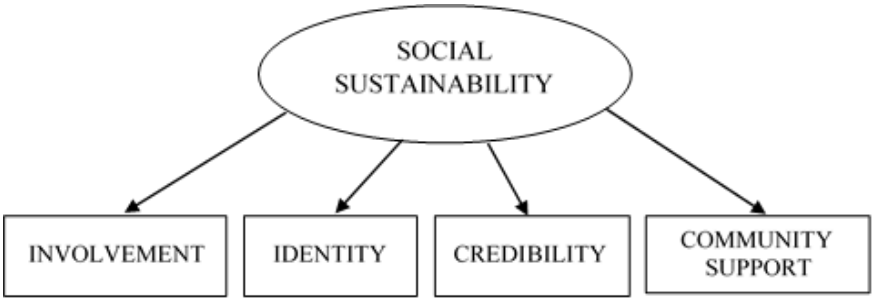

Figure 3. 4: The Construct of Social Sustainability. Source: author.

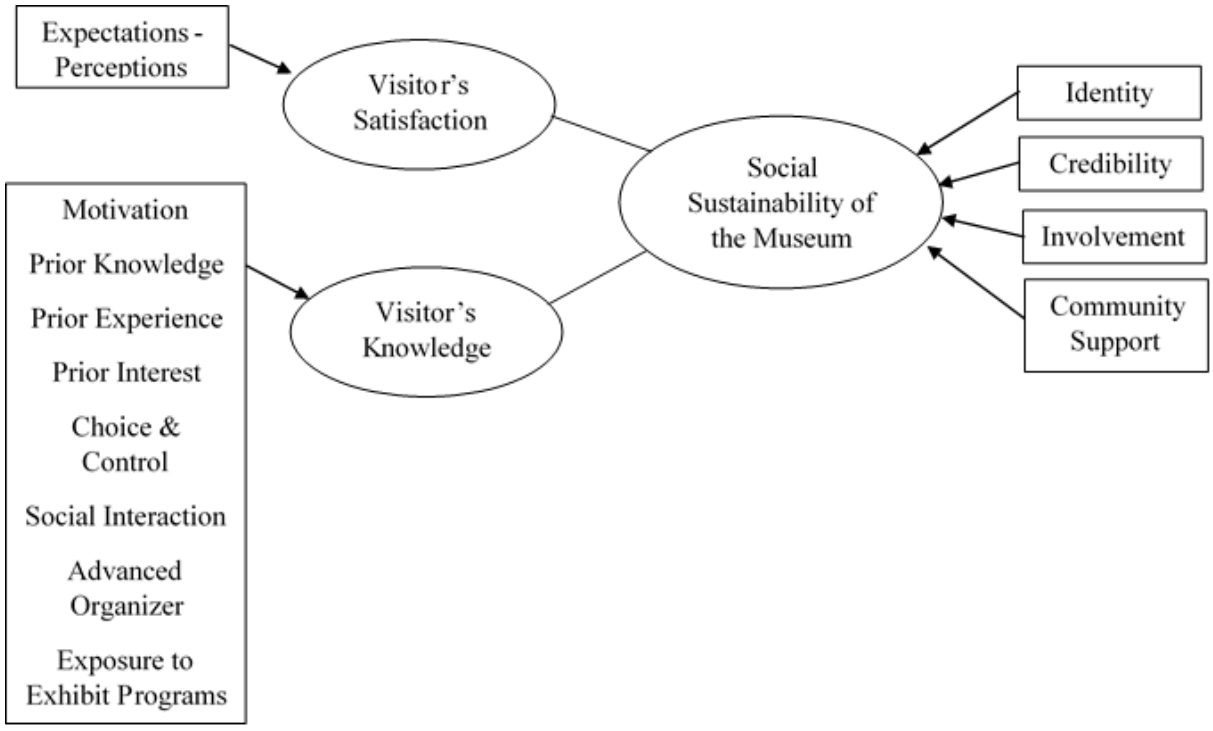

Figure 3. 5: The Study Theoretical Framework. Source: author

3.5. Research Questions and Hypotheses

3.5.1. Major Research Questions (MjRQ)

MjRQ1: What are the expectations of the museum visitors regarding the quality of the museum's services?

MjRQ2: To what extent are visitors expectations met?

MjRQ3: To what extent do the visitor perceptions of service quality influence visitor satisfaction with the museum experience?

MjRQ4: To what extent does the museum tour add to the visitor knowledge?

MjRQ5: How do contextual factors such as the visitor's motivation, prior interest and control over the visit affect the extent of knowledge acquired from the visit?

MjRQ6: What is the meaning of social sustainability for museums?

MjRQ7: To what extent does the visitor experience determine the museum's social sustainability?

3.5.2. Minor Research Questions (MinRQ)

MinRQ1: To what extent does the perceived quality of services affect customer satisfaction?

MinRQ2: Does visitor's perceptions vary according visitor's group type?

MinRQ3: Does visitor's perceptions vary according visitor's age group?

MinRQ4: Does the level of visitors' satisfaction vary according to visitor's group type?

MinRQ5: Does the level of visitors' satisfaction vary according to visitor's age group?

MinRQ6: Is there a relation between acquired knowledge and visitor's prior motivation to make a visit?

MinRQ8: Is there a relation between acquired knowledge and visitor's prior interests?

MinRQ9: To what extent does visitors control over visit affects change in knowledge?

MinRQ10: Does acquired knowledge vary according to visitor's group type?

MinRQ11: Does acquired knowledge vary according to visitor's age group?

MinRQ12: Does the perceived quality of the educational service vary according to visitor's age group?

MinRQ13: Does the perceived quality of the educational service vary according to visitor's group type?

3.6. Research Hypotheses

Hypothesis 1:

Null Hypothesis (Ho)

There is no relationship between museum service quality as perceived by visitors and visitors' satisfaction with the museum visit.

Alternative Hypothesis (Ha)

The better the service quality as perceived by the visitor, the greater the customer satisfaction with the museum visit.

Hypothesis 2:

Null Hypothesis (Ho)

There isn't a significant difference in levels of visitors' satisfaction of varied social groups.

Alternative Hypothesis (Ha)

There is a significant difference in levels of visitors' satisfaction of varied social groups.

Hypothesis 3:

Null Hypothesis (Ho)

There isn't a significant difference in levels of visitors' satisfaction of varied age groups.

Alternative Hypothesis (Ha)

There is a significant difference in levels of visitors' satisfaction of varied age groups.

Hypothesis 4:

Null Hypothesis (Ho)

There is no relationship between visitor's changes in knowledge and visitor's control over the visit.

Alternative Hypothesis (Ha)

There is a relationship between visitor's changes in knowledge and visitor's control over the visit

Hypothesis 5:

Null Hypothesis (Ho)

There is no relationship between visitor's changes in knowledge and visitor's prior interest.

Alternative Hypothesis (Ha)

There is a relationship between visitor's changes in knowledge and visitor's prior interest

Hypothesis 6:

Null Hypothesis (Ho)

There is no relationship between visitor acquired knowledge and museums social sustainability.

Alternative Hypothesis (Ha)

The higher the visitor's acquired knowledge, the greater the museums social sustainability.

Hypothesis 7:

Null Hypothesis (Ho)

There is no relationship between visitor's perception of the quality of educational service and museums social sustainability.

Alternative Hypothesis (Ha)

The higher the perception of the quality of the educational service, the greater the museums social sustainability.

Hypothesis 8:

Null Hypothesis (Ho)

There is no relationship between visitor satisfaction with museum visit and museums social sustainability.

Alternative Hypothesis (Ha)

The higher visitors' satisfaction with museum visit, the greater the museums social sustainability

3.7. Research Methodology

3.7.1. Overall Design Strategy

The design of the study was divided into four phases: 1) Semi structured interviews with museum's general manager, executive manager and first line staff were conducted to gather information about the museum's services and activities; 2) A survey questionnaire was developed based on a measurement model of service quality, a measurement model of knowledge and the construct of social sustainability; 3) Study sample was specified; and 4) Data was collected using the developed surveys.

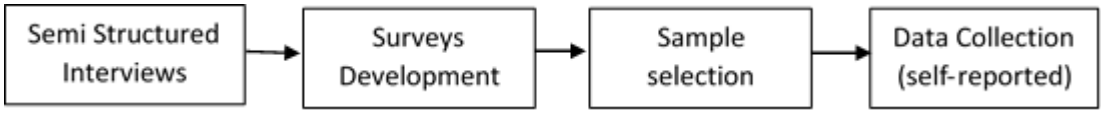

Figure 3. 6: The Overall Design Strategy. Source: author

3.7.1.1. PHASE 1: Interviews

The first phase of the study involved conducting semi structured interviews with the museum management team and front-line staff, interview questions are listed in (Appendix B). Interviews with the general manager and the executive manager, (Appendix B, '1') helped to construct a perspective about the museum, gain information about the museum's vision, mission, services, visitor's demographics and approximate number of visitors. As illustrated in Chapter 4 (Analysis), interviews with the management team helped in preparing the surveys and the

sampling process. Interviews with front line staff (Appendix B, '2'), the museum's geologists, provided important information about the interaction with visitors, the educational service provided, front-line staff roles and responsibilities, as presented in Chapter 4 (Analysis). Also based on the interviews with front-line staff, the objective assessment part of the knowledge instrument that consisted of a set of multiple choice questions was developed with the front-line staff of geologist. The sets of multiple choice questions were about general concepts in the science of geology, which educators were keen to communicate to museums visitors.

3.7.1.2. PHASE 2: Surveys Development

Survey Questionnaire Development

The second phase of the study involved preparing surveys for collecting data about the museum's visitors. As presented earlier in the methodology chapter, three surveys or instruments were developed: The Servqual instrument, (Appendix A, questions 'A1-A27 & C1-C29'), which was adopted from Nowacki (2005) research on service quality and satisfaction measurements. The knowledge instrument, (Appendix A, questions 'B1-B10 & D1-D10'), which was developed based on John Falk's contextual learning instrument (J. Falk & Storksdieck, 2005). The social sustainability instrument, (Appendix A 'E1-E14'), was developed based on Butter's measurement tool of sustainability (Butters, 2004).

Two copies of the survey questionnaires were developed. Originally the survey was designed in English and later translated into Arabic language. The Arabic version was translated by the researcher and a pilot was conducted in the museum with Egyptian and foreign visitors to make sure that participants would reach the same understanding of survey questions using the different language versions. Generally Egyptian visitors were handed an Arabic copy of the survey questionnaire, but for some students who preferred to have an English copy, while foreigners were handed an English copy (Appendix A).

Servqual Instrument

The Servqual instrument was based on Nowacki research on service quality and satisfaction measurements (2005). The instrument used in this study included most of the elements suggested in a research paper by Nowacki. As presented earlier in this chapter (Methodology), the instrument includes a set of items where each item is rephrased into two statements, "one to measure expectations about services in general, and the other to measure perceptions about particular entities, of which the service quality was being assessed" (Nowacki 2005; p.238). A five-level Likert scale accompanied each statement. The scale was inverted where (1) reflected the highest value and (5) reflected the lowest, (Appendix A, questions 'A1-A27 & C1-C29').

Knowledge Instrument

The knowledge instrument was based on Falk's framework for contextual learning. As presented earlier in this chapter (Methodology), elements related to personal context, physical context and sociocultural context were included in the survey for assessing acquired knowledge experience in the Egyptian Geological museum. The instrument included Yes/No questions, multiple choice questions and scale questions. In the scale questions and Based on the scale measurement proposed by John Falk (2005), a six-level Likert scale was used where (1) reflected the lowest value and (5) reflected the highest, (Appendix A, questions 'B1-B10 & D1-D10).

Social Sustainability Instrument

The social sustainability instrument was based on Butter's sustainability measurement tool, the value map, and an interview conducted with an expert in the field of sustainable development. The instrument included Yes/No questions, multiple choice questions and scale questions. In the scale questions, a five-level Likert scale was used. The scale was inverted where (1) reflected the highest value and (5) reflected the lowest, (Appendix A 'E1-E14').

3.7.1.3. PHASE 3: Sample Selection

The third phase of the study involved sample selection. Based on information collected during interviews with management team of the Egyptian Geological museum, the total targeted number of participants was calculated. As illustrated in the table below, the sample size was calculated based on information acquired about yearly expected visitors' numbers and the percentage of each visiting group from the total number of visitors. Around 4000-4500 are visiting the museum every year. The method for selecting visitors was designed to be unbiased and representative of the museum visitors. For unbiased sample, the data was collected by including one visitor and excluding one of the museum visitors. Data was collected in one and a half month period. Therefore a representative sample size of the museum visitors was around 280 participants. Response rate was expected to be around 90%, therefore 300 responses were collected. The response rate was high, above 95%, yielding a total of 289 valid responses.

Based on interviews with museum management, four groups of visitors and their percentages from the total number of visitors were identified: school students, university students, families and foreigners were the four main groups targeting the museum. School and university students combined were the largest group; they represent 80% of the total number of museum visitors. The second largest group was families; it represented almost 15% of the museum visitors. The smallest sample was foreigners; it represented only 5% of museum visitors. The visitor sample used in the study was representative of the overall population of the Egyptian Geological Museums.

Table 3. 4: The Overall Design Strategy. Source: author.

Total Number of Visitors per year	4000-4500
Total Number of Visitors per month	375
Unbiased sample size per month (By taking one and passing one)	188
Unbiased sample in one and a half month (the period of data collection)	280

Table 3. 5: Study Sample. Source: author.

Participant Group	N	Percent
School	187	64.7%
University	51	17.6%
Family	45	15.6%
Foreigner	6	2.1%
Overall	289	100%

3.7.1.4. PHASE 4: Data Collection

The fourth phase was data collection. Between November 2015 and mid December 2015, a nonbiased sample of 300 teenagers and adults visiting the Egyptian Geology museum alone or as part of school, university, or family group participated in the study. The basic research design involved face-to-face interviews before and after visit. The research team had a location at entry point of the museum. The team included the principle researcher and a well-trained data collector. The data collector was trained for one day by the researcher to accurately collect data. The data collection process was accomplished as follows: In the case of schools or university group visiting the museum, the students were asked to make a line, and then the researcher started selecting based on the main selection strategy of including one visitor and excluding one. After selection, if targeted participants agree to participate, the researcher handed the participant the survey copy to start filling the questions included in the previsit form, if the targeted participant refused the selection method was repeated. The same strategy was used for family

groups, but through using a slightly different technique in the date collection process. In a family groups of two, one visitor was selected randomly and asked to participant. Upon receiving a participant's permission, previsit interviews were conducted, and individuals were asked to approach the researcher right after the visit for a second interview.

In the previsit interview, participants were requested to fill a self-reported survey. They were expected to provide information about their expectations of the museums' service through filling the first part of the Servqual survey questionnaire (Appendix A, questions 'A1-A27'). Also participants were asked to provide information about their motivations to visit, prior knowledge, prior interests, prior experience with the museum and the level of expected choice and control over the visit through filling the first part of the knowledge survey questionnaire (Appendix A, questions 'B1-B10).

In the postvisit interview, participants were asked to provide information about their perception of the visit and the level of satisfaction with the experience through filling the second part of the Servqual survey questionnaire (Appendix A, questions 'C1-C29'). In addition, participants were asked provide information about the educational service. For example a question requested participants to evaluate the control over the visit and another requested participants to evaluate the quality of educational service they received, through filling the second part of the contextual survey questionnaire (Appendix A, questions 'D1-D10'). Also in the post visit interviews, participants were requested to provide information about the museum level of credibility and community involvement, and other parameters related to museum social sustainability through filling the social sustainability survey questionnaire (Appendix A 'E1-E14').

Table 3. 6: Research Question, Hypotheses and Survey Questions. Source: author

Research Question	**Research Hypothesis**	**Theoretical Framework Variable/Scale**	**Survey Question**
To what extent does the perceived quality of services affect visitor satisfaction?	Hypothesis 1	The Servqual Method (Nowacki, 2005)	C1-C24 C25-C29
Is there a relation between the level of visitors' satisfaction is and the visiting group type?	Hypothesis 2	The Servqual Method (Nowacki, 2005) & Intermediate Variable(Participan Group)	C25,C26,C27,C28,C29& * Social group type question
Is there a relation between the level of visitors' satisfaction and visitor's age group?	Hypothesis 3	The Servqual Method (Nowacki, 2005) & Intermediate Variable(Age)	C25, C26, C27, C28, C29 & *the Age group question
Is there a relation between change in knowledge and visitor's control over the visit?	Hypothesis 4	The Contextual Model of Learning (J. Falk & Storksdieck, 2005)	B1, B2, B3, B5, B6, B7, B8, B9, B10, D5, D6, D7, D8, D9 & D10
Is there a relation between change in knowledge and visitor's prior interests?	Hypothesis 5	The Contextual Model of Learning (J. Falk & Storksdieck, 2005)	B5, B6, B7, B8, B9, B10, B11, B12, D5, D6, D7, D8, D9 & D10
To what extent does change in knowledge influence social sustainability of the museum?	Hypothesis 6		B5, B6, B7, B8, B9, B10, B15, D5, D6, D7, D8, D9, D10, E7, E8 & E11
To what extent does the perceived quality of the educational service influence social sustainability of the museum?	Hypothesis 7	The Contextual Model of Learning (J. Falk & Storksdieck, 2005) & Social Sustainability Construct(Butters, 2004)	D4 E7, E8, E11

To what extent does visitor's satisfaction affect service influence social sustainability of the museum?	Hypothesis 8	The Servqual Method (Nowacki, 2005) & Social Sustainability Construct(Butters, 2004)	C25,C26, C27,C28,C29, E7,E8 & E11

Chapter 4

Data Analysis, Findings and Discussion

4.1. Study Sample Characteristics

4.1.1.Participant Demographics Profile

Using the SPSS, the sample can be described as follows: The total number of visitor participants was 289, 53% of which were male and 47% were females (see Figure 4.1). As for sample age groups, 47.4 % of the participants aged between 12-16, 38.1% between 17-24, 8.3% between 25 to 40 and only 6.2% were above 40 (see Figure 4.2).

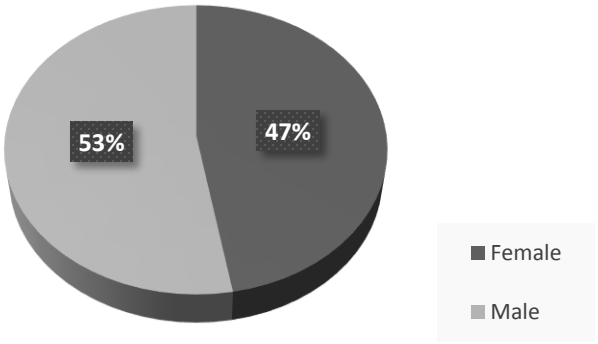

Figure 4. 1: Participants Gender Percentages. Source: author

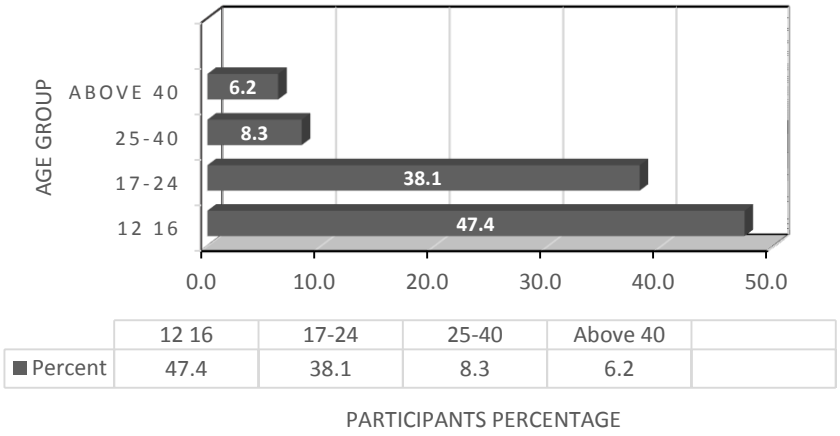

Figure 4. 2: Participants Age Groups. Source: author

As illustrated in Chapter 3 (methodology), participants were divided into four groups, based on the data acquired from the initial interviews with the museum's management team about the types of museum visitors, as follows: school students, university students, families and foreigners. The largest group of visitors targeting the Egyptian Geological museums were high school students studying geology with a 64.7% out of the whole sample, followed by university students who are studying Geology, Botany or Astronomy, 17.6%. On the other hand, 15.6% of the sample were individuals, families or friends, all falling under the family group, while only 2.1% of the whole sample were foreigners. Based on the information acquired though the initial interviews, the foreigner group was expected to be a little bigger. However, the sample was unpredictable to some extent, due to the fact that it is affected by some external factors such as the political instability in the country. (see Figure 4.3).

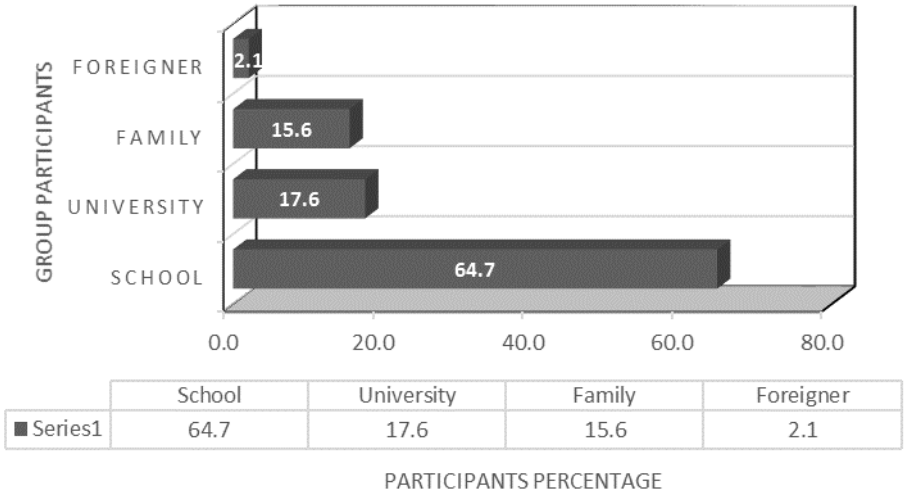

Figure 4. 3: Participant Social Groups. Source: author

4.2. Length of visit

The Length of visit: which refers to the time period participants spent at the museum. Almost 29.1% of the sample stayed for three hours, 20.8% stayed for one hour and only 15.6% of the sample stayed for three-hours and a half (see Figure 4.4)

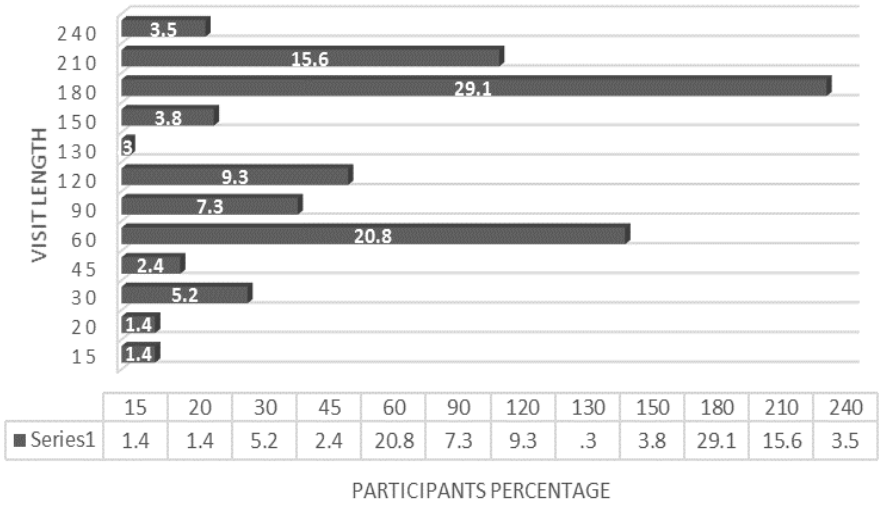

Figure 4. 4: The Length of Visit. The time period participants spent at the museum. Source: author

The Percentage Visited: refers to the percentage of the museum's collection investigated by participants during their visit. The museum was divided into three main display halls, namely vertebrate fossils, invertebrates and rocks and minerals. Almost 6.9% of the participants focused on 25% of the exhibition that displays the vertebrate fossils. Another 19% investigated 50% of the collection, while the remaining 70% investigated from 75% to 100% of the exhibition collection. (see Figure 4.5).

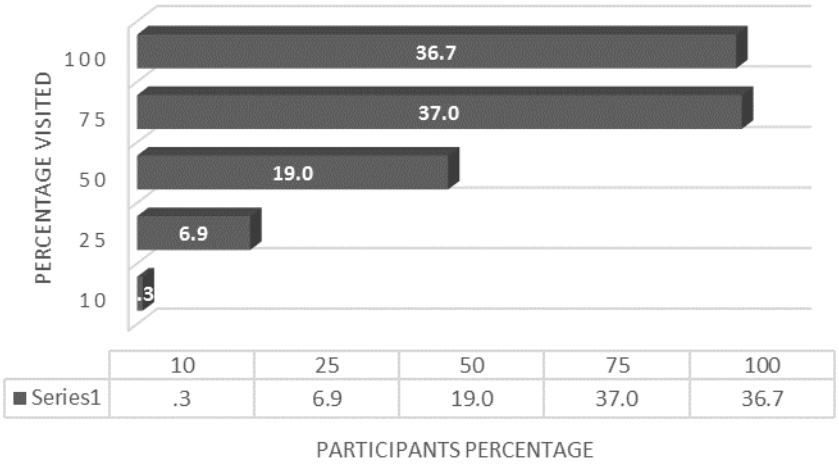

Figure 4. 5: Percentage Visit. The percentage of the displayed collection investigated by participants. Source: author

4.3. Surveys Results Analysis and Findings

4.3.1.Descriptive Analysis of Service Quality & Satisfaction Variables

The first section covered the analysis of the Expectations/Perceptions measurement model, which was used to investigate overall service quality of the museum, from the subjective experience of the museum visitor. It also covered the satisfaction measurement, which was used to measure the level of visitors' satisfaction with the visit. As illustrated in Chapter 3 (methodology), the expectations/perceptions measurement was divided into two parts: 1) Expectations, which was used in the pre-visit survey to measure the participants' expectations of the museum's services; 2) Perceptions, which was used in the post-visit survey to measure the participants' perceptions of the museum's services. The satisfaction measurement consisted of five questions to investigate the level of satisfaction with the visit. The results of visitors' expectations and perceptions are to be analyzed consecutively in this section of the data analysis, followed by the analysis of visitors' satisfaction. The last part on the first section will include the inferential statistics involving the two aforementioned measurement models.

4.3.1.1. Visitors' Expectations Survey Analysis

The measurement of expectations constituted the first part of the Servqual instrument which was used to measure the service quality. A five-level Likert scale was used where (1) reflected the highest level of expectations and (5) reflected the lowest. Based on the analysis included in (Table 4.1), the mean values of participants' expectations of service quality of the below mentioned items were generally high. The highest expectations were given to the friendliness of the ticket office personnel, and the uniqueness of the museum's building architecture, yielding 1.28 & 1.30 respectively, with a standard deviation of .547 & .550. Both items showed moderate variability in visitor's expectation, which indicates that generally high expectations were places on both items. The next highest expectations were given to both the warning of potential danger before the visit and the availability of a map of nearby attractions with a mean of 1.43, with standard deviation of .648 & .694 respectively. Four items had high variability in visitors' expectation. The highest variability was presented in the item related to ticket-office responsibility to provide a brief about activities provided in the museum, with a standard deviation of .943. Such high variability items was investigated to explore between-group differences in expectations.

Generally, the participants had high expectations regarding items related to the museums entrance and personnel courtesy (see Table 4.1).

Table 4. 1: Descriptive Analysis: Pre-visit Expectations Mean Values. Source: author

	Visitors' Expectations	N	Minimum	Maximum	Mean	Std. Deviation
1-	Museum's external Design	289	1.00	3.00	1.30	.550
2-	Suitable parking area	289	1.00	5.00	2.02	.933
3-	Friendly Ticket-office personnel	289	1.00	4.00	1.28	.547
4-	Ticket-office personnel give a brief description of the museum's nature and activities	288	1.00	5.00	1.90	.943

5- Clear maps to orient visitors during their visit	289	1.00	5.00	1.43	.694
6- A map of nearby tourist attractions	289	1.00	5.00	2.06	.911
7- Being Warned of potential danger that might occur during a visit or an activity	288	1.00	4.00	1.43	.648
8- Being informed of forbidden behavior during the visit	289	1.00	5.00	1.60	.740
9- High-quality collection of literature and souvenirs	289	1.00	5.00	1.98	.930
10- Reasonably priced literature and souvenirs	289	1.00	4.00	1.58	.741
11- Interesting and good display of the products for sale	289	1.00	5.00	1.85	.893

Moreover, based on the analysis included in (Table 4.2), participants also had high expectations regarding services related to the main exhibition, recreational service and toilets. The analysis revealed that the highest expectations between those areas were given to the attractiveness of the main exhibition and toilets cleanness, yielding mean values of 1.29 & 1.31 respectively, with standard deviation of .513 & .519. On the other hand, the lowest expectations, though still considered on the higher scale with a mean of 2.0, was given to the availability of catering during the visit, with standard deviation of .929. The variability in such item was high, therefore between-group difference were investigated (see Table 4.2).

Table 4. 2: Descriptive Analysis: Pre-visit Expectations Mean Values. Source: author

Visitors' Expectations	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
12- Attractiveness and arrangement of exhibition	288	1.00	3.00	1.29	.513
13- Exhibition presents a series of ideas in a logical order	289	1.00	5.00	1.56	.700
14- Exhibition presents information about the museum history and	289	1.00	5.00	1.79	.881
15- Exhibitions' personnel voluntarily trying to help visitors to find their way	289	1.00	5.00	1.68	.836

16- Exhibition's personnel provide competent information	289	1.00	4.00	1.71	.734
17- Exhibition provides interesting activities for groups of different ages and backgrounds	288	1.00	5.00	1.56	.749
18- Accessible Research facility or library	289	1.00	5.00	1.68	.848
19- Exhibition design unique architecture	289	1.00	4.00	1.42	.631
20- A well-designed illustrative signage for all displayed	289	1.00	3.00	1.43	.568
21- Signs to orient visitor's movement within the	286	1.00	3.00	1.42	.573
22- Adequate lighting	288	1.00	4.00	1.39	.586
23- Collection display is accessible to all age groups	288	1.00	5.00	1.44	.633
24- Places for visitors to rest and have coffee and snacks	289	1.00	5.00	2.04	.929
25- Proper and clean toilets	289	1.00	4.00	1.31	.519
26- Proper toilets for disabled	289	1.00	5.00	1.43	.714

4.3.1.2. Visitors' Perceptions Survey Analysis

The measurement of perceptions constituted the second part of the Servqual instrument which was used to measure service quality. A five-level Likert scale was used where (1) reflected the highest level of perceptions and (5) reflected the lowest. Firstly, and based on the analysis included in (Table 4.3) the mean values of participants' perceptions of service quality for listed items generally ranged from average to low. The lowest perceptions were given to the museum's building architecture, orientation maps and souvenirs and literature display, yielding 3.15, 3.11 and 3.01 respectively. Yet the variability in aforementioned three items is very high, with standard deviations yielding 1.26, 1.13 & .887 respectively. Also the mean value for visitors' perceptions of the parking area was 2.97, which was considered low, with a standard deviation of 1.06. Generally, participants had average to low perceptions to services related to

the museum entrance and reception, personnel courtesy, literature quality and attractiveness of display (see Table 4.3).

Table 4. 3: Descriptive Analysis: Perceptions Post-visit. Source: author.

Visitors' Perceptions	N	Minimum	Maximum	Mean	Std. Deviation
1- Museum's external Design Uniqueness	289	1.00	5.00	3.15	1.26
2- Suitable parking area	289	1.00	5.00	2.97	1.06
3- Friendly Ticket-office personnel	289	1.00	5.00	2.26	.858
4- Ticket-office personnel give a brief description of the museum's nature and	285	1.00	5.00	2.84	1.13
5- Clear maps to orient visitors during their visit	288	1.00	5.00	3.11	1.13
6- A map of nearby tourist attractions	286	1.00	5.00	-	1.04
7- Being Warned of potential danger that might occur during a visit or an activity	289	1.00	5.00	-	1.28
8- Being informed of forbidden behavior during	289	1.00	5.00	2.72	1.29
9- High-quality collection of literature and souvenirs	287	1.00	5.00	2.85	.948
10- Reasonably priced literature and souvenirs	288	1.00	5.00	2.86	.901
11- Interesting and good display of the products for sale	288	1.00	5.00	3.01	.887

Secondly and based on the analysis included in (Table 4.4), participants had average perceptions of some services related to the main exhibition: variables measuring the attractiveness of the exhibition, the logical order of information presented within the exhibition and the availability of historical information about the museum establishment. On the other hand, participants had above average perception of variables measuring the personnel helpfulness and competency; yielding 1.97 and 1.92 respectively. Other service presented in the main exhibition, such as activities, exhibition design and orientations sign were perceived as below average, yielding

3.03, 2.78 and 2.79 respectively. Finally, the toilets cleanness had a below average score of 2.97 from the subjective view of participants (see Table 4.4). All items in the perception measurement were high variability items, therefore further analysis were conducted to investigate the variance in perceptions of different groups regarding the museum services.

Table 4. 4: Descriptive Analysis: Perceptions Post-visit. Source: author

Visitors' Perceptions	N	Minimum	Maximum	Mean	Std. Deviation
12- Attractiveness and arrangement of	288	1.00	5.00	2.32	1.26
13- Exhibition presents a series of ideas in a logical order	288	1.00	5.00	2.20	1.13
14- Exhibition presents information about the museum history and	288	1.00	5.00	2.30	1.17
15- Exhibitions' personnel voluntarily trying to help visitors to find	289	1.00	5.00	1.97	1.09
16- Exhibition's personnel provide competent information	288	1.00	5.00	1.92	.978
17- Exhibition provides interesting activities for groups of different ages and backgrounds	289	1.00	5.00	3.03	1.02
18- Accessible Research facility or library	289	1.00	5.00	2.67	1.02
19- Exhibition design unique architecture	288	1.00	5.00	2.78	1.30
20- A well-designed illustrative signage for all displayed pieces	289	1.00	5.00	2.32	1.15
21- Signs to orient visitor's movement within the exhibition	287	1.00	5.00	2.79	1.16
22- Adequate lighting	289	1.00	5.00	2.34	1.14
23- Collection display is accessible to all age	287	1.00	5.00	2.38	1.17
24- Proper and clean toilets	284	1.00	5.00	2.97	.932

4.3.1.3. Satisfaction Survey Analysis

The measurement of visitor satisfaction constituted the third part of the Servqual instrument which was used to measure service quality. A five-level Likert scale was used where (1) reflected the highest level of satisfaction and (5) reflected the lowest. Based on the Servqual method for measuring customer level of satisfaction, five items were used to measure the overall level of satisfaction with a museum services and experience. Based on the analysis included in (Table 4.5), the mean values of participants' satisfaction with the service quality for listed items was above average. Participants were happy with their decision to visit the museum. Also they were almost satisfied with the time they spent in the museum. On the other hand, participants won't make a quick decision to buy souvenirs after the visit and the probability that they will consider visiting the museum again is average. However, the standard deviation of all items were high. Therefore between-group difference was investigated in the next section of analysis.

Table 4. 5: Descriptive Analysis: Satisfaction with the museum experience. Source: author.

	Satisfaction Construct	N	Minimum	Maximum	Mean	Std. Deviation
1-	I am happy with my decision to visit the geological museum	289	1.00	5.00	1.97	1.03
2-	I would like to buy a souvenirs and some publications about the museum to educate myself more about it	289	1.00	5.00	2.57	1.22
3-	I had a good time and my visit is satisfactory	287	1.00	5.00	2.26	1.09
4-	I will recommend the museum to a friend	289	1.00	5.00	2.26	1.19
5-	I will visit the museum again	289	1.00	5.00	2.48	1.23

4.3.2.Evaluating Visitor's Perceptions Measurement Model

A principle factor analysis (PFA) was conducted on the Servqual survey to investigate the underlying construct that might exist by the scale variables and to reduce the number of

variables into a smaller set of variables which holds the most variance in the survey items. As stated in the literature, the minimum number of variables to run a factor analysis is 3 and the smallest sample size is 100 participants (Pallant, 2010). The Servqual instrument included 51 variables and the study sample size was 289, which was found adequate for performing a PCA.

A principle component analysis was run with a Varimax rotation on the 24 variables of the perception survey questionnaire. The Kaiser-Meyer-Oklin (KMO) measure score was 0.878, which was classified by Kaiser (1974) as 'meritorious'. Also the Bartlett's Test of Sphericity was statistically significant ($p < .001$). Evidently all factorability assumptions turned out to be aligned with the aforementioned tests results.

PCA generated five factors which had eigenvalues greater than one. The five factors explained 61.75% of the total variance. After rotation the first factor explained 18.8% of the total variance, the second factor explained 32.8%, the third factor explained 44.5%, and the fourth factor explained 55%, while the fifth explained 61.75% of the total variance. The five factors were interpreted based on the original tested constructs within the measurement scale: Strong loading of the (exhibition design & theme) items were found on the first factor, (entrance & reception area) items on the second factor, (personnel competency) items on the third factor, (literature & souvenir) items on the fourth factor, and (library) items on the fifth factor. Factors loadings and the rotated solution are illustrated in (Table 4.6)

Table 4. 6: Principle Factor Analysis of Servqual (Perceptions) Measurement Scale. Source: author.

Rotated Component Matrixa					
	Component				
	1	2	3	4	5
12- Attractiveness and arrangement of exhibition	0.745	0.227	0.254	0.094	0.009
22- Adequate lighting	0.739	0.152	0.139	0.059	0.064
23- Collection display is accessible to all age groups	0.705	0.179	0.123	0.038	0.207
19- Exhibition design unique architecture	0.651	0.495	0.096	0.039	0.035
13- Exhibition presents a series of ideas in a logical order	0.64	0.144	0.212	0.232	-0.111
20- A well-designed illustrative signage for all displayed pieces	0.585	0.184	0.001	0.057	0.402
14- Exhibition presents information about the museum history and establishment	0.535	0.036	0.292	0.193	0.151
21- Signs to orient visitors movement within the exhibition	0.499	0.297	0.112	0.206	0.446
6- A map of nearby tourist attractions	0.107	0.734	0.161	0.1	0.336
5- Clear maps to orient visitors during their visit	0.187	0.73	0.125	0.108	0.358
1- Museum's external Design Uniqueness	0.427	0.664	0.129	0.06	-0.036
2- Suitable parking area	0.298	0.607	-0.001	0.186	-0.042
15- Exhibitions' personnel voluntarily trying to help visitors to find their way	0.275	-0.149	0.726	0.062	0.106
8- Being informed of forbidden behavior during the visit	0.086	0.291	0.722	0.031	-0.074
16- Exhibition's personnel provide competent information	0.363	-0.162	0.633	0.073	0.28
7- Being Warned of potential danger that might occur during a visit or an activities	0.152	0.485	0.616	0.179	-0.042
3- Friendly Ticket-office personnel	0.096	0.353	0.551	0.034	0.096
9- High-quality collection of literature and souvenirs	0.14	0.114	0.11	0.826	0.016
10- Reasonably priced literature and souvenirs	0.023	0.068	0.025	0.833	-0.027
11- Interesting and good display of the products for sale	0.231	0.146	0.081	0.761	0.156
Accessible Research facility or library	0.102	0.146	0.095	0.021	0.762
Extraction Method: Principal Component Analysis.					
Rotation Method: Varimax with Kaiser Normalization.					
Rotation Method: Varimax with Kaiser Normalization.					

4.3.3.Inferential Analysis of Service Quality & Satisfaction Variables

This section involves further analysis on the Servqual measurement model: (1) Differences between perceptions and expectations were calculated to reach an approximation of the level of satisfaction with the service quality; (2) Paired Samples t-test was conducted to investigate the level of statistical significance of the difference between visitors' expectations and perceptions; (3) Analysis of Variance (ANOVA) tests were conducted for expectations, perceptions and satisfaction. Tukey's-b Test was used to help identify the pairs which were significantly different; and finally (4) Linear regression was conducted to understand the effect of visitors' perception on their level of satisfaction with the visit experience.

4.3.3.1. Calculating Differences between Visitor's Perception & Expectations

The differences between expectations and perceptions were calculated (see Table 4.7). A large difference indicated that visitors' expectations were far from being met by current status of service provision from the subjective view of visitors, while the small difference indicated that visitors' expectations were partially or completely met. Generally, all expectations were higher than perceptions, but this could be partially related to the fact that most visitors usually tend to have higher expectation than most service providers could provide.

Through observation of the mean differences reported in Table 4.7, the biggest differences in mean values were part of the second factor of (Entrance & Reception) and the fourth factor of (Literature & Souvenirs). On the other hand, the smallest differences appeared in the first factor of (Exhibition Design and theme) and (Personnel competency).

Items which scored the smallest differences were the front-line staff in terms of being helpful and knowledgeable with differences of 0.26 and 0.29 respectively. Although both differences were small, visitors' expectations of both items were high before the visit, which indicated that the difference was not small because the expectations were low, but because both services had high quality from the subject view of visitors. The greatest differences scores went to the museums architecture, orientations maps, and toilets, yielding 1.85, 1.68 and 1.66 respectively. With such differences, those three elements were considered to have the most negative effect on the museum's service quality and were expected to affect the overall satisfaction with the visit.

4.3.3.2. Investigating the level of statistical significance of the differences between Visitor's Perception & Expectations

A paired-samples t-test was conducted to determine whether there was a significant mean difference between visitors' expectations and perceptions. The mean differences for all items

were statistically significant (see Table 4.7).

Table 4. 7: Mean Value Differences between Expectation and Perceptions and their Level of Significance. Source: author

Expectations minus Perceptions	Expect. Mean	Pecpt. Mean	Diff.	T-test	Sig.
Factor 1 (Exhibition Design &Theme) Items					
1- Attractiveness and arrangement of exhibition	1.29	2.32	-1.03	-12.4	.000
2- Exhibition presents a series of ideas in a logical order	1.56	2.20	-0.64	-7.976	.000
3- Exhibition presents information about the museum history and	1.79	2.30	-0.51	-6.269	.000
4- A well-designed illustrative signage for all displayed pieces	1.43	2.32	-0.89	-12.173	.000
5- Signs to orient visitor's movement within the exhibition	1.42	2.79	-1.37	-17.692	.000
6- Adequate lighting	1.39	2.34	-0.95	-12.704	.000
7- Collection display is accessible to all age groups	1.44	2.38	-0.94	-11.429	.000
Factor 2 (Entrance & Reception) Items					
8- Museum's external Design Uniqueness	1.30	3.15	-1.85	-22.46	.000
9- Suitable parking area	1.30	3.15	-1.85	-11.65	.000
10- Clear maps to orient visitors during their visit	1.43	3.11	-1.68	-20.86	.000
11- A map of nearby tourist attractions	2.06	3.30	-1.24	-15.153	.000
Factor 3 (Personnel Competency)					
12- Friendly Ticket-office personnel	1.28	2.26	-0.98	-16.236	.000
13- Being Warned of potential danger that might occur during a visit or	1.43	3.00	-1.57	-12.433	.000
14- Being informed of forbidden behavior during the visit	1.60	2.72	-1.12	-19.375	.000
15- Exhibitions' personnel voluntarily trying to help visitors to find their	1.68	1.97	-0.29	-3.802	.000

16- Exhibition's personnel provide competent information	1.71	1.92	-0.26	-2.948	.003
Factor 4 (Literature & Souvenirs)					
17- High-quality collection of literature and souvenirs	1.98	2.85	-0.87	-11.558	.000
18- Reasonably priced literature and souvenirs	1.58	2.86	-1.28	-18.744	.000
19- Interesting and good display of the products for sale	1.85	3.01	-1.16	-15.885	.000
Factor 5 (Library)					
20- Accessible Research facility or library	1.68	2.67	-0.99	-13.627	.000

4.3.3.3. Investigating Variance in Visitor's Perception & Expectations between participant Groups

A one-way ANOVA was conducted to determine if visitor's perceptions, expectations and the level of satisfaction were different between group participants. Participants were classified according to their age into four groups: 12-16 (n=129), 17-24 (n =103), 25-40 (n =22) and Above 40 (n=18). Participants were also classified by social groups into four groups: school (n= 176), university (n=47), family (n=43) and foreigners (n=6). Additionally, groups were classified by gender into male (n=144) and female (n=127).

A. Expectation with Age Groups

Table 4. 8: Variance in Expectation between Different Age Groups. Source: author

Visitors' Expectations	F	Sig.
- Suitable parking area	5.191	.002
- Ticket-office personnel give a brief description of	4.772	.003
- A map of nearby tourist attractions	8.719	.000
- Being informed of forbidden behavior during the visit	3.576	.014
- High-quality collection of literature and souvenirs	5.005	.002
- Interesting and good display of the products for sale	3.526	.015

- Exhibition presents information about the museum history and establishment	10.92	.000
- Exhibition's personnel provide competent information	5.878	.001
- A well-designed illustrative signage for all displayed pieces	3.877	0.01
- Signs to orient visitor's movement within the exhibition	4.569	.004

Statistically significant differences were found between age groups in their expectations about items listed in (Table 4.8). Expectations regarding the availability of suitable parking were significantly different between participants of different age groups, Welch's F (5.7) = 56.12, $p < .005$. Tukey's post hoc analysis revealed that the age group (above 40) had significantly higher Expectation for the availability of parking area than the age group (12-16). This could be attributed to the fact that the younger age group of (12-16) visited the museum using the school bus, while the elder age group of (above 40) visited the museum using private cars.

Expectations regarding the ticket-office personnel competency in providing information about the museum activities and facilities were significantly different between participants of different age groups, Welch's F (4.8) = 53.6, $p < .005$. Tukey's post hoc analysis revealed that the age group (25-40) had significantly higher expectation for this item than the age group (12-16). This could be attributed to the fact that the younger age group of (12-16) visited the museum for educational purposes and they usually follow the visit program planned by their school instructor, while the elder age group of (25-40) visited the museum using for educational, leisure purposes or for both. Also the elder age group might need to get exposed to various service the museum provided as a way to get the best out of the visit, and to measure the extent to which the museum could satisfy their needs.

Expectations regarding the availability of a map that included nearby touristic attractions were significantly different between participants of different age groups, Welch's F

(10.6) = 56.65, p < .005. Tukey's post hoc analysis revealed that the age group (25-40) had the highest expectation for such item with a mean value of 1.5, followed by the age group (above 40) with expectations mean value of 1.67. Younger age groups (17-24) & (12-16) had lower expectations regarding the availability of a map that illustrated nearby touristic attraction. From the aforementioned results, it could be concluded that elder age groups (25-40) & (above 40), are more interested in visiting more than one touristic attraction at a time.

Expectations regarding the availability of high-quality collection of literature and souvenirs were significantly different between age groups, Welch's F (8.1) = 59.4, p < .005. Tukey's post hoc analysis revealed that the age group (above 40) had significantly higher expectation for the availability of high-quality collection of literature and souvenirs than age group (12-16). This could be attributed to that fact that they are more aware of the value of provided by the museum reflected in souvenirs and literature, and they are more interested buying.

Expectations regarding the existence of interesting display of the products for sale were significantly different between age groups, Welch's F (7.4) = 61.6, p < .005. Tukey's post hoc analysis revealed that the age group (above 40) had significantly higher Expectation for such item than other visitor groups. This could be attributed to their interest in buying products for sale.

Expectation regarding the availability of well-designed illustrative signage for all displayed pieces within the main exhibition was significantly different between participants of different age groups, Welch's F (7.4) = 60.2, p < .005. Tukey's post hoc analysis revealed that the age group (25-40) had the highest expectation for such item with a mean value of 1.13, followed by the age group (above 40) with expectations mean value of 1.22. Younger age groups (17-24) & (12-16) had lower expectations regarding this item.

Expectation regarding the availability of signs to orient visitor's movement within the exhibition was significantly different between participants of different age groups, Welch's $F(6.6) = 60.3$, $p < .005$. Tukey's post hoc analysis revealed that the age group (12-16) were less interested to be orientated using signs within the exhibition. This could be attributed to the fact that this age group is more interested to be guided by front-line staff or by their instructors. On the other hand age group (25-40) & (above 40) were equally interested to be oriented within the exhibition using signs and maps.

B. Perceptions with Age Groups

Table 4. 9: Variance in Perceptions between Age Groups. Source: author.

Visitors' Perceptions	F	Sig.
- Museum's external Design Uniqueness	6.59	.000
- Friendly Ticket-office personnel	4.69	.003
- Office personnel give a brief description of the museum's nature and activities	4.54	.004
- Clear maps to orient visitors during their visit	6.65	.000
- A map of nearby tourist attractions	5.98	.001
- Being Warned of potential danger that might occur during a visit or an activity	8.29	.000
- Being informed of forbidden behavior during the visit	7.41	.000
- Attractiveness and arrangement of exhibition	9.76	.000
- Exhibition presents a series of ideas in a logical order	8.42	.000
- Exhibition presents information about the museum history and establishment	6.73	.000
- Exhibitions' personnel voluntarily trying to help visitors to find their way	9.28	.000
- Exhibition's personnel provide competent information	4.59	.004
- Exhibition provides interesting activities for groups of different ages	9.03	.000
- Exhibition design unique architecture	6.42	.000

- Signs to orient visitor's movement within the exhibition	10.68	.000
- Adequate lighting	5.97	.001
- Collection display is accessible to all age groups	8.84	.000
- Proper and clean toilets	6.68	.000

A statistically significant differences were found between age groups in their perceptions of items listed in (Table 4.9). Perceptions of the arrangement of the exhibition were significantly different between participants of different age groups, Welch's F (10.2) = 52.5, $p < .005$. Tukey's post hoc analysis revealed that the age group (above 40) had significantly lower perception of the attractiveness and arrangement of the main exhibition, with a mean value of 3.38, than age group (17-14) with a mean value of 1.96. Generally perceptions of the attractiveness of the exhibition ranged from average to low, yet age group (above 40) the lowest perceptions of this item. Older group might be more experience than younger groups. They might have visited more museums in Egypt and abroad. Therefore, they would be more critical and have better judgments for such item.

Perceptions of the information arrangement in terms of logical and chronological order within the exhibition were significantly different between participants of different age groups, Welch's F (7.3) = 51.3, $p < .005$. Tukey's post hoc analysis revealed that the age group (25-40) had significantly lower perception of information arrangement, with a mean value of 3.13, than age group (17-14) with a mean value of 1.92. Generally perceptions of this item ranged from average to low, yet age group (25-40) the lowest perceptions of this item.

Perceptions of the helpfulness of exhibition personnel within the exhibition were significantly different between participants of different age groups, Welch's F (5.6) = 54.6, $p < .005$. Tukey's post hoc analysis revealed that the age group (25-40) had significantly lower perception of the helpfulness of the museum personnel with a mean value of 3.2, than age group

other age groups. This age group might needed more help than younger group (12-16), who were more dependent of the school program or their instructor.

Perceptions of the level of competency of the personnel within the exhibition were significantly different between participants of different age groups, Welch's F (3.0) = 53.2, $p < .005$. Tukey's post hoc analysis revealed that the age group (25-40) had significantly lower perceptions of personnel, with a mean value of 2.56, than other age. Generally perceptions of personnel competency ranged from average to high. Age group from (25-40) lower perceptions could be attributed to the fact that a considerable percentage of this group were family groups. Generally family groups were visitors who are not specialized in geology which made them more challenging to receive technical information provided by the museum front-staff.

Perceptions of the presence of interesting activities for groups of different ages were significantly different between participants of different age groups, Welch's F (9.1) = 56.4, $p < .005$. Tukey's post hoc analysis revealed that both age group (12-16) & (25-50) had significantly lower perception of the presence of interesting activities for groups of different ages, with a mean value of 3.33 for both age groups. This could be attributed to the fact that both groups included teenagers and children who would be looking for more fun and interesting activities.

Perceptions of the exhibition lighting were significantly different between participants of different age groups, Welch's F (5.4) = 51.4, $p < .005$. Tukey's post hoc analysis revealed that the age group (25-40) had significantly lower perception of the adequacy of exhibition lighting, with a mean value of 3.04, than other age groups. Generally perceptions of lighting adequacy ranged from average to below average. The lower perception of the age group (25-40) could be attributed to their need to have an attractive exhibition, as they seek the museum not only for educational purpose. Therefore, they need an environment with higher aesthetics.

Perceptions of the extent to which the collection is accessible to all age groups within the exhibition were significantly different between participants of different age groups, Welch's F (9.3) = 52.6, $p < .005$. Tukey's post hoc analysis revealed that the age group (25-40) had significantly lower perception of this item, with a mean value of 3.3, than other age groups. Generally perceptions of this item ranged from average to low. Age group (25-40) lower perceptions could be attributed to the fact that a considerable percentage of this group are family groups. Generally family groups include children, therefore the heights of the current display vitrines and shelves would not be accessible for them.

Perceptions of the toilets were significantly different between participants of different age groups, Welch's F (6.4) = 53.4, $p < .005$. Tukey's post hoc analysis revealed that the age group (12-16) had significantly lower perception of the toilets, with a mean value of 3.2, than other age groups. Generally perceptions of the toilets ranged from below average to low. The youngest age group (12-16) visited the museum in large groups, at least 25 student at a time, therefore, the one cabinet currently existing at the museum would not be enough when large groups approach the museum.

C. Satisfaction with Age Groups

A statistically significant difference was found between different age groups of participants with their level of satisfaction. Welch's F (13.915) = 62.455, $p < .005$. Tukey's hoc analysis revealed that the age group (Above 40) had a higher level of satisfaction with the visit experience. Generally the level of visitor's satisfaction ranged from average to high. The high level of satisfaction of the age group (above 40) could be attributed to their higher level of awareness about the value and the uniqueness of the Egyptian Geological museum.

4.3.3.4. Testing the relationship between visitor's perception of the quality of service and their level of satisfaction with the visit

Linear Regression was used to test the extent to which visitor perceptions of service quality influence visitor satisfaction with the museum experience, which directly answer one of the major research questions: MjRQ3, also investigate research hypothesis: H1

Regression run results show the existence of a significant relationship between perceived service quality and visitor's satisfaction with core service

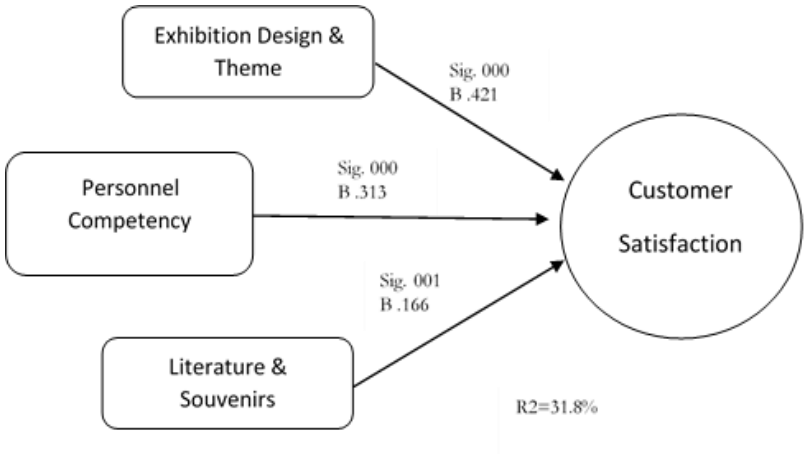

Figure 4. 6: Relationship between Customer Satisfaction and Service Quality.
Source: author.

Based on the regression analysis (see Figure 4.6), the service quality explained 31.8% of the variance in the customer satisfaction with the museum visit (R2). Relationships between independent variables as reflected in exhibition design, personnel competency, literature and satisfaction are positively significant. Satisfaction with the core service is mostly influenced by exhibition design and theme with B=0.421 followed by personnel competency with B=0.313 and finally followed by literature & souvenirs with B= 0.166.

4.3.4.The Knowledge Survey Analysis

The second section covered the analysis of the knowledge measurement model that was used to investigate educational service provided by the museum and measure acquired

knowledge. The knowledge measurement includes three approaches of measurement: (1) objective measurement approach, (2) subjective measurement approach and (3) contextual variables approach.

4.3.4.1. The Objective measurement of knowledge: Prior Knowledge Vs. Acquired Knowledge (Pre/Post Visit)

Change in knowledge is a main variable measured during the study as a way to evaluate the educational service provided by the museum, as well as to assess the museum's contribution in educating the public. Two main tests were used to measure change in knowledge, namely prior knowledge test and acquired knowledge test.

Table 4. 10: Prior Knowledge Test Results. Source: author.

Prior Knowledge		The remains of an extra-terrestrial particle which is found on earth's	The proper conditions for an organism to become fossilized	Which is least likely to become a fossil	Most fossils are of creatures that lived in	The most abundant component in the earth core	Geology is
N	**Valid**	271	229	285	287	263	286
	Missing	18	60	4	2	26	3
Right Answer (%)		218 (75.4%)	190 (65.7%)	179 (61.9%)	249 (86.2%)	163 (56.4%)	215 (74.4%)
Wrong Answer		54 (18.4%)	39 (13.4%)	43 (14.9%)	37 (12.8%)	100 (34.6%)	4 (1.4%)
Possible Answer		--	--	63 (21.8%)	1 (.3%)	--	67 (23.2%)

In the prior knowledge test, conducted pre-visit, participants were asked a number of multiple choice questions about general concepts in geology. One of the questions was omitted as for the very limited number of answers. Every question has four or five choices, generally question has one right answer, yet during questions development with museums geologist, some claimed the there are some possible answers for some question which have become possible due

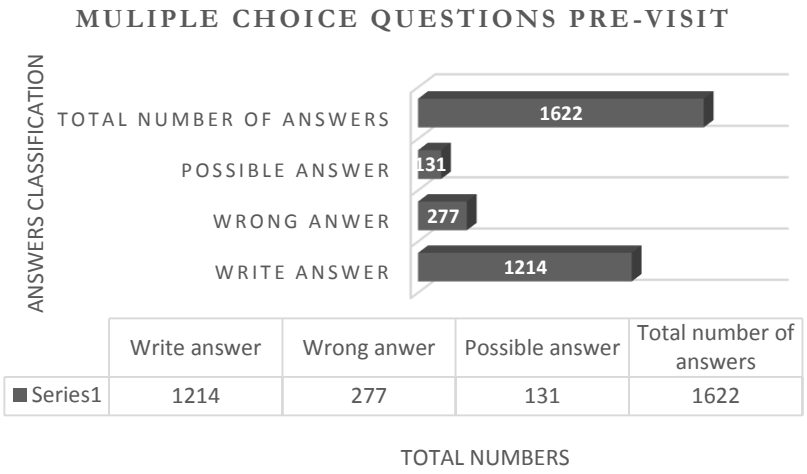

Figure 4. 7: The Change in Knowldeg Test Pre-visit Test Results. Source: author

to recent finding in Geology. Geologists are focusing on incorporating new scientific findings in their educational messages. Therefore, the higher the percentage of right answers or possible answers the better the results. As illustrated in (Figure 4.7), the total number of right answers is high, 1214(74.8 %). The number of possible answer are 131(8%). There was relatively a small number of wrong answers, 277(17%). It is worth mentioning that the questions are very generic and considered easy in terms of level of difficulty. The questions were meant to be for all visitors of all cultural backgrounds, ages and educations level.

Table 4. 11: Acquired Knowledge Test Results. Source: author.

Acquired Knowledge		The remains of an extra-terrestrial particle which is found on earth's surface	The proper conditions for an organism to become fossilized	Which is least likely to become a fossil	Most fossils are of creatures that lived in	The most abundant component in the earth core	Geology is
N	**Valid**	278	196	282	280	269	280
	Missing	11	93	7	9	20	9
Right Answer (%)		248(85.8%)	163(57.8%)	155(53.6%)	248(85.8%)	165(57.1%)	173(59.9%)
		30(10%)	33(10%)	45(15.6%)	32(11.1%)	104(36%)	1(.3%)
Wrong Answer		--	--	82(28.4%)	--	--	106(36.7%)
Possible Answer							

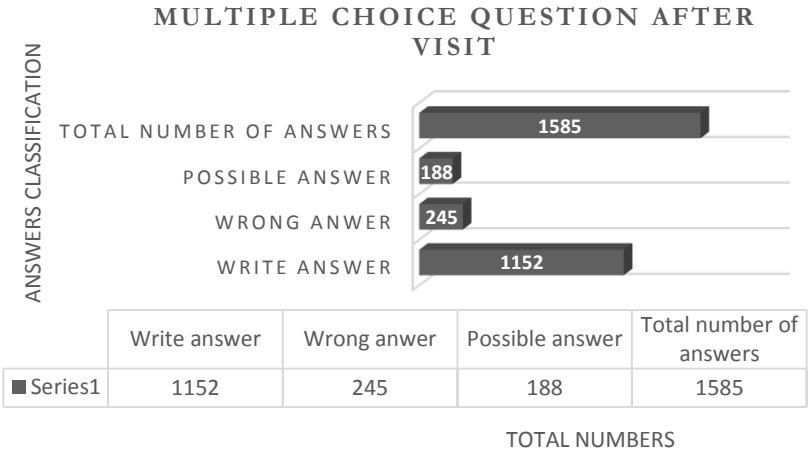

Figure 4. 8: The Change in Knowldeg Test Post-visit Test Results. Source: author.

In the acquired knowledge test, which was conducted post-visit, participants were asked the same questions they were asked before their visit. The main target was to measure the change in knowledge pre-visit and post-visit. As illustrated in (Figure 4.8), the total number of answers decreased as some visitors did not want to take the same test twice. Although the total number of wright answers decreased to be 1152(73%), the total number of possible answers increased to be

188(11.86%). The increase in the number of possible answers is a positive sign of change in knowledge during the visit. Also the total number of wrong answers decrease to be 245(15.45%).

4.3.3.1. The Subjective measurement of knowledge

Table 4. 12: Mean Value of Knowledge Pre-visit from the Subjective View of Visitors. Source: author.

	N	Minimum	Maximum	Mean	Std. Deviation
Rate your knowledge in geology	277	1.00	6.00	3.66	1.28

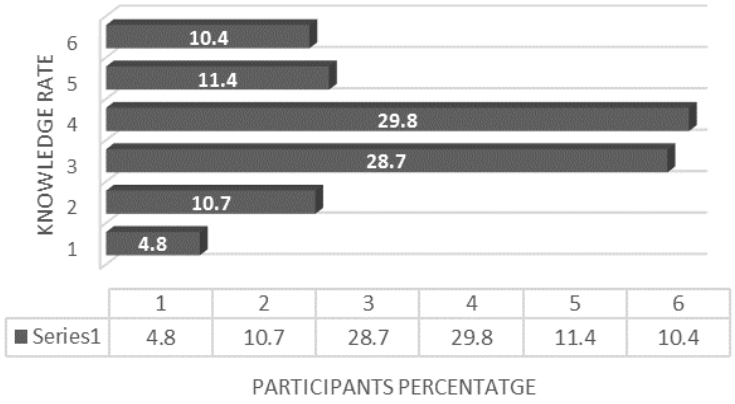

Figure 4. 9: Subjective Evaluation of Visitors Knowledge Pre-visit. Source: author.

In the prior knowledge test, conducted pre-visit, participants were asked to rate their knowledge in Geology. As illustrated in (Figure 4.9), around 60% of participants claimed that they had average to above average knowledge in geology. Around 20% claimed that they have very good knowledge in Geology, while only 15% of participant had limited knowledge about geology.

A subjective measure of acquired knowledge was included in the questionnaire. Participants were asked to evaluate the educational service provided by the museums. A six-level Likert scale was used where (1) reflected the lowest value and (5) reflected the highest.

Table 4. 13: Mean Value of the Quality of the Educational Service. Source: author.

	N	Minimum	Maximum	Mean	Std. Deviation
Rate The Museum's Educational Service	286	1.00	6.00	4.21	1.28

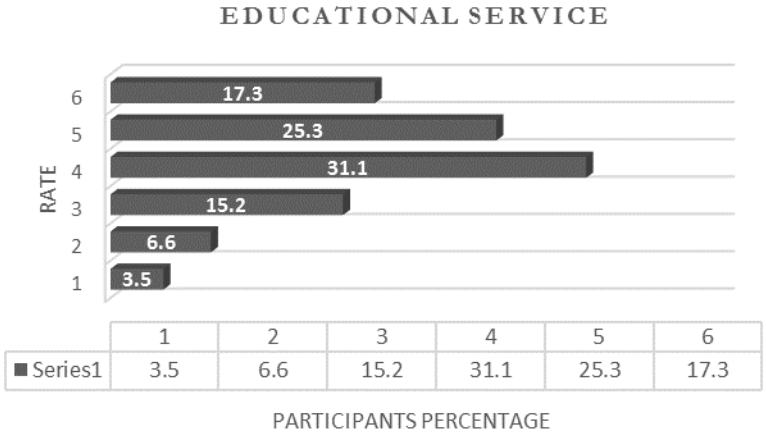

Figure 4. 10: Visitors' Evaluation of the Educational Service. Source: author

As illustrated in (Table 4.13), participants' evaluation for the educational service was above average to high, with a mean value of 4.21. As illustrated in (Figure 4.10), around 42% of participant rated the educational service as high. Another 31.1% of participant rated the service as above average, while 15.2% rated the service as average. Only 10% rated the service as below average.

4.3.4.2. Contextual Variables Affecting Knowledge Acquisition

- **Visitor's Motivations (Pre-visit)**

Table 4. 14: Visitors Motivation behind the Visit. Source: author.

	Visit Motivation	N	Minimum	Maximum	Mean	Std. Deviation
1-	I visit the museum to learn about its collection and the	289	1.00	6.00	5.13	1.24
2-	I visited the museum to have a good time about it	289	1.00	6.00	3.14	1.52

3-	I visit the museum to entertain people in my company (friends &	288	1.00	6.00	2.57	1.77

Visitor's motivation was included in the knowledge survey to investigate the extent to which visitor's motivation to visit the museum affected knowledge acquisition during the visit. A six level scale was used were 1 is to be given for biggest motivation behind the visit and 6 is the least. As illustrated in (Table 4.14), the biggest motivation behind visiting the Geological museum is learning about the collection as the mean value scored very high, 5.13 with a standard deviation of 1.24. The variability in the data is high.

In addition, the mean value leisure as motivation of the visit scored above average, 3.14. Also visiting a museum to entertain others had an average score of 2.57, which means that some visitors are not likely to visit museums if alone.

- **Prior Interest (Pre-visit)**

Investigating the extent to which a visitor is interested in Geology was included in the knowledge survey to assess its influence on knowledge acquisition during visit. As illustrated in (Figure 4.11), 65.4% of participant had prior interest in Geology. Although 34.6% of participants had low prior interest in Geology, they had the decision to visit the museum.

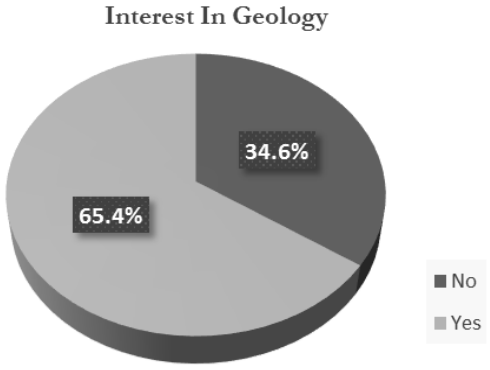

Figure 4. 11: Visitors Interest or Non-interest in Geology

Also the visit participant were asked about the topic that they find most interesting in Geology. As illustrated in (Figure 4.12), the biggest percentage of participants 42% were interested in fossil. This aligns with information provided during interview with front-line staff that fossil collection was the most investigated collection by visitors. In addition, 28.7% of participant were interested in rocks, while only 4% of participants were interested in minerals collection.

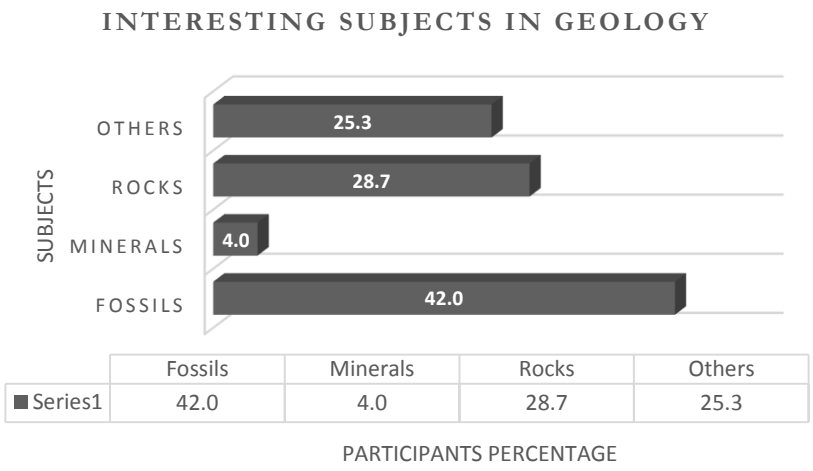

Figure 4. 12: Visitors Interest in Geology. Source: author

- **Prior Experience**

Visitor's prior experience with the museums was investigated to assess the extent to which such variable affected knowledge acquisition during the visit. As illustrated in (Figure 4.13), around 93% of participant had not visited the museum before research data gathering time period, while 7% of visitors had had visited the museum before. This give a preliminary indicator of the revisit rate in the museum.

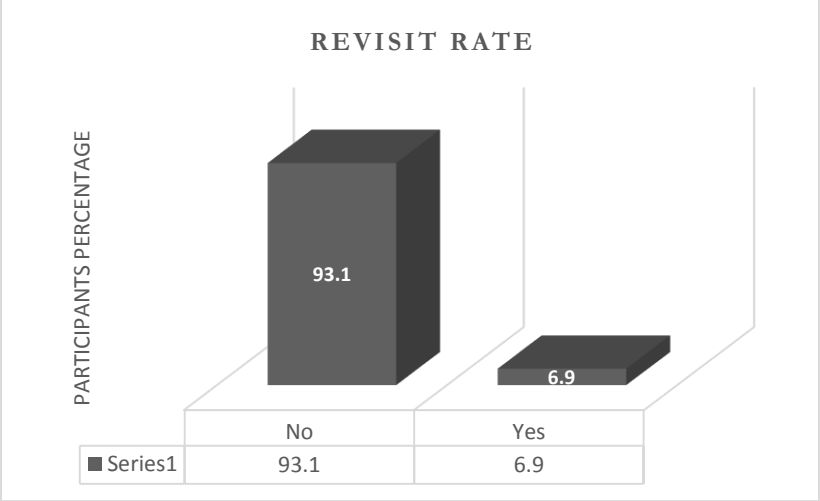

Figure 4. 13: Revisit Rate at the Museum. Source: author.

- **Choice & Control (Pre-visit & Post-visit)**

Participants evaluated their preference for choice & control before visit. Pre-visit aspired level of control over visit was measured. Post-visit, the level of visitor's control over the visit was assessed from the subjective view of visitors.

A six level scale was used where 1 is to be given for highest control and 6 is the least. Almost 65.6% of participants prefer to have minimal or no control over their visit, which means they would like to be guided whether by a tour guide or at least by using orientation maps. Another 25% prefer to have medium control over visit, while only 13.2% prefer to have a full control over their visit. Post-visit, participants were asked to rate their level of control experienced during their visit. Only 30.4% had no control over the visit, 38.8% had medium control over the visit, while 30.8% had full control over their visit.

While 65.6% preferred to have limited control over visit, 30.4% only have such limited control during the last visit. This could be due to that fact that the cost of tour guidance or the limited time the visitor dedicated to the visit.

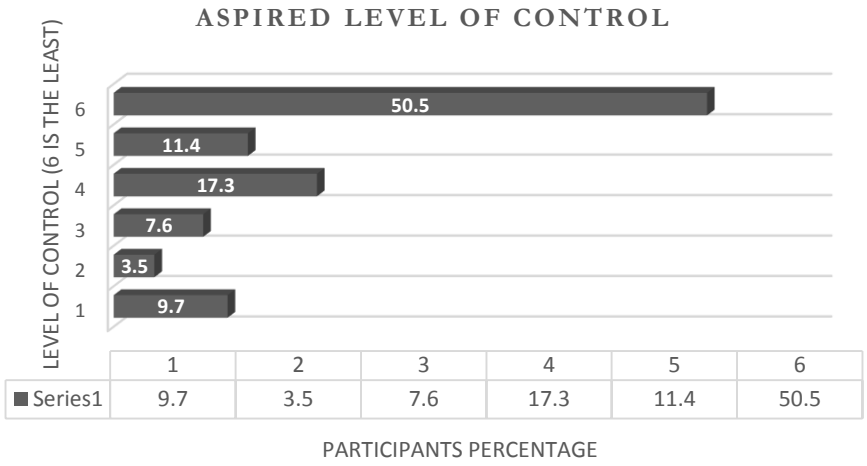

Figure 4. 14: Aspired Level of Control over the Visit. Source: author

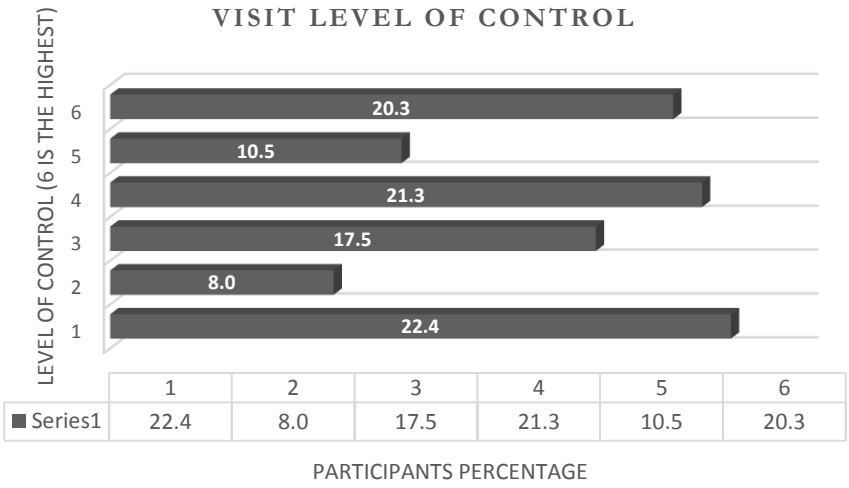

Figure 4. 15: Level of Control of the Visit. Source: author.

- **Social Interaction (Post-visit)**

Social interaction contextual factor was assessed post-visit. Post-visit participants were asked about their interaction with front-line staff during the visit, where interaction means two-ways communication and this is different from guidance as guidance could result in a form of one-way communication. After that participants were asked to rate the usefulness of front-line staff, geologists, this might be rated based on the one-way of the two-ways communication

occurred during visit. A six level scale was used were 1 is to be given to low usefulness with staff and 6 is high usefulness. Almost 56.3% of participants rated front-line staff as very useful. Another 31.4% believe they were average. 4.9% believed they were below average and 7.5% believe they were not useful to them during the visit. The overall interaction with front-line staff in the museum is considered high.

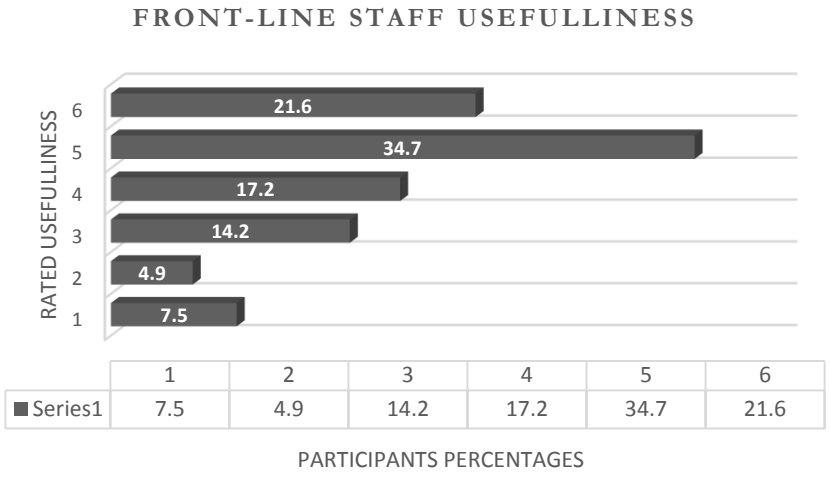

Figure 4. 16: Visitors' Evaluation of the Front-line Staff Competency. Source: author.

4.3.4.3. Investigating the level of change in visitor's knowledge

This section involves further analysis on the Knowledge measurement model: (1) Paired Samples t-test was conducted to investigate the level of statistical significance between visitors' knowledge pre-visit and post-visit; (2) Analysis of Variance (ANOVA) tests were conducted. Tukey's-b Test was used to help identify the visitors group that has experienced significantly different change in their knowledge than other groups; (3) Linear regression was conducted to understand the effect of contextual factors on knowledge change during the museum visit experience.

A paired-samples t-test was conducted to determine whether there was a significant mean difference between visitors' Knowledge pre-visit and post-visit. In order to perform the test, the number of right answers was counted for each question of the 6 MCQ questions, for each

visitors. This approach helped in measuring the change in the number of the right answer before and after the visit, for each visitor. The mean differences for all item were not statistically significant. By using the objective measurement of knowledge, results showed that there were not significant differences between visitor's knowledge before and after the visit.

4.3.4.4. Investigating Variance in Visitor's acquired knowledge between participant Groups

A one-way ANOVA was conducted to assess variances in acquired knowledge between group participants. Participants were classified age into four groups: 12-16 (n=129), 17-24 (n =103), 25-40 (n =22) and Above 40 (n=18). Participants were also classified by social groups into four groups: school (n= 176), university (n=47), family (n=43) and foreigners (n=6). Additionally groups were classified by gender into male (n=144) and female (n=127).

Knowledge with Age Groups

The variance in the number of right answers between different age groups participants post visit was investigated. A statistically significant difference was found participants of different age groups. Welch's F (2.373) = 49.081, $p < .0005$. Tukey's post hoc analysis revealed that age group (12-16) experienced a greater change in their knowledge during their visit, while age group (25-40) experienced the least change in their knowledge during their visit. This could be attributed to the fact that age group (12-16) were visiting the museum for educational purpose, and also they get guided by front-line staff during their visit.

4.3.4.5. Testing the relationship between visitor's acquired knowledge using both objective and subjective knowledge measurement models and contextual factors

Regression analysis of acquired knowledge using both object and subjective knowledge measurement models against contextual factors answered one of the major research question:

MjRQ5: How do contextual factors such as the visitor's motivation, prior interest and control over the visit affect the extent of knowledge acquired from the visit?

Performing regression analysis using the objective knowledge measurement (right answers postvisit) revealed that no correlations existed between acquired knowledge and contextual factors existed within the museum environment.

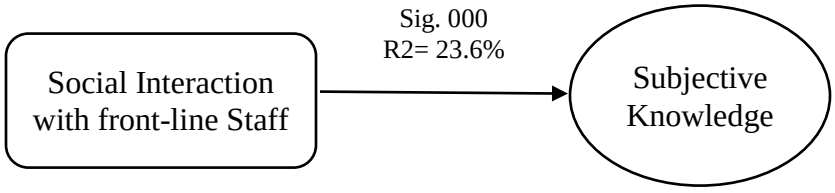

Figure 4.17: Relationship between Subjective Knowledge and Contextual Factors of the Museum. Source: author

Performing regression analysis using the subjective knowledge measurement, the question that requested participant to rate the educational service in the museum, revealed that a correlation existed between subjective knowledge and contextual factors existed within the museum environment.

As illustrated in (figure 4.17), the interaction with front-line staff for knowledge acquisition explained 23.6% of the variance (R2). Other contextual factors, such as visit motivation, prior interest, and control over visit had no statistically significant correlation with knowledge acquired from the subjective view of visitors during the visit. No other significant relations where found. One interpretation could be as follow: when visitors found the interaction with museum staff to be useful, it positively influence their perception of having acquired knowledge as a result of visiting the museum, even if their level of knowledge of Geology as measured objectively through MCQ test did not change significantly.

4.3.5.Social Sustainability Measurement Model

4.3.5.1. Descriptive Analysis of Social Sustainability

The third section covered the analysis of the construct of social sustainability. The data for this model was collected post-visit. The model was divided into four variable as mentioned in chapter 3 (methodology): 1) Credibility, 2) Identity, 3) Community Support and 4) Involvement

A. Credibility Construct

Credibility is the first variable in the proposed the social sustainability construct. A five-level Likert scale was used where 1 is to be given for highest credibility and 5 is the lowest. As illustrated in (table 4.15), the mean values of credibility was 2.37 with a standard deviation of .957. This indicates that participants' believe that the museum was moderately doing their job toward the community. However the museum is expected to increase their activities to better serve the community.

Table 4. 15: Evaluation of the Level of Credibility achieved by the Museum. Source: author.

Credibility	N	Minimu	Maximu	Mean	Std. Deviation
The museum is doing its job in serving the community	288	1.00	5.00	2.37	.957

B. Identity Construct

Identity is the second variable in the proposed social sustainability construct. A five-level Likert scale was used were 1 is to be given for most unique identity and 5 is the lowest. As illustrated in (table 4.16), the mean values of identity was 2.07 with a standard deviation of .920. This indicates that participants' had above average perception of the unique identity of the museum in culture and history. Yet the museum still could work to strengthen such perception.

Table 4. 16: Identity of the Museum. Source: author.

Identity	N	Minimu	Maximu	Mean	Std. Deviation
The museum holds a unique identity in culture and history	289	1.00	5.00	2.07	.920

C. Community Support

Community support is the third variable in the proposed social sustainability construct. A five-level Likert scale was used were 1 is to be given for the highest level of community support and 5 is the lowest. As illustrated in (table 4.17), mean values for the variable of community support was high, 1.40. This indicates that participants' support the museum's existence and they believe that it should be sustained.

Table 4. 17: The Level of Support to the Existence and Continuity of the Museum. Source: author.

Community Support	N	Minimu	Maximu	Mean	Std. Deviation
the museum should continuously be supported by the government to sustain its work for future generations	285	1.00	4.00	1.40	.661

Additionally, participants were asked about the means through which they would like to support the museum. Almost 63% of participants claimed that they give recommendation to others to visit the museum. Another 18.7% of participants claimed that they would volunteer, while 8.7% claimed that they would support the museum financially.

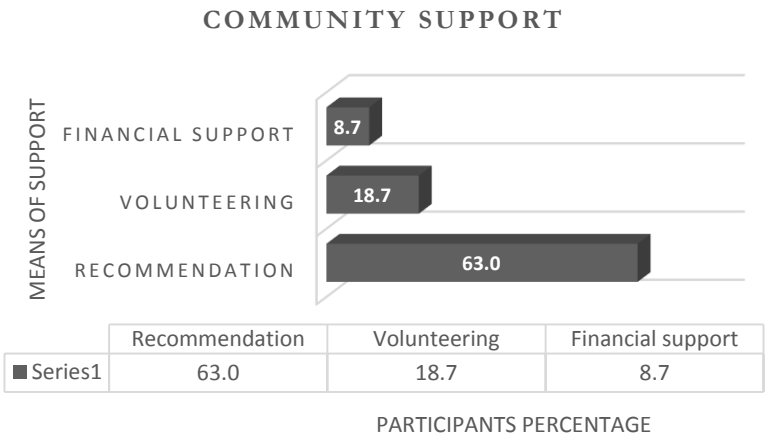

Figure 4. 17: Means of Visitors Support. Source: author.

4.3.5.2. The Measurement Model for Social Sustainability

A principle factor analysis (PCA) was conducted using three items, namely identity, credibility and community support. PCA was conducted to seek support from the data regarding the theorized structure of the construct that is reflected in the three aforementioned items of social sustainability.

A principle component analysis was run with a Varimax rotation on the variables of the social sustainability survey questionnaire. The Kaiser-Meyer-Oklin (KMO) measure score was .54, which reflects sampling adequacy as stated by Kaiser (1974). Also the Bartlett's Test of Sphericity was statistically significant (p <.001).

The three item of social suitability loaded well on the factor. Identity item had the highest loading of .835, followed by identity variable with had a loading of 827, and then community support which had a loading of .445. Results supported the validity of the social sustainability construct in the context of the Egyptian Geological museum as defined in the study conceptual model presented in Chapter 3 (methodology).

4.3.5.3. Testing the relationship between visitor experience and the level of social sustainability of the museum

The regression answers a major research question: MjRQ7. To what extent does the visitor experience determine the museum's social sustainability?

As illustrated in (figure 4.18), visitors' satisfaction explained 25.1% of the variance in the social sustainability of the museums (R2). A positive association existed between satisfaction as independent variable and social sustainability, while no significant association existed between acquired knowledge and the social sustainability of the museum.

Linear Regression (1) Using objective measure of Knowledge

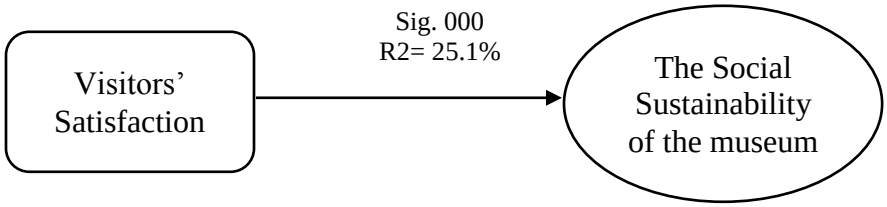

Figure 4. 18: Relationship between Visitors' Experience (objective measurement of knowledge) and Social Sustainability. Source: author

4.3.5.4. Testing the relationship between knowledge using the subjective measurement, visitor's satisfaction and the level of social sustainability of the museum

As illustrated in (figure 4.19), visitors' satisfaction and subjective knowledge explained 25.1% of the variance in the social sustainability of the museums (R^2). A positive association existed between satisfaction and subjective knowledge as independent variable and social sustainability.

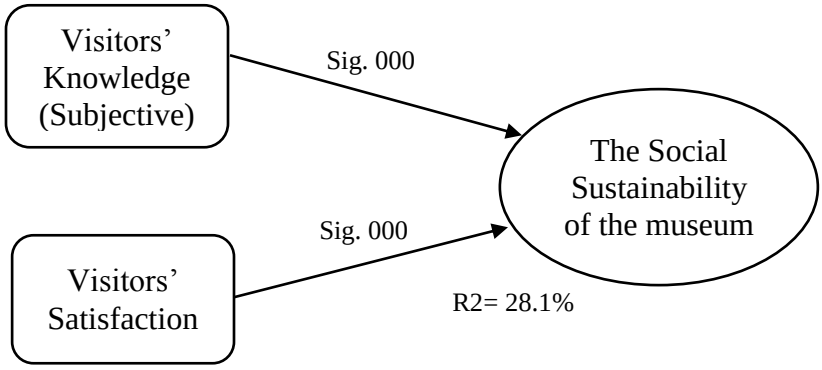

Figure 4. 19: Relationship between Visitors' Experience (subjective measurement of knowledge) and Social Sustainability. Source: author

Findings revealed the extent to which visitor's satisfaction is important in museum social sustainability. The findings aligned with facts reported in Chapter 1, (literature review), about the significance of visitor-oriented for museums development. Findings also showed that it was the subjective experience of visitor's that affected the level of social sustainability of the museum.

Additionally, the subjective evaluation of museum knowledge was affecting the social sustainability of the museum more than objective addition of knowledge.

Chapter 5

Discussion, Findings and Recommendations

The study proposed a comprehensive framework for museums development. The framework presents instruments for measuring visitors' satisfaction with current services provided by the Egyptian Geological Museum, assessing the effectiveness of the educational service and investigating the extent to which the museum is socially sustainable. Additionally, the study investigates the extent to which social sustainability is affected by acquired knowledge and visitors' satisfaction with the visit. The study also proposed a definition and measurement scale for social sustainability of the museum, and examined the relationship between visitors' experience and the level of social sustainability. The study findings carry important implications for the museum's management, with specific actionable recommendations in key areas such as: strategic marketing, communication and service.

This chapter discussed the following: 1) main findings and their interpretations of the results of the Servqual survey questionnaire used to measure the service quality from the subjective view of visitors and visitor's level of satisfaction, the knowledge survey questionnaire used to measure knowledge, and the construct of social sustainability, 2) Managerial Implications drawn from the study results, 3) Policy Implications, 4) contribution of the study, 5) recommendations for future research.

5.1. Differences between Visitor's Expectations & Perceptions as an Indicator of the Level of Service Quality

The biggest differences in mean values between visitor's expectations and perceptions were found in the items under (Entrance & Reception) and (Literature & Souvenirs), while moderate differences were found in items under (Exhibition Design and theme). On the other

hand, the smallest differences appeared in the items related to (Personnel competency). Based on the regression analysis conducted on perceived service quality and the level of visitor's satisfaction, the service quality explained 31.8% of the variance in the customer satisfaction with the museum visit (R2). Factors that had significant association with satisfaction were (Exhibition Design and Theme), (Personnel Competency) and (Literature and Souvenirs). Both (Exhibition Design and Theme) & (Literature and Souvenirs) are factors that the museum management is advised to consider in order to increase the level of visitor's satisfaction. (Personnel Competency), although influenced the level of visitor's satisfaction, relatively small differences were found between visitor's expectations and perceptions, which means that the status of items within the factor were meeting visitor's expectations. Also museum management are advised to consider service items of (Entrance & Reception) as it will positively affect visitor's perceptions of the quality of services provided by the museum.

5.2. Adjust Service Quality to Increase the Level of Satisfaction

This section includes recommendations for management and front-line staff to increase visitor's satisfaction and perception of service quality, followed by explanations for recommended actions for developments.

1 ***Management is advised to allocate more resources on the development of the main exhibition:***

The arrangement of the exhibition in terms of logical order of collection items, the attractiveness of the exhibition in terms of design, the availability of interesting activities that suits all age groups, the adequacy of lighting, and the extent to which the exhibition vitrines are accessible to all age groups to easily investigate the collection. The five aforementioned items would result in a higher level of satisfaction for all visitors of different age groups. The

satisfaction of the age group (above 40) is partially dependent on the aforementioned items related to Exhibition design and theme.

While (Exhibition Design and Theme) is one of the elements that affect the level of visit satisfaction, perceptions of the attractiveness of the exhibition ranged from average to low. Younger groups of visitors, (12-16) & (17-25), had average perceptions of items within this factor. On the other hand, age group (above 40) had low perception of the factor with a mean value of 3.38. the main items which had low perceptions within the factor were the arrangement of the exhibition in terms of logical order of collection items, the attractiveness of the exhibition, the availability of interesting activities that suits all age groups, the adequacy of lighting, and the extent to which the exhibition vitrines are accessible to all age groups to easily investigate the collection.

2 Management is advice to dedicate a well-seen and a well-designed spot at the museum for products display.

The second biggest differences between perceptions and expectations were found in items under (Literature and Souvenirs). Generally perceptions of Literature and souvenirs were below average, while expectations regarding the availability of high-quality collection of literature and souvenirs were high. Finding revealed that the age group (above 40) had significantly higher Expectation for such item than other visitor groups. This could be attributed to their interest in buying products for sale. Therefore, the museum management is advice to consider items under the factor of (literature and Souvenirs) in order in boost visitors' perceptions of the service quality and increase the level of satisfaction with the visit. Based on interview with front-line staff, management team and researcher evaluation of products for sale, the museum provided good quality products that were expected to be valued by different groups of visitor. However, literature and souvenirs have a very poor display, and a lot of products are

not on display. Working to improve display would boost revenues from sale of literature and souvenirs items.

3 ***Front-line staff is advised to design more creative ways for communicating the knowledge to visitors of different age groups and educational back-grounds.***

4 ***Front-line staff is advised to take the initiative to offer guidance to all groups, especially age group (17-24).***

5 ***Management is advised to reduce the cost of guidance for small groups that are targeting the museum.***

Personnel Competency is the third element that affected the level of visitor's satisfaction. Generally perceptions of personnel competency ranged from average to high. Age group from (25-40) lower perceptions could be attributed to the fact that a considerable percentage of this group were family groups. Generally family groups were visitors who are not specialized in geology which made them more challenging to receive technical information provided by the museum front-line staff. For the museum to increase the level of satisfaction regarding museum personnel, interaction and creative ways for communicating the knowledge to visitors who do not have strong knowledge in Geology are essential. This will positively affect the level of satisfaction and perceptions of family groups regarding the front-line staff of the museum.

Perceptions regarding the helpfulness of the museum personnel were low for age group (17-24) with a mean value of 3.04. This age group might have needed more help than the younger group (12-16), who were more dependent of the school program or their instructor. Also the group age (17-24) might have needed more support than older groups, who usually prefer to have total control over the visit. For museum management to increase the level of satisfaction regarding personnel, front-line staff should offer more help to age group (17-24) even if they do not ask for full guidance. This age group could get more satisfied if it had the same service

which was offered to school students. From research observation, staff did not take the initiative to offer guidance to any group, only if visitors asked for it. Front-line staff are advised to recommend this age group (17-24) to have full guidance. (Educational programs)

6 ***Staff are advised to prepare a map that indicates nearby touristic attractions.***

7 ***Management is advised to provide a more suitable parking area which is big enough and more approachable by all visitors.***

The first biggest differences in mean values between visitor's expectations and perceptions were found in the items under (Entrance & Reception). Therefore, the museum management is advice to consider those items in order in boost visitors' perceptions of the service quality.

The greatest differences scores went to the museums architecture and orientations maps yielding 1.85 & 1.68respectively. With such differences, those three elements were considered to have the most negative effect on the museum's service quality.

Expectations regarding the availability of a map that included nearby touristic attractions were significantly different between participants of different age groups. Findings revealed that the age group (25-40) had the highest expectation for such item with a mean value of 1.5, followed by the age group (above 40) with expectations mean value of 1.67. Younger age groups (17-24) & (12-16) had lower expectations regarding the availability of a map that illustrated nearby touristic attraction. From the aforementioned results, it could be concluded that elder age groups (25-40) & (above 40), are more interested in visiting more than one touristic attraction at a time. Proposing routes for visitors who are interested to spend their day in visiting different touristic and cultural attractions is expected to increase the level of visitor's satisfaction. Also from observation and interviews with foreigner visitors, this element turned to be of significant importance to foreigner groups.

Findings revealed that the general perceptions of the existence of a suitable parking was low. Findings also revealed that the age group (above 40) had significantly higher Expectation for the availability of parking area than the age group (12-16). This could be attributed to the fact that the younger age group of (12-16) visited the museum using the school bus, while the elder age group of (above 40) visited the museum using private cars. There is a parking area that is attached to the museum, but it does not belong to the museum. The current parking area not big enough to host more than five cars. Also busses were not allowed to use the parking. A more suitable parking area which is big enough and more approachable by all visitors is expected to increase visitor's perceptions of the quality of services provided by the museum.

Knowledge at the Museum

8 Museum staff are advised to design their tour guiding lecture to suit the group that is visiting the museum.

Findings revealed that no correlations existed between acquired knowledge and contextual factors existed within the museum environment, while a positive association existed between subjective knowledge and social interaction within the museum environment.

Museum staff are recommended to design their tour guiding lecture to suit the group that is visiting the museum. For example incorporate some interesting activities for family groups to encourage them to get involved with front-line staff and learn from them. Through observations, the museum staff are currently working on new approaches for communicating knowledge and they are exerting great effort in transferring their educational message to all types of visitors. For example, they started producing short movies about up-to-date topics in geology and they dedicate (10-30) minutes of the visit experience for watching and discussing a movie. Also they started offering workshops in which children are involved in a process of preparing a mold of a fossil. Front-line staff should take the initiative and recommend guidance including those

interactive activities for family groups which is expected to positively affect the acquired knowledge.

Social Sustainability of the Museum

9 ***Management is advised to have activities out-side the museum premises to better contribute to community development.***

Credibility, identity and community support are the three element the explained social sustainability in the Egyptian Geological Museum.

Findings revealed that the mean value of the level of credibility was 2.37 with a standard deviation of .957. This indicates that participants' believe that the museum was moderately doing their job toward the community. Offering activities, such as trip to geological sites, lectures and temporary exhibitions that tackle issue related to recent scientific finding are expected to increase that level of credibility which contributes to the museum social sustainability.

The level of social sustainability of the Egyptian Geological museum turned out to be dependent on the level of customer satisfaction with the visit as well as the perceived quality of the educational service. Managers should adopt approaches presented in the previous sections in boost the level of satisfaction with the visit. Also they should consider different ways in communicating knowledge to different groups and not to focus on students as a way to increase visitors' perception of educational service quality, which in turn will positively affect social sustainability of the museum.

5.3. Managerial Implications to Attract Different Groups and Increase the Outreach and the Revisit

Segmentation is one extremely important marketing approach. Museums directors should be aware of the fact that an effective communication channel helps the museum increase the level of satisfaction with the visit and consequently encourage revisit. Based on the analysis and

the finding of what makes each group of visitors satisfied with the visit, various approaches for visitor outreach could be developed.

To attract and encourage the age group (12-16) to revisit:

1 ***Management should compensate and motivate their front-line staff.***

2 ***Interactive activities that combine educational messages with leisure activities.***

This group visits the museum for educational purposes. The mean value for the level of satisfaction of the group was 2.4. Analysis revealed that the level of satisfaction of the group was met by one of the elements affecting the overall satisfaction with the visit, competent personnel. This group is highly dependent on information provided by museum's front-line staff, as they were guided by them during their visit.

Analysis revealed that the front-line staff in the Egyptian Geological Museum is a great asset. Fortunately, the museum management were aware of the fact that their strength is in the staff of geologist who are working in the museum and directly interacting with visitors. The museum management is advised to keep on qualifying their staff, through training. Also as stated by the management staff during the interviews that they were mainly targeting schools and university students for educational purposes. The findings revealed that they succeeded in their mission to attract and satisfy those groups of visitors, which was accomplished through hiring competent personnel to serve their vision. However, (12-16) had significantly lower perception of the presence of interesting activities for groups of different ages, with a mean value of 3.33 for both age groups. Incorporating more activities during the visit that are suitable for this age group is expected to positively affect the level of satisfaction with the visit.

To attract and encourage age group (17-24) to revisit:

1 ***Staff should initiate full guidance.***

As stated earlier in this chapter, this age group needs to get encouraged to interact more with the museum front-line staff to learn and to have a better perception about their competency. For museum management to increase the level of satisfaction regarding personnel, front-line staff should offer more help to age group (17-24) even if they didn't ask for full guidance. This age group could get more satisfied if it has the same service which is offered to school students. Front-line staff are advised to recommend this age group (17-24) to have full guidance.

To attract and encourage age Group (25-40) to revisit:

1. ***Management is advised to develop the main exhibition.***
2. ***Management is advised to conduct in-depth interview with family groups to learn more about their needs.***
3. ***Management is advised to evaluate any newly proposed activity from the subjective view of visitors and consider visitor's needs and aspiration its development.***

This group visits the museum for both leisure and educational purposes. The mean value for the level of satisfaction of the group was 2.2. This group of visitors is more challenging, due to the fact that they include different age groups, and they generally had higher expectations regarding most services. They visit a museum for leisure purposes, while the museum is focusing on education provision. Museums directors are advised to work on increasing this segment for the following reasons: 1) during school vacation, especially the summer vacation, the museum is hardly having visitors, 2) focusing on more than one group of visitor's is expected to affect the level of social sustainability of the museum, 3)the museum would be better contributing to community development.

To increase the level of family group satisfaction of age group (25-40), and encourage the revisit, management is advised to consider below mentioned items:

As revealed by the analysis that the age group (25-40) had significantly lower perception of information arrangement within the main exhibition, with a mean value of 3.13. Management directors should dedicate more resources for the development of the main exhibition to increase the level satisfaction of family group.

Analysis also revealed that age group (25-40) had significantly lower perception of the presence of interesting activities for groups of different ages, with a mean value of 3.33 for both age groups. Museum management is advised to keep on developing more activities that suits all age groups visitors. Also they are advised to evaluate any newly proposed activity from the subjective view of visitors and consider visitor's needs and aspiration its development.

Additionally, analysis revealed that the age group (25-40) had significantly lower perception of the adequacy of exhibition lighting, with a mean value of 3.04, than other age groups. Generally perceptions of lighting adequacy ranged from average to below average. Therefore, management is advised to dedicate more resources in developing the exhibition interior.

Finally analysis revealed that the age group (25-40) had significantly lower perception of the extent to which the collection is accessible for all age groups, with a mean value of 3.3, than other age groups. Generally perceptions of this item ranged from average to low. Age group (25-40) lower perceptions could be attributed to the fact that family groups include children, therefore the heights of the current display vitrines and shelves would not be accessible for them. Management is advised to dedicate more resources in developing the exhibition interior.

Also management is advised initially to conduct in-depth interviews or focus groups with family visitors to better understand their needs regarding the aforementioned elements to be considered in the museum action plan for development.

5.4. Policy Implications for The Museums and other Egyptian Museums Development

To foster proposed approach for development, a set of recommendations targeting policy makers were drawn from the study.

1 ***Policy maker are advised to consider adding a marketing unit within the museum.***

As presented in the study, the inclusion of a marketing unit have become essential for museums development and sustainability. A marketing unit could work for the benefit of a group of museums. A marketing unit that conducts periodical research on visitors using the surveys and the research techniques used in the study to know about their need, develop outreach programs for non-visitors and work on the publicity is an important step toward socially sustainable museums.

2 ***Policy makers are advised to have an educational unit within the museum***

As presented in the study, the inclusion of educational unit have become essential for museums development and sustainability. The museum should have an educational strategy that consider recent developments in knowledge communication and dissemination. In the case of the Egyptian geological museum, education specialist can work in collaboration with museum geologist on developing educational programs that are design targeting each group of the museum's visitors.

3 ***Policy makers should be aware of the importance of developing a positive image of the role of the museum as a provider of education and leisure.***

Building a positive image that combine education and leisure, on policy level, could be achieved firstly through placing an educational policy that communicate all school, university and other educational institution with museums for learning purposes. This way local and

international community would have different perspective on the role of museum in community development. Secondly, placing museum as leisure venues by dedicating resources for activities development rather than only focusing on the collection would serve museums efforts to have healthy flow of visitors form local and international community.

4 ***Policy makers should be aware of the great importance of building collaboration between all museums in Egypt, including all specialized museums, such as the Egyptian geological museum.***

Combined efforts for development and information exchange between museums are intrinsic to their development and sustainability. In the case of the Geological museum, the institution is under the supervision of ministry of mining and all manager and staff members are geologist. Therefore, the museums lacks the presents of museologists who are primarily responsible museums design and organization. A policy which fosters collaboration between different ministries under which museums of Egypt are placed is expected to support museums development and to facilitate effort for development within the institution.

5 ***Policy makers are advised to facilitate community involvement in museums work.***

Community involvement whether through volunteering or involvement in the decision making would help museums development with less burn on the government in terms of resources. Visitors should be invited to volunteer in museums, attend discussion tackling future developments, and experience that their view are taken into consideration by museums professionals. There should be clear rules and regulations to facilitate the interactions between museums staff and volunteers. Also the inclusion of

visitors in decision making would result in sustainable development as presented in the study.

5.5. Study Contribution

This study offers two main contributions to museums sustainability literature: a comprehensive framework for museums evaluation, which includes assessment of service quality from the subjective experience of the visitor, the effectiveness of the educational service, and the level of social sustainability of the museums. This method could be used in future research as well as in practice.

Another contribution is the developed construct of social sustainability. The developed construct is positively adding to the literature on social sustainability that is to date loosely defined in the literature. The measurement scale developed in this research for measuring social sustainability can be considered a first step towards the development of a validated scale for measuring social sustainability of museums, and possibly other organizations.

Another contribution is the empirical work in conducted the Egyptian Geological museum through which the service quality, the effectiveness of the educational service as well as the level of social sustainability were evaluated, which will help in future developments.

The study findings will help managers to develop a new perspective on how to conduct a development approach that increase the level of social sustainability of museums and provide better services that meets the needs of the visitors.

The proposed study offers contributions to academia and business. From an academic standpoint, the recommended model represents a creative research design which is expected to provide a guide for future research studies. The study contributions to the nascent literature on social sustainability which is still in its early development. From a business standpoint, the

proposed evaluation model is to be used by museum management unit for evaluation and development.

5.6. Future Research

Future research could tackle several areas which are expected to contribute to the adopted development approach, the visitor-oriented approach, one of which is non-visitors research. Researching non-visitors could help museums to attract more visitors through using right marketing messages and marketing channels to attract non-visitors. .

Another areas for research could tackle the other two major factors of sustainability: economic and environmental sustainability. Museums in Egypt are governmental institutions. Financial constraints on museums are big problems to their sustainability. Research that contribute to economic sustainability of museums in Egypt is an extremely important to be studied by researchers. Also the area of environmental sustainability is an important field of research. It is expected to be tapped into by geologist in the case of the Egyptian geological museum. It basically focuses on the efficient extraction and conservation of collection. Additionally, another pillar of sustainability, intellectual sustainability, was recommended by museum practitioners in Bristol meeting (Friedman, 2007). Intellectual sustainability which reflects the extent to which the staff are updated with latest news, innovations and developments in the field they treat, is an important area of research, especially in science museums.

Also further extension and refinement and definition of social sustainability and its measurement scale would contribute to sustainable development of museums.

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APPENDIX A: Survey Questionnaire

A	Preferential/Expectations Model	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Museums and its surrounding						
1	I care that the external design or look of a museum building is unique					
2	I care to find a suitable parking area next to a museum					
Reception/ticket office						
3	I care that Ticket-office personnel are friendly					
4	I care that Ticket-office personnel give a brief description of the museum's nature and activities					
5	I care to find a clear map to orient visitors during their visit (a map which illustrates different activities locations)					
6	I care to find a map of nearby tourist attractions					
7	I care to be warned of potential danger that might occur during a visit or an activity					
8	I care to be informed of forbidden behavior during the visit, such as touching collection in display					
Literature and souvenirs selling area						
10	I care to find interesting and high quality collection of literature and souvenirs					
11	I care to find reasonably priced literature and souvenirs					
12	I care to find good display of the products for sale					
Exhibition						
13	I care that the exhibition is interestingly arranged and attractive					
14	I care that a museum exhibition presents a series of ideas in a logical order					
15	I care that a museum exhibition presents information about the museum history and establishment					
16	I care that exhibition personnel voluntarily trying to help visitors to find their way through the museum, even if the visitor does not pay for guidance					
17	I care that exhibition personal provide competent information about the museum collection					

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
18	I care that a geology exhibition provides interesting activities for groups of different ages and backgrounds					
19	I care to find a research facility or a library that is accessible to interested visitors					
20	I care that the interior design of a museum presents a unique architectural style					
21	I care that a museum has a well-designed illustrative signage for all displayed pieces					
22	I care to find signs to orient visitors movement within the exhibition					
23	I care that a museum has adequate lighting					
24	I care that the collection is displayed in a way which makes it comfortable and easy for all age, children as well as adults, group to look at it					
Services						
25	I care to find a place for visitors to rest and have coffee and snacks					
26	I care to find proper and clean toilets					
27	I care to find toilets for disabled visitors					

B	Contextual learning Model	**1 Low**	**2**	**3**	**4**	**5**	**6 High**
Motivations							
1	I visit the museum to learn about its collection and the geology science						
2	I visited the museum to have a good time						
3	I visit the museum to entertain people in my company						
Prior Knowledge							
4	How would you rate your knowledge in geology?						

5- Geology is:

a. earth Science
b. sea Science
c. space Science
d. all of the above

6- Which is least likely to become a fossil?

a. a feather
b. a bone
c. a shell
d. a piece of wood e. None of the above

7- Most fossils are of creatures that lived in:

a. the sea
b. rivers
c. fresh water
d. the land
e. All of the above

8- The most abundant component in the earth core:
a. iron
b. copper
c. nickel
d. aluminum
e. None of the above

9- the proper conditions for an organism to become fossilized:
a. The existence of a solid structure
b. Rapid burial of the object after death
c. Suitable burial conditions
d. All of the above

10-The remains of an extraterrestrial particle which is found on earth's surface is called a(n)
a. meteoroid
b. asteroid
c. meteorite
d. satellite

Prior Interest							
11*	Is there a topic in geology which you find particularly interesting? If yes, What is it? ( )					**YES**	**NO**
12	If there a program on geology that is shown on a weekly basis, on national geographic for example, how would you rate you interest in showing such a program?	**1**	**2**	**3**	**4**	**5**	**6**
Prior Experience							
13	Do you know what types of collections the museum has?					**YES**	**NO**
14	Did you visit the Geological museum before?						
Choice & Control							
15	There are some people who really want to know where they are going through the museum and there are some people who just go a long on a totally whim bases. (1=enter and go wherever your whim takes you), (6=always use maps and directional signs or need guiding)	**1**	**2**	**3**	**4**	**5**	**6**
Length of Entry Interview:							

C	Perceptions Model	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Surroundings of the Geological Museum						
1	I find that the external appearance of the museum building is unique					
2	I found a suitable parking area next to the museum					
Reception/ticket office						
3	The Ticket-office personnel were friendly to me					
4	The Ticket-office personnel gave a brief description about the museum nature and activities					
5	The is a clear map to orient visitors during their visit(a map which illustrates different activities location)					
6	The is a clear map of nearby tourist attractions					
7	I was warned of potential danger that might occur during a visit or an activities					
8	I was informed of forbidden behavior during the visit, such as touching collection in display					
Literature and souvenirs selling area						
9	There is an interesting and high quality collection of literature and souvenirs					
10	The literature and souvenirs are reasonably priced					
11	Products for sale are displayed in an attractive way					
Exhibition						
12	The exhibition is interestingly arranged and attractive					
13	The geology museum exhibition presents a series of ideas in a logical order					
14	The exhibition presents information about the museum history and establishment					
15	The exhibition personnel voluntarily tried to help me to find my way through the museum					
16	The exhibition personal provide competent information about the museum collection					
17	The exhibition provides interesting activities for groups of different ages and backgrounds					
18	There is a good research facility or a library that is accessible to interested visitors					
19	the interior design of the geology museum presents a unique architectural style					

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
20	The museum have a well-designed illustrative signage for all displayed pieces					
21	There are signs that helped me find my way within the exhibition					
22	There museum have adequate lighting					
23	The collection is displayed in a way which makes it comfortable and easy for all age, children as well as adults, group to look at it					
Services						
24	There are proper and clean toilets					
General impression						
25	I am happy with my decision to visit the geological museum					
26	At the end of my visit I would like to buy a souvenirs and some publications about the museum to educate myself more about it					
27	I had a good time and my visit is satisfactory					
28	I will recommend the museum to a friend					
29	I will visit the museum again					

D	Contextual learning Model	**1 Low**	**2**	**3**	**4**	**5**	**6 High**
*	**Researcher rating** intensity of social interaction (Groups- Staff)						
Your visit							
Total length of stay: **Percentage of total exhibit visited:** **Most investigated collection: (Fossils-Rocks-metals)**							
Social Interaction							
1	Did you interact with the museum staff during your tour?					YES	NO
2	Rate the usefulness of your interaction with front-line staff						
Choice & Control							
3	Rate you control over the visit (1= No control, Not the one who got to decide where to go and when to go)	**1 Low**	**2**	**3**	**4**	**5**	**6 High**
Acquired Knowledge							
4	Rate the educational service at the geological museum	**1 low**	**2**	**3**	**4**	**5**	**6 High**

5- The remains of an extraterrestrial particle which is found on earth's surface is called a(an)
   a. meteoroid
   b. asteroid
   c. meteorite
   d. satellite

6- the proper conditions for an organism to become fossilized:
   e. The existence of a solid structure
   f. Rapid burial of the object after death
   g. Suitable burial conditions
   h. all of the above

7- Which is least likely to become a fossil:
   a. a feather
   b. a bone
   c. a shell
   d. a piece of wood
   e. none of the above

8- Most fossils are of creatures that lived in:
   a. the sea
   b. rivers
   c. fresh water
   d. the land
   e. all of the above

9- The most abundant component in the earth core:
   f. iron
   g. copper
   h. nickel
   i. aluminum
   j. none of the above

10- Geology is:
   a. Earth Science
   b. Science
   c. Space Science
   d. all of the above

'E' Social Sustainability Survey

Access to the museum

1- 1. How did you know about the Geological Museum?
   - school course
   - newspaper
   - friends
   - social media
   - others :( )
     Please be accurate

2- What was the method of transport you used to reach the Museum today?

• Car • School bus/University bus • transportation
3- How was your trip to the museum? • Difficult • Average • Easy
4- Is there enough street signs that guided you to the museum location? • Yes • No
5- Is there clear signs to the museum entry point? • Yes • No
6- Do you care that a museum building is accessible to the elderly and disabled people • Yes • No
Credibility
7- I believe that the museum is doing their job in serving the community • Strongly agree • Agree • Neutral • Disagree • Strongly disagree
Identity
8- I found that the museum holds a unique identity in culture and history • Strongly agree • Agree • Neutral • Disagree • Strongly disagree
Community support
9- I would like to support the Geology museum • Yes/No
10- If Yes; I would like to support by: • Recommendation • Giving Time (Volunteering) • Money
11- I believe that the museum should continuously be supported by the government to sustain its work for future generations • Strongly agree • Agree • Neutral • Disagree • Strongly disagree
Community involvement in decision making
12- Did you communicate any suggestions or complaints about your visit to the museum before? • Yes/No

13- If Yes; how did you do that:

- I used the museum suggestions box
- I talked to the museum staff
- I talked to the museum management

Others:

14- How easy/satisfying was the experience of submitting your complaint/suggestion?

- Very Satisfying
- Satisfying
- Neutral
- Not satisfying
- Not at all satisfying

Please write down the reason for your choice:

Would you be willing to participate in a follow-up interview 1month from now? Name: Email: Phone Number: Best Time to Call: Residence Location:	**YES**	**NO**

Gender		**Age Group**				
Male:	Female:	8-11	12-16	17-24	25-40	Above 40

Social Group					**Length of your visit:**
School	University	Family	Friends	Alone	

Hour:	**Date:**	**Collector:**
Visitor Code:		**Length of Exit Interview :**

أ	نموذج التوقعات والتفضيلات	موافق جدا"	موافق	محايد	غير موافق	غير موافق اطلاقا"
محيط المزار السياحي						
1	أهتم بأن يكون المظهر الخارجي للمتحف ذو طابع معماري مميز					
2	أهتم بأن يتوافر منطقة وقوف سيارات الزوار بالقرب من المتحف					
3	أهتم بأن يكون المتحف مصمم لاستقبال جميع الزوار بما فيهم كبار السن وزوى الاحتياجات الخاصة					
الاستقبال/غرفة التذاكر						
4	أهتم بأن أجد موظفي مكتب التذاكر يتعاملون مع الزوار بلطف					
5	أهتم بأن يقدم موظفي مكتب التذاكر فكرة عامة عن طبيعة المتحف وأنشطته					
6	أهتم بأن أجد خريطة واضحة لتوجيه الزوار خلال الزيارة (خريطة تحتوي على مواقع الأنشطة المختلفة حيث تساعد الزائر على سهولة الحركة)					
7	أهتم بأن أجد خريطة للمزارات السياحية المجاورة للمتحف					

8	أهتم بأن يتم تحذيري من المخاطر المحتملة أثناء التواجد بالمتحف					
9	أهتم بأن يتم إرشادي للسلوكيات الممنوعة والتي يجب على تجنبها اثناء الزيارة، مثل لمس المقتنيات					
المطبوعات والهدايا التذكارية / منطقة البيع						
10	أهتم بأن أجد مجموعة من المطبوعات والهدايا التذكارية عالية الجودة					
11	أهتم بأن تكون أسعار المطبوعات والهدايا التذكارية مناسبة لجميع الزوار					
12	أهتم بأن أجد المطبوعات والهدايا التذكارية معروضة بشكل جذاب					
صالات عرض المقتنيات						
13	أهتم بأن تكون صالات العرض بالمتحف قد تم تصميمها وترتيب المقتنيات بها بشكل جذاب ومثير للاهتمام					
14	أهتم بأن يعرض المتحف مجموعة من الأفكار في ترتيب منطقي					
15	أهتم بأن يحتوي المتحف على معلومات عن تاريخ المتحف وانشاءه					
16	أهتم بأن أجد الافراد العاملين بصالة العرض يقومون بمساعدة الزوار للتعرف على المقتنيات المختلفة حتى في حالة عدم طلب الارشاد الكامل					
17	أهتم بأن يوفر الافراد العاملين بالمتحف معلومات متخصصة عن المقتنيات المختلفة					
18	أهتم بأن يحتوي أي متحف جيولوجيا على أنشطة جاذبة وممتعة لجميع الزوار على اختلاف الاعمار والخلفيات					
19	أهتم بأن يتوافر منشأة بحثية أو مكتبة متخصصة للبحث والاطلاع					
		موافق جدا"	موافق	محايد	غير موافق	غير موافق اطلاقا"
20	أهتم بأن يكون التصميم الداخلي للمتحف ذو طابع معماري مميز					
21	أهتم بأن يحتوي المتحف على لوحات إرشادية وتوضيحية لجميع المعروضات					
22	أهتم بوجود علامات ارشادية لتسهيل التوجه والحركة داخل صالة العرض					
23	أهتم بأن يكون المتحف مزود بالإضاءة المناسبة لإظهار المقتنيات					
24	أهتم بأن تسمح طريقة عرض المقتنيات للزوار على مختلف أعمارهم بالمشاهدة الجيدة					
الخدمات						
25	أهتم بوجود مكان للراحة وتناول القهوة والوجبات الخفيفة خلال أو بعد الزيارة					
26	أهتم بوجود دورات مياه مناسبة ونظيفة					
27	أهتم بأن تكون دورات المياه مزوده بأماكن للزوار ذوي الاحتياجات الخاصة					

ب	نموذج الخدمة التعليمية	1 الأقل	2	3	4	5	6 الأعلى
الدوافع وراء زيارة المتحف							
1	أزور المتحف لمعرفة المزيد عن المقتنيات الجيولوجية وعلم الجيولوجيا						
2	أزور المتحف لأقضي اوقاتا طيبة						
3	أزور المتحف تلبيتا" لرغبة عائلتي-أصحابي-مدرستي						
المعرفة المسبقة							
4	كيف تقيم معرفتك بعلم الجيولوجيا؟						

5-علم الجيولوجيا هو:
علم الأرض
علم البحار
علم الفضاء
كل ما سبق

6- أي من الاتي لا يمكن أن تصبح حفرية؟
ريشة
عظام
قوقعة
لا شيء

7-الحفريات هي من المخلوقات عاشت في:
البحار
المياه العذبة
اليابسة
كل ما سبق

8-العنصر الأكثر وفرة في باطن الأرضية:
حديد
نحاس
النيكل
الألومنيوم
ليس أي مما سبق

9-شروط تكون حفرية للكائن الحي:
وجود هيكل صلب
الدفن السريع للكائن بعد موته
عوامل دفن مناسبة
كل ما سبق

10-يطلق القطع المعدنية أو الصخرية التي سقطت من الفضاء الخارجي على الأرض:
مذنب
الكويكب
نيزك
الأقمار الصناعية

الاهتمامات			
*11	هل هناك موضوع في الجيولوجيا والعلوم الطبيعية تثير اهتمامك؟ لو نعم، ما هو؟ ( )	**نعم**	**لا**

12	إذا كان هناك برنامج عن الجيولوجيا والعلوم الطبيعية يعرض أسبوعيا، على ناشيونال جيوغرافيك على سبيل المثال، هل تقوم بمتابعته؟	**1**	**2**	**3**	**4**	**5**	**6**
الخبرات							
13	هل تعرف ما هي مختلف انواع المقتنيات بالمتحف؟					**نعم**	**لا**
14	هل قمت بزيارة المتحف الجيولوجي من قبل؟						
التحكم والاختيار							
15	هناك بعض الزوار يفضلون أن يتم ارشادهم خلال الزيارة، وهناك اخرين لا يهتمون (لا تهتم بأن يتم ارشادك = 1) (دائما استخدام الخرائط وعلامات الاتجاه = 6)	**1**	**2**	**3**	**4**	**5**	**6**
طول مقابلة الدخول:							

ج	نموذج التصورات	موافق جدا"	موافق	محايد	غير موافق	غير موافق اطلاقا"
محيط المتحف الجيولوجي						
1	المظهر الخارجي لمبنى متحف ذو طابع معماري مميز					
2	يوجد بجوار المتحف منطقة مناسبة لانتظار السيارات					
الاستقبال/غرفة التذاكر						
3	موظف مكتب التذاكر تعامل معي بلطف ومهنية					
4	موظف مكتب التذاكر قام بتقديم فكرة عامة عن المتحف وأنشطته المختلفة					
5	يوجد بالمتحف خريطة واضحة لتوجيه الزوار خلال الزيارة، الخريطة تحتوي على مواقع الأنشطة المختلفة وقد ساعدتني على سهولة الحركة داخل المتحف					
6	يوجد بالمتحف خريطة توضح أماكن المزارات السياحية المجاورة للمتحف					
7	تم تحذيري من المخاطرالمحتملة أثناء تواجدي بالمتحف					
8	لقد تم إرشادي للسلوكيات الممنوعة والتي يجب تجنبها اثناء الزيارة					
المطبوعات والهدايا التذكارية / منطقة البيع						
9	المطبوعات والهدايا التذكارية بالمتحف ذات قيمة وجودة عالية					
10	أجد أسعار المطبوعات والهدايا التذكارية مناسبة					
11	المطبوعات والهدايا التذكارية معروضة بشكل جذاب					
صالة عرض المقتنيات						
12	صالة العرض بالمتحف الجيولوجي قد تم تصميمها وترتيب المقتنيات بها بشكل جذاب ومثير للاهتمام					

13	الأفكار المختلفة التي يحتويها المتحف معروضة بتسلسل منطقي، تسلسل زمني مثلا، وقد ساعدني ذلك على استيعاب الأفكار المختلفة على تعددها					
14	المتحف يقدم معلومات عن تاريخ المتحف وإنشاءه					
15	الأفراد العاملين بصالة العرض قاموا بمساعدتي في التعرف على المقتنيات المختلفة للمتحف، وقد تم ذلك بشكل شبه تتطوعي					
16	يوفر الجيولوجيين الذين يتعاملون مباشرة مع الزوار معلومات متخصصة ووافية عن المقتنيات المعروضة					
17	يحتوي المتحف على أنشطة وورش عمل جاذبة وممتعة لجميع الزوار على اختلاف أعمارهم وخلفيتهم					
18	يوجد منشأة بحثية "مكتبة "متخصصة للبحث والاطلاع					
		موافق جدا"	موافق	محايد	غير موافق	غير موافق اطلاقا"
19	التصميم الداخلي للمتحف ذو طابع معماري مميز					
20	المتحف يحتوي على لوحات ارشادية وتوضيحية لجميع المعروضات وقد ساعدتني في التعرف على المقتنيات المختلفة المتحف					
21	توجد لوحات إرشادية وتوضيحية لتسهيل التوجه والحركة داخل صالة العرض					
22	المتحف به إضاءة مناسبة وكافية لإظهار المقتنيات					
23	طريقة عرض المقتنيات تسمح للزوار على إختلاف أعمارهم بالمشاهدة الجيدة					
الخدمات						
24	يوجد دورات مياه مناسبة ونظيفة					
الانطباع العام						
25	سعدت بقراري زيارة المتحف الجيولوجي					
26	في نهاية زيارتي أريد شراء هدية تذكارية من المتحف وبعض المطبوعات لزيادة المعرفة بالمقتنيات					
27	لقد أمضيت وقت ممتع بالمتحف وقد كانت زيارتي مرضية					
28	سأقوم بترشيح زيارة المتحف لأصدقائي					
29	سوف أقوم بزيارة المتحف أكثر من مرة					

د	نموذج الخدمة التعليمية	**1 الأقل**	**2**	**3**	**4**	**5**	**6 الأعلى**
*	**تقييم الباحث** لكثافة الاختلاط بين الجيولوجيين والزائر						
الزيارة							
المدة التي قضيتها بالمتحف: **ما هي النسبة من المتحف التي قمت بزيارتها:** **المقتنيات التي أخذت الاهتمام الأكبر:(الحفريات-المعادن-الصخور)**							
التفاعل الاجتماعي خلال زيارتك							
1	هل استعنت بموظفي المتحف أثناء تجولك بالمتحف؟					نعم	لا
2	قيم مدى استفادتك من الاختلاف بالجيولوجيين المتواجدين بصالة العرض						
التحكم في الزيارة							
3	قيم نسبة تحكمك في الزيارة ,لست المتحكم =1) لم تكن الشخص الذي يقرر الحرك خلال الزيارة)	**1 الأقل**	**2**	**3**	**4**	**5**	**6 الأعلى**
المعرفة المكتسبة							
4	قيم الخدمة التعليمية بالمتحف الجيولوجي	**1 الأقل**	**2**	**3**	**4**	**5**	**6 الأعلى**

5-يطلق القطع المعدنية أو الصخرية التي سقطت من الفضاء الخارجي على الأرض: 5
مذنب
الكويكب
نيزك
الأقمار الصناعية

9-شروط تكون حفرية للكائن الحي:
وجود هيكل صلب
الدفن السريع للكائن بعد موته
عوامل دفن مناسبة
كل ما سبق

7-أي من الاتي لا يمكن أن تصبح حفرية؟
ريشة
عظام
قوقعة
قطعة خشب
لا شيء

8-الحفريات هي من المخلوقات عاشت في:
البحار
الأنهار
المياه العذبة
اليابسة
كل ما سبق

9-العنصر الأكثر وفرة في باطن الأرضية:
حديد
نحاس

النيكل الألومنيوم ليس أي مما سبق **10-علم الجيولوجيا هو:** علم الأرض علم البحار علم الفضاء كل ما سبق

نموذج الاستدامة الاجتماعية
الوصول للمتحف
1-كيف عرفت عن المتحف الجيولوجي؟ • المدرسين أو المقرر الدراسي • الجريدة • أصدقاء • وسائل التواصل الاجتماعي • غير ذلك:( )
2-كيف وصلت إلى المتحف اليوم؟ • سيارة خاصة • أتوبيس المدرسة /أتوبيس الجامعة • المواصلات العامة
3-كيف كانت رحلتك إلى للوصول للمتحف؟ • سهلة • متوسطة • صعبة
4-هل هناك علامات الطريق للمتحف علامات كافية لإرشادك لموقع المتحف؟ • نعم • لا • لا أعلم
5-هل هناك إشارات واضحة إلى نقطة دخول المتحف؟ • نعم • لا • لا أعلم
6-هل تهتم أن مبنى المتحف يكون مجهز لاستقبال كبار السن والمعاقين؟ • نعم • لا
المصداقية
7-أعتقد أن المتحف يؤدى واجبه كاملا" في خدمة المجتمع • موافق جدا" • موافق • محايد • غير موافق • غير موافق اطلاقا"
الهوية
8-لقد وجدت أن المتحف يحمل هوية فريدة من نوعها في الثقافة والتاريخ • موافق جدا"

• موافق • محايد • غير موافق • غير موافق اطلاقا"
دعم المجتمع للمتحف
9-أعلم أهمية المتحف الجيولوجي ولذلك أحب أن أدعمه • نعم • لا
10-إذا كانت اجابتك بنعم، بأي الطرق تحب أن تدعمه؟ • نعم • التوصية لأصدقائك ومعارفك • التطوع داخل المتحف • الدعم المادي
11-أعتقد أن المتحف يجب باستمرار أن تدعم من قبل الحكومة للحفاظ على عملها من أجل الأجيال القادم • موافق جدا" • موافق • محايد • غير موافق • غير موافق اطلاقا"
المشاركة المجتمعية في صنع القرار
12-هل قمت بتقديم أية اقتراحات أو شكاوى خلال زيارتك للمتحف من قبل؟ • نعم • لا
13-إذا كانت اجابتك بنعم، كيف قمت بتقديم المقترح أو الشكوى؟ من خلال • صندوق المقترحات والشكاوى الموجود بالمتحف • بالتحدث لأحد العاملين بالمتحف • بالتحدث لإدارة المتحف • أخرى:
14-تجربة تقديم شكواك أو اقتراحك كانت • مرضية جدا" • مرضية • محايد • غير مرضية • غير مرضية اطلاقا" لماذا:

هل من الممكن أن تشارك في استبيان قصيرا جدا حول لمتحف بعد شهر من اليوم؟ الاسم: البريد الإلكتروني: رقم الهاتف: الوقت المفضل لتلقى المكالمة: موقع السكن:	**نعم**	**لا**

النوع		**الفئة العمرية**					**المجموعات الاجتماعية**					
ذكر	انثى	11-8	16-12	24-17	40-25	فوق 40	مدرسة	جامعة	عائلة	أصدقاء	بمفردك

APPENDIX B: Interview Questions

(1) Interviews: Management Team

Q1. How would you define the museum mission? Is it only educational?

Q2. Approximately, what is the number of visitors per year? What are most common visitors' profiles?

Q3. What are the different sources of funding?

Q4. What is the main source of revenues?

Q5. Do you have a budget deficit?

Q6. If yes, what do you think the factors contributing to it?

Q7. What do you think the main factors contributing to less interest of the museum development?

Q8. What activities does the museum do to generate more visitors?

Q9. What do you believe the core competency of the museum? Museum management, front-line staff, technical team, ..ect

Q10. What do you think are the weaknesses that should be worked-out? Please prioritize?

Q11. What are the frequent types if activities you do in the museum? What are the infrequent ones?

Q12. Do you do any activities out-side the museum? Educational services for example, or activities with other museums or cultural centers?

Q13. If no, do you support and recommend such activities? Is it against the museum strategy?

Q14. Do you take visitors suggestions/complaints into consideration? How is that? Can you give me an example of a situation where the visitor suggestions/complaint was handled?

Q15. Do you seek volunteers to help with museum work?

Q16. Do you target volunteers from the visiting community regardless their educational back-ground, age?

Q17. Do you involve volunteers in the decision making; such as suggestions for museum development and museums service improvements?

(2) Interview: Front-line Staff

Q1. Which is the most influential collection on visitors? Why?

Q2. Which do you say is the most important collection? Why?

Q3. Do you try to drive visitors' attention to a specific collection or you leave them the choice? If yes, How? Is it included in the museum policy?

Q4. What is the main set of concepts/knowledge to be communicated to visitors?

Q5. Dose all front-line staff work with the same strategy?

Q6. What are the frequent types if activities you do in the museum? What are the infrequent ones?

Q7. Do you do any activities out-side the museum? Educational services for example, or activities with other museums or cultural centers?

Q8. If no, do you support and recommend such activities?

Q9. Does the front-line staff voluntarily initiate communication with visiting community to know their needs and suggestions?

APPENDIX C: IRB-Approval and Consent Forms

THE AMERICAN UNIVERSITY IN CAIRO
INSTITUTIONAL REVIEW BOARD

Documentation of Informed Consent for Participation in Research Study

Project Title: Visitor-oriented approach for museums development

Principal Investigator: Eman Taha El-Adawy/Master Student at AUC-
email: emmataha@aucegypt.edu telephone: 01016665855

*You are being asked to participate in a research study. The purpose of the research is the development of the Geology museum in Egypt [whereas the quality of service provided by museums is a basic determinant of their success in terms of sustainability. The study aims to evaluate the visitors experience and the educational service provided by the geology museum in Egypt, which will help its management team to identify weaknesses and strengths in provided services as well as areas in which development will help the museum to sustain a healthy flow of visitors. Increasing visitors flow will help the museum to sustain its activities and better contribute to community development.], and the findings may be *published, presented, or both*. The expected duration of your participation is [*25mintues*].

*The procedures of the research will be as follows:

1- **Before the visit:** you will be asked to fill a survey which is divided into two parts;
   -
   - The expectations form (27 questions on how you believe a museum services
     - Should be?)
   - The contextual learning model form (15 questions on your knowledge in geology)
   -
2- **After the visit:** you will be asked to fill a complementary survey which is divided into two parts;
   - The perceptions form (29 questions on your perceptions of the geology museum)
   - The contextual learning model form (10 questions measuring the change in your knowledge resulted from having a tour in a specialized museum)
   - The social sustainability form (13 question measuring the museum sustainability)

If you have the well and the capacity to participate in a follow up survey which is be done over the phone one month later, this would be appreciated as it will add a considerable value to the research. It will focus of measuring your knowledge in geology as to investigate how sustainable is the educational outcome from your visit.

*There *might be* minor risks or discomfort associated with this research. If you feel any discomfort while completing the survey, you may withdraw from the study at any stage of completing the survey.

*There *will not be* direct benefits to you from this research, yet your contribution will be of great benefit to the development of the geology museum. Also similar development approach could be adopted in the development of other museums and other tourist attractions in Egypt. In future, everyone who is interested in education in general and in museums in particular will be benefiting from the proposed development.

*The information you provide for purposes of this research *is confidential*.

*Should you have any questions about the study, or any inquiry should be communicated to Eman El-Adawy at emmataha@aucegypt.edu, 01016665855

*Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or the loss of benefits to which you are otherwise entitled.

Signature _____

Printed Name _____

Date _____

الجامعة الأمريكية بالقاهرة

استمارة موافقة مسبقة للمشاركة في دراسة بحثية

عنوان البحث: النهج الموجه للزوار لتنمية المتاحف

الباحث الرئيسي: إيمان طه العدوى/ طالبة ماجستير بالجامعة الأمريكية
البريد الالكتروني: emmataha@aucegypt.edu
الهاتف: 01016665855

انت مدعو للمشاركة في دراسة بحثية عن (المتحف الجيولوجي بالقاهرة).

نتائج البحث ستنشر في (دوريه متخصصة).

هدف الدراسة هو تطوير المتحف (حيث أن جودة الخدمة التي تقدمها المتاحف هي المحدد الأساسي لنجاحها واستدامتها. وتهدف هذه الدراسة إلى تقييم عنصرين، هما تجربة الزواربالمتحف والخدمة التعليمية التي يقدمها المتحف الجيولوجي في مصر. الأمر الذي سيساعد فريق الإدارة لتحديد نقاط الضعف والقوة في الخدمات المقدمة والسعي الى تحسينها وهذا سيساعد على تطوير المتحف والحفاظ على تدفق صحي من الزوار. زيادة عدد الزائرين سيساعد المتحف على الحفاظ على أنشطته والمساهمة بشكل أفضل في التنمية المجتمعية.)

المدة المتوقعة للمشاركة في هذا البحث (25 دقيقة)

اجراءات الدراسة تشتمل على:

1- **قبل دخولك المتحف:** سيطلب منك ملء استطلاع مكون من نموذجين
   - نموذج التوقعات: (27 سؤال عن اعتقاداتك لما يجب أن يكون المتحف عليه وعن الخدمة التي تتوقع أن تجدها بالمتحف)
   - نموذج التعلم السياقى: (15 أسئلة لقياس مدى معرفتك بعلم الجيولوجيا)

2- **بعد انتهائك من الزيارة:** سيطلب منك ملء استطلاع اخر مكون من نموذجين
   - نموذج التصورات: (29 سؤال تهدف إلى معرفة وتوثيق رأيك عن المتحف وخدماته المختلف)
   - نموذج اخر للتعلم السياقى:(10 أسئلة لقياس التغير في معرفتك في علم الجيولوجيا والذي قد ينتج عن جولتك في متحف متخصص لعلوم الجيولوجيا)
   - نموذج التنمية المجتمعية: (13 سؤلا لقياس استدامة المتحف)

إذا كان لديك القدرة على المشاركة في استطلاع المتابعة الذي سيتم القيام به عبر الهاتف بعد شهر من زيارتك للمتحف، فسوف تضيف مشاركتك قيمة مهمة للدراسة. ويهدف استطلاع المتابعة إلى قياس معرفتك في الجيولوجيا مرة اخرى لقياس استدامة المعرفة المكتسبة خلال زيارتك للمتحف.

المخاطر المتوقعة من المشاركة في هذه الدراسة: إذا شعرت بالإجهاد خلال استكمال الاستطلاع، فيمكنك الانسحاب ومن المشاركة في الدراسة في أي مرحلة من مراحل الاستقصاء.

الاستفادة المتوقعة من المشاركة في البحث**:** مساهمتك ذات قيمة كبيرة للدراسة ولتطوير وتنمية المتحف الجيولوجي، كما أنه يمكن اتخاذ نهج مماثل لتنمية متاحف أخرى في مصر

السرية واحترام الخصوصية: المعلومات التي ستقدمها لهذا البحث سرية، أي انه لن يتم ذكر اسم المشترك في الدراسة.

إذا كان لديك أي أسئلة عن الدارسة، يمكنك إرسال أي استفسار لإيمان-العدوى على emmataha@aucegypt.edu- 01016665855

ان المشاركة في هذه الدراسة ماهي الا عمل تطوعي، حيث أن الامتناع عن المشاركة لا يتضمن أي عقوبات أو فقدان أي مزايا تحق لك. ويمكنك أيضا التوقف عن المشاركة في أي وقت من دون عقوبة أو فقدان لهذه المزايا.

الامضاء: .....

اسم المشارك: .....

التاريخ: ...../...../.....

THE AMERICAN UNIVERSITY IN CAIRO
INSTITUTIONAL REVIEW BOARD

Documentation of Informed Consent for Participation in Research Study

Project Title: Visitor-oriented approach for museums development

Principal Investigator: Eman Taha El-Adawy/Master Student at AUC-
email: emmataha@aucegypt.edu telephone: 01016665855

*You are being asked to participate in a research study. The purpose of the research is the development of the Geology museum in Egypt [whereas the quality of service provided by museums is a basic determinant of their success in terms of sustainability. The study aims to evaluate the visitors experience and the educational service provided by the geology museum in Egypt, which will help its management team to identify weaknesses and strengths in provided services as well as areas in which development will help the museum to sustain a healthy flow of visitors. Increasing visitors flow will help the museum to sustain its activities and better contribute to community development.], and the findings may be *published, presented, or both*. The expected duration of your participation is [*30mintues*].

* The procedures of the research will be limited to a semi-structured interview which will take about 30 minutes. I will be asking questions about the museum mission, activities, visitors and other related questions.

*There *might be* minor risks or discomfort associated with this research. If you feel any discomfort during the interview, you may withdraw from the study at any stage of completing the survey.

*There *will be* direct benefits to you from this research, as your contribution will be of great benefit to the development of the geology museum. Also similar development approach could be adopted in the development of other museums and other tourist attractions in Egypt. In future, everyone who is interested in education in general and in museums in particular will be benefiting from the proposed development.

*The information you provide for purposes of this research *is confidential*.

*Should you have any questions about the study, or any inquiry should be communicated to Eman El-Adawy at emmataha@aucegypt.edu, 01016665855

*Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or the loss of benefits to which you are otherwise entitled.

Signature _____

Printed Name _____

Date _____

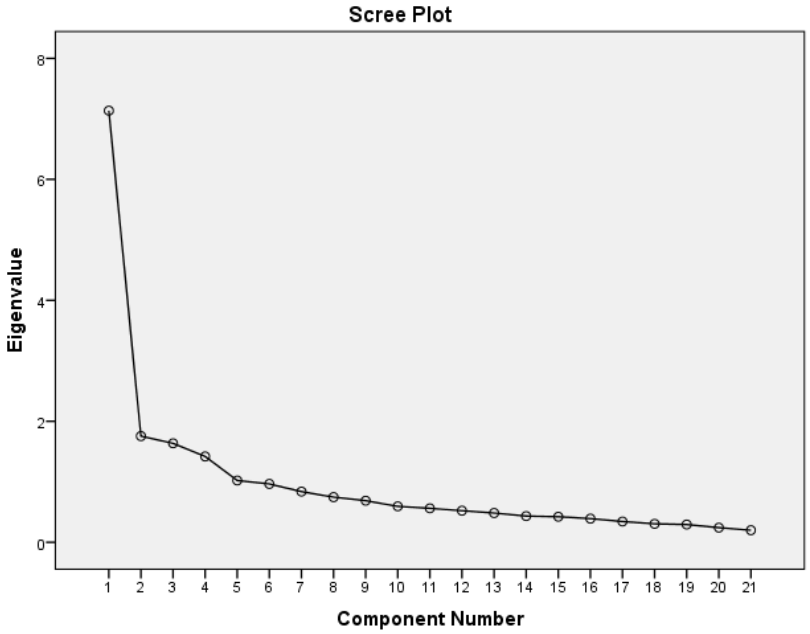
APPENDIX D: Statistical Tests

Principle Factor Analysis of Servqual (Perceptions)

Total Variance Explained										
Component	Initial Eigenvalues			Extraction Sums of Squared Loa			Rotation Sums of Squared Loadings			
	Total	% of Varia	Cumulative %	Total	% of Varia	Cumulativ	Total	% of Varia	Cumulative %	
1	7.135	33.977	33.977	7.135	33.977	33.977	3.957	18.842	18.842	
2	1.756	8.361	42.338	1.756	8.361	42.338	2.929	13.947	32.789	
3	1.636	7.791	50.129	1.636	7.791	50.129	2.47	11.762	44.551	
4	1.419	6.756	56.885	1.419	6.756	56.885	2.212	10.535	55.086	
5	1.022	4.865	61.75	1.022	4.865	61.75	1.399	6.664	61.75	
6	0.965	4.596	66.346							
7	0.839	3.993	70.339							
8	0.746	3.553	73.892							
9	0.688	3.278	77.17							
10	0.594	2.829	79.999							
11	0.561	2.672	82.671							
12	0.522	2.488	85.159							
13	0.484	2.307	87.466							
14	0.433	2.063	89.529							
15	0.423	2.015	91.544							
16	0.391	1.863	93.407							
17	0.344	1.636	95.043							
18	0.306	1.456	96.499							
19	0.294	1.4	97.899							
20	0.242	1.153	99.051							
21	0.199	0.949	100							

Rotated Component Matrixa					
	Component				
	1	2	3	4	5
12- Attractiveness and arrangement of exhibition	0.745	0.227	0.254	0.094	0.009
22- Adequate lighting	0.739	0.152	0.139	0.059	0.064
23- Collection display is accessible to all age groups	0.705	0.179	0.123	0.038	0.207
19- Exhibition design unique architecture	0.651	0.495	0.096	0.039	0.035
13- Exhibition presents a series of ideas in a logical order	0.64	0.144	0.212	0.232	-0.111
20- A well-designed illustrative signage for all displayed pieces	0.585	0.184	0.001	0.057	0.402
14- Exhibition presents information about the museum history and establishment	0.535	0.036	0.292	0.193	0.151
21- Signs to orient visitors movement within the exhibition	0.499	0.297	0.112	0.206	0.446
6- A map of nearby tourist attractions	0.107	0.734	0.161	0.1	0.336
5- Clear maps to orient visitors during their visit	0.187	0.73	0.125	0.108	0.358
1- Museum's external Design Uniqueness	0.427	0.664	0.129	0.06	-0.036
2- Suitable parking area	0.298	0.607	-0.001	0.186	-0.042
15- Exhibitions' personnel voluntarily trying to help visitors to find their way	0.275	-0.149	0.726	0.062	0.106
8- Being informed of forbidden behavior during the visit	0.086	0.291	0.722	0.031	-0.074
16- Exhibition's personnel provide competent information	0.363	-0.162	0.633	0.073	0.28
7- Being Warned of potential danger that might occur during a visit or an activities	0.152	0.485	0.616	0.179	-0.042
3- Friendly Ticket-office personnel	0.096	0.353	0.551	0.034	0.096
9- High-quality collection of literature and souvenirs	0.14	0.114	0.11	0.826	0.016
10- Reasonably priced literature and souvenirs	0.023	0.068	0.025	0.833	-0.027
11- Interesting and good display of the products for sale	0.231	0.146	0.081	0.761	0.156
Accessible Research facility or library	0.102	0.146	0.095	0.021	0.762
Extraction Method: Principal Component Analysis.					
Rotation Method: Varimax with Kaiser Normalization.					
Rotation Method: Varimax with Kaiser Normalization.					

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.878
Bartlett's Test of Sphericity	Approx. Chi-Square	2395.735
	df	210
	Sig.	0



Principle Factor Analysis of Servqual (Social Sustainbility)

Total Variance Explained							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			
	Total	% of Varia	Cumulative %	Total	% of Varia	Cumulative %	
1	1.551	51.709	51.709	1.551	51.709	51.709	
2	0.842	28.071	79.78				
3	0.607	20.22	100				
Extraction Method: Principal Component Analysis.							

Component Matrixa	
	Component
	1
The museum is doing their job in serving the community	0.827
The museum should continuously be supported by the government	0.445
The museum holds a unique identity in culture and history	0.835
Extraction Method: Principal Component Analysis.	
a 1 components extracted.	

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.575
Bartlett's Test of Sphericity	Approx. Chi-Square	65.645
	df	3
	Sig.	0

***Analysis Of Variance* (ANOVA)**

Expectations/Age Group

أهتم بأن يتوافر منطقة وقوف سيارات الزوار بالقرب من المتحف

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	1.61	
	25-40	24	1.71	1.71
	17-24	110	1.89	1.89
	12-16	137		2.23

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن يقدم موظفي مكتب التذاكر فكرة عامة عن طبيعة المتحف وأنشطته

Age Group		N	0.05	
			1	2
Tukey B[a,b]	25-40	24	1.50	
	Above 40	18	1.61	1.61
	17-24	110	1.79	1.79
	12-16	136		2.10

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.191.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن أجد خريطة للمزارات السياحية المجاورة للمتحف

Age Group		N	0.05	
			1	2
Tukey B[a,b]	25-40	24	1.50	
	Above 40	18	1.67	
	17-24	110	1.95	1.95
	12-16	137		2.31

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن يتم إرشادي للسلوكيات الممنوعة والتي يجب على تجنبها اثناء الزيارة، مثل لمس المقتنيات

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	1.28	
	25-40	24	1.42	1.42
	17-24	110	1.52	1.52
	12-16	137		1.73

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن أجد مجموعة من المطبوعات والهدايا التذكارية عالية الجودة

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	1.39	
	25-40	24	1.63	1.63
	17-24	110		1.97
	12-16	137		2.13

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن أجد المطبوعات والهدايا التذكارية معروضة بشكل جذاب

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	1.33	
	25-40	24	1.67	1.67
	17-24	110	1.82	1.82
	12-16	137		1.99

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن تكون صالات العرض بالمتحف قد تم تصميمها وترتيب المقتنيات بها بشكل جذاب ومثير للاهتمام

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	1.00	
	12-16	137	1.26	1.26
	25-40	24	1.29	1.29
	17-24	109		1.38

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.182.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن يحتوي المتحف على معلومات عن تاريخ المتحف وانشاءه

Age Group		N	0.05	
			1	2
Tukey B[a,b]	25-40	24	1.42	
	Above 40	18	1.50	
	17-24	110	1.55	
	12-16	137		2.09

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن يوفر الافراد العاملين بالمتحف معلومات متخصصة عن المقتنيات المختلفة

Age Group		N	0.05	
			1	2
Tukey B[a,b]	25-40	24	1.25	
	Above 40	18	1.33	
	12-16	137		1.78
	17-24	110		1.79

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بأن يحتوي المتحف على لوحات ارشادية وتوضيحية لجميع العروض

Age Group		N	0.05	
			1	2
Tukey B[a,b]	25-40	24	1.13	
	Above 40	18	1.22	1.22
	17-24	110	1.45	1.45
	12-16	137		1.50

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

أهتم بوجود علامات ارشادية لتسهيل التوجه والحركة داخل صالة العرض

Age Group		N	0.05	
			1	2
Tukey B[a,b]	25-40	24	1.17	
	Above 40	18	1.17	
	17-24	109	1.39	1.39
	12-16	135		1.53

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.148.

b. The group sizes are unequal. The harmonic mean of

Perceptions/Age Group

المظهر الخارجي لمبنى متحف ذو طابع معماري مميز

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	110	2.81	
	12-16	137	3.25	3.25
	Above 40	18		3.56
	25-40	24		3.88

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

موظف مكتب التذاكر قام بتقديم فكرة عامة عن المتحف وأنشطته المختلفة

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	108	2.56	
	12-16	137	2.93	2.93
	Above 40	18	3.17	3.17
	25-40	22		3.32

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 34.023.

b. The group sizes are unequal. The harmonic mean of

يوجد بالمتحف خريطة واضحة لتوجيه الزوار خلال الزيارة، الخريطة تحتوي على مواقع الأنشطة المختلفة وقد ساعدتني على سهولة الحركة داخل المتحف

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	110	2.77	
	12-16	136	3.26	3.26
	Above 40	18	3.33	3.33
	25-40	24		3.67

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.191.

b. The group sizes are unequal. The harmonic mean of

تم تحذيري من المخاطرالمحتملة أثناء تواجدي بالمتحف

Age Group		N	Subset for alpha = 0.05		
			1	2	3
Tukey B[a,b]	17-24	110	2.69		
	12-16	137	3.01	3.01	
	Above 40	18		3.56	3.56
	25-40	24			3.96

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of the group

لقد تم إرشادي للسلوكيات الممنوعة والتي يجب تجنبها اثناء الزيارة

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	110	2.45	
	12-16	137	2.71	
	Above 40	18	3.11	3.11
	25-40	24		3.71

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

المطبوعات والهدايا التذكارية بالمتحف ذات قيمة وجودة عالية

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	2.33	
	17-24	110	2.85	2.85
	12-16	135	2.88	2.88
	25-40	24		3.00

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.174.

b. The group sizes are unequal. The harmonic mean of

صالة العرض بالمتحف الجيولوجي قد تم تصميمها وترتيب المقتنيات بها بشكل جذاب ومثير للاهتمام

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	109	1.96	
	12-16	137	2.39	
	Above 40	18	2.56	
	25-40	24		3.38

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.182.

b. The group sizes are unequal. The harmonic mean of

الأفكار المختلفة التي يحتويها المتحف معروضة بتسلسل منطقي، تسلسل زمني مثلا، حيت ساعدني على استيعاب الأفكار المختلفة على تعددها

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	110	1.92	
	Above 40	18	2.17	
	12-16	136	2.28	
	25-40	24		3.13

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.191.

b. The group sizes are unequal. The harmonic mean of

المتحف يقدم معلومات عن تاريخ المتحف وانشاءه

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	109	2.04	
	12-16	137	2.35	
	Above 40	18	2.39	
	25-40	24		3.17

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.182.

b. The group sizes are unequal. The harmonic mean of

الافراد العاملين بصالة العرض قاموا بمساعدتي في التعرف على المقتنيات المختلفة للمتحف، وقد تم ذلك بشكل شبه تتطوعي

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	1.72	
	17-24	110	1.85	
	12-16	137	1.91	
	25-40	24		3.04

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

يوفر الجيولوجيين الذين يتعاملون مباشرة مع الزوار معلومات متخصصة ووافية عن المقتنيات المعروضة

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	109	1.78	
	12-16	137	1.92	
	Above 40	18	1.94	
	25-40	24		2.58

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.182.

b. The group sizes are unequal. The harmonic mean of

يحتوي المتحف على أنشطة وورش عمل جاذبة وممتعة لجميع الزوار على اختلاف أعمارهم وخلفيتهم

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	110	2.67	
	Above 40	18	2.89	2.89
	12-16	137		3.29
	25-40	24		3.33

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

التصميم الداخلي للمتحف ذو طابع معماري مميز

Age Group		N	Subset for alpha = 0.05		
			1	2	3
Tukey B[a,b]	17-24	109	2.50		
	12-16	137	2.78	2.78	
	Above 40	18		3.39	3.39
	25-40	24			3.58

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.182.

b. The group sizes are unequal. The harmonic mean of the group

المتحف يحتوي على لوحات ارشادية وتوضيحية لجميع المعروضات وقد ساعدتني في التعرف على المقتنيات المختلفة المتحف

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	2.06	
	17-24	110	2.16	
	12-16	137	2.38	2.38
	25-40	24		2.92

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

المتحف به اضاءة مناسبة وكافية لإظهار المقتنيات

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	110	2.05	
	12-16	137	2.41	2.41
	Above 40	18	2.56	2.56
	25-40	24		3.04

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.207.

b. The group sizes are unequal. The harmonic mean of

طريقة عرض المقتنيات تسمح للزوار على مختلف أعمارهم بالمشاهدة الجيدة

Age Group		N	0.05	
			1	2
Tukey B[a,b]	17-24	110	2.05	
	12-16	135	2.47	
	Above 40	18	2.50	
	25-40	24		3.29

Means for groups in homogeneous subsets are

a. Uses Harmonic Mean Sample Size = 35.174.

b. The group sizes are unequal. The harmonic mean of

يوجد دورات مياه مناسبة ونظيفة

Age Group		N	0.05	
			1	2
Tukey B[a,b]	Above 40	18	2.56	
	17-24	109	2.74	2.74
	25-40	24	3.00	3.00
	12-16	133		3.21

Means for groups in homogeneous subsets are

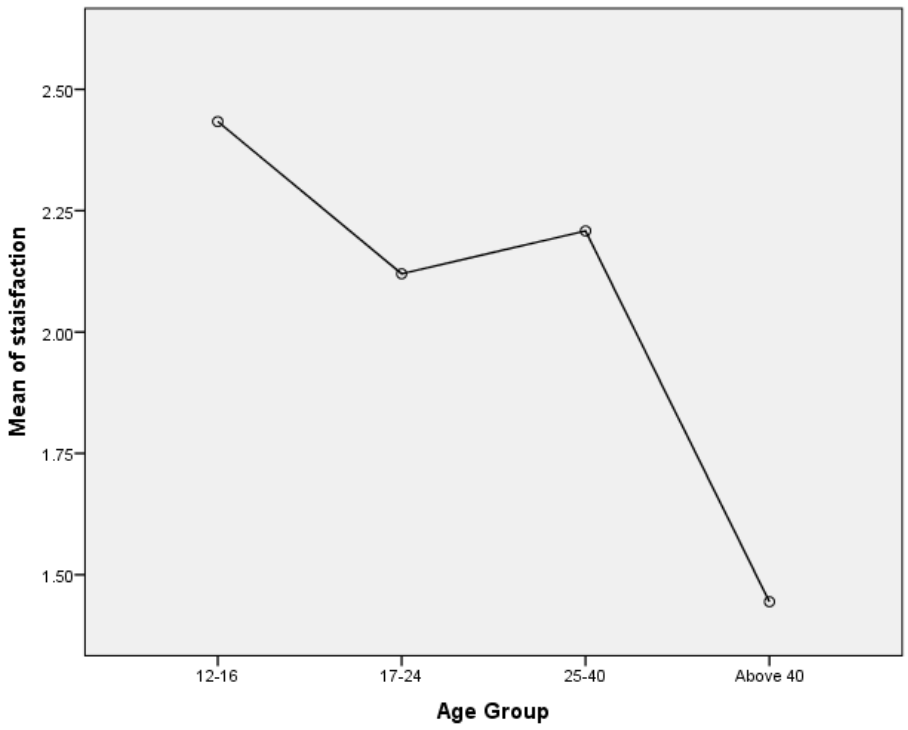
a. Uses Harmonic Mean Sample Size = 35.114.

b. The group sizes are unequal. The harmonic mean of

Satisfaction/Age Group

ANOVA					
Satisfaction					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.123	3	6.041	5.453	0.001
Within Groups	315.744	285	1.108		
Total	333.868	288			

Satisfaction			
Tukey B a,b			
Age Group	N	Subset for alpha = 0.05	
		1	2
Above 40	18	1.4444	
17-24	110		2.12
25-40	24		2.2083
Dec-16	137		2.4336
Means for groups in homogeneous subsets are displayed.			
a Uses Harmonic Mean Sample Size = 35.207.			



Satisfaction/Social Group

ANOVA					
Satisfaction					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.633	3	2.211	1.926	0.126
Within Groups	327.235	285	1.148		
Total	333.868	288			

Satisfaction/Gender

ANOVA						
staisfaction						
	Sum of Squares	df	Mean Square	F	Sig.	
Between Groups	1.392	1	1.392	1.203	0.274	
Within Groups	330.948	286	1.157			
Total	332.34	287				

Knowledge/Age Group

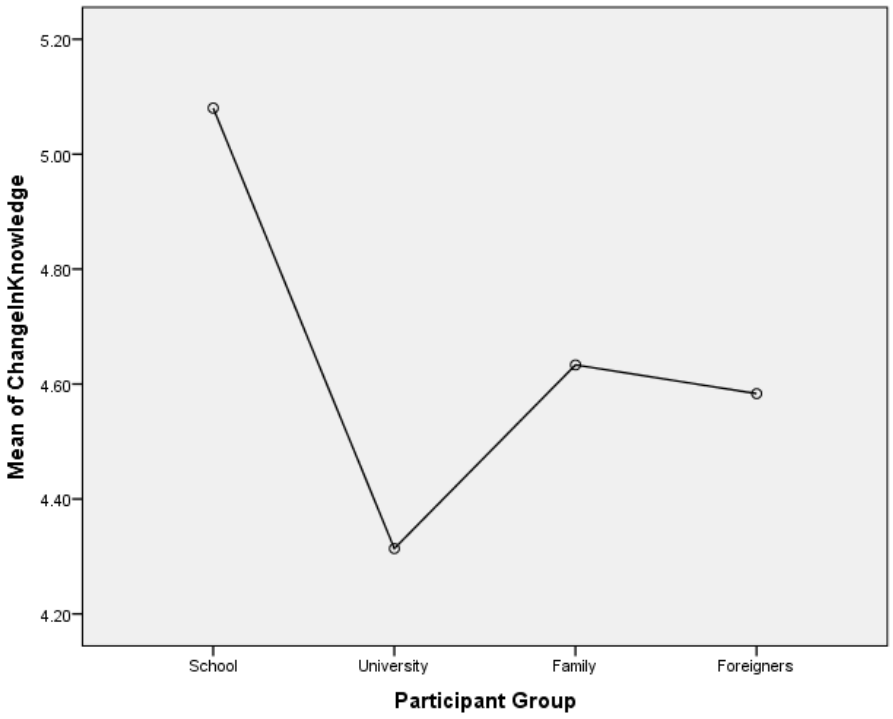
ANOVA					
Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.292	3	4.764	5.058	0.002
Within Groups	268.445	285	0.942		
Total	282.737	288			

Knowledge			
Tukey B a,b			
Age Group	N	Subset for alpha = 0.05	
		1	
25-40	24	4.6042	
17-24	110	4.6591	
Above 40	18	4.6944	
Dec-16	137	5.0985	
Means for groups in homogeneous subsets are displayed.			
a Uses Harmonic Mean Sample Size = 35.207.			

Knowledge/Social Group

ANOVA					
Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27.052	3	9.017	10.051	0
Within Groups	255.686	285	0.897		
Total	282.737	288			

Knowledge			
Tukey B a,b			
Participant Group	N	Subset for alpha = 0.05	
		1	
University	51	4.3137	
Foreigners	6	4.5833	
Family	45	4.6333	
School	187	5.0802	
Means for groups in homogeneous subsets are displayed.			
a Uses Harmonic Mean Sample Size = 18.705.			



Knowledge/Gender

ANOVA					
Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.811	1	6.811	7.093	0.008
Within Groups	274.633	286	0.96		
Total	281.444	287			

Social Sustainability/Age Group

ANOVA					
Social Sustainbility					
	Sum of Squares	df	Mean Squ	F	Sig.
Between Groups	4.929	3	1.643	4.405	0.005
Within Groups	106.292	285	0.373		
Total	111.221	288			

Social Sustainability/Social Group

ANOVA					
Social Sustainbility					
	Sum of Squares	df	Mean Squ	F	Sig.
Between Groups	0.29	3	0.097	0.248	0.863
Within Groups	110.932	285	0.389		
Total	111.221	288			

Social Sustainability/Gender

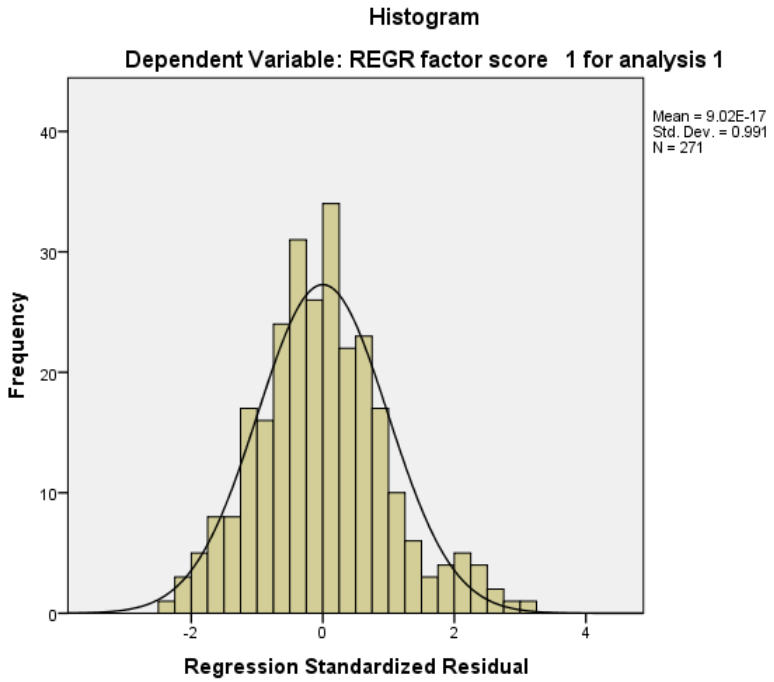
ANOVA					
Social Sustainbility					
	Sum of Squares	df	Mean Squ	F	Sig.
Between Groups	0.145	1	0.145	0.376	0.54
Within Groups	110.558	286	0.387		
Total	110.703	287			

Linear Regression

Satisfaction on Perceptions

ANOVAa								
Model		Sum of Squares	df	Mean Squ	F	Sig.		
1	Regression	87.572	5	17.514	24.684	.000b		
	Residual	188.028	265	0.71				
	Total	275.6	270					
a Dependent Variable: REGR factor score 1 for analysis 1								
b Predictors: (Constant), REGR factor score 5 for analysis 37, REGR factor score 4 for analysis 37,								
REGR factor score 1 for analysis 37, REGR factor score 2 for analysis 37, REGR factor score 3 for analysis 37								

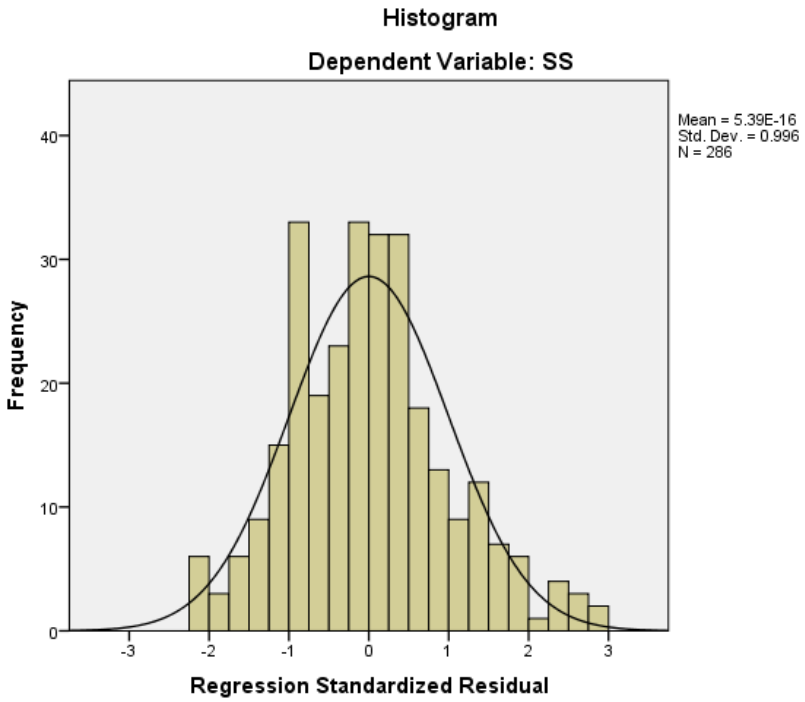
CoefficientSatisfaction								
Model		Unstandardized Coefficient		Standardi: t		Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bou	Upper Bound
1	(Constant)	-0.01	0.051		-0.186	0.852	-0.11	0.091
	Factor 1 Exhibition Design & Theme	0.421	0.051	0.417	8.221	0	0.32	0.522
	Factor 2 Entrance & Reception	0.141	0.051	0.139	2.749	0.006	0.04	0.242
	Factor 3 Personnel Competency	0.313	0.051	0.309	6.081	0	0.211	0.414
	Factor 4 Literature & Souvenir	0.166	0.051	0.165	3.247	0.001	0.065	0.267
	Factor 5 Library	0.056	0.051	0.056	1.102	0.272	-0.044	0.157
a Dependent Variable: REGR factor score 1 for analysis 1								



Social Sustainability on Satisfaction & Subjective Evaluation of Knowledge

ANOVAa						
Model		Sum of Squares	df	Mean Squ	F	Sig.
1	Regression	29.003	2	14.501	51.688	.000b
	Residual	79.398	283	0.281		
	Total	108.401	285			
a Dependent Variable: SS						
b Predictors: (Constant), Educational Service Subjective Evaluation, satisfaction						

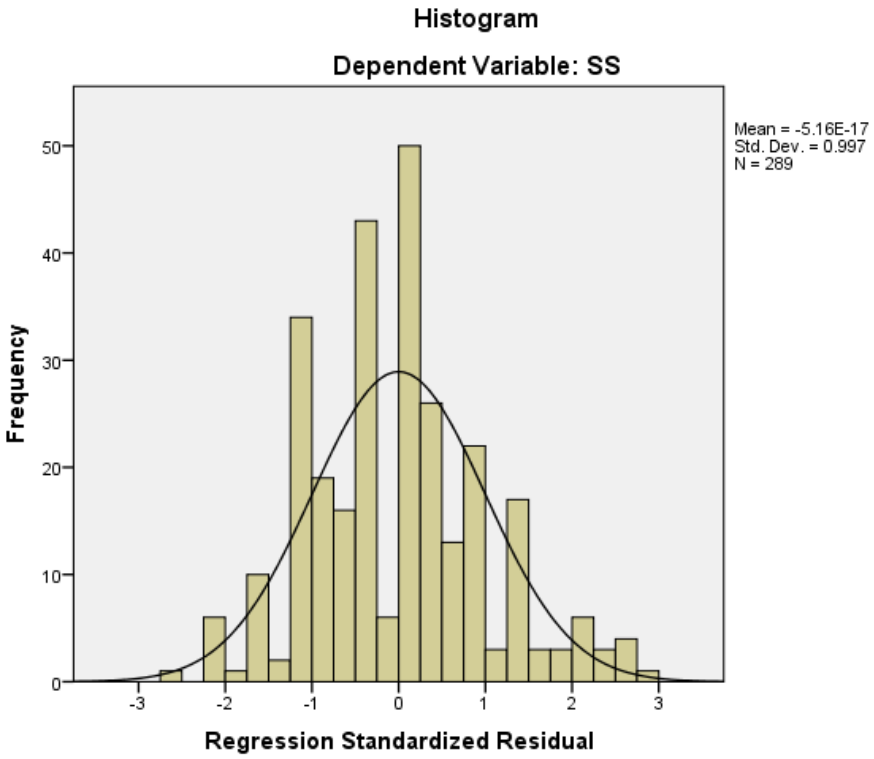
Coefficientsa						
Model		Unstandardized Coefficient		Standardi	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.064	0.167		12.385	0
	Satisfaction	0.192	0.033	0.333	5.805	0
	Educational Service Subjective Evaluation	-0.13	0.028	-0.271	-4.719	0
a Dependent Variable:Social Sustainability						



Social Sustainability on Satisfaction & Objective Evaluation of Knowledge

ANOVAa						
Model		Sum of Squares	df	Mean Squ	F	Sig.
1	Regression	24.614	2	12.307	40.641	.000b
	Residual	86.608	286	0.303		
	Total	111.221	288			
a Dependent Variable: Social Sustainability						
b Predictors: (Constant), Knowledge After Visit, staisfaction						

Coefficientsa						
Model		Unstandardized Coefficient		Standardi	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.303	0.157		8.292	0
	Satisfaction	0.272	0.03	0.471	9.011	0
	Knowledge After Visit	0.008	0.027	0.015	0.279	0.781
a Dependent Variable:Social Sustainability						


Histogram
Dependent Variable: SS
Mean = -5.16E-17
Std. Dev. = 0.997
N = 289
Frequency
50
40
30
20
10
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual